

# Electric Railway Journal

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## BAD LIGHTING OF STREETS

Adequate lighting of streets is a proper municipal obligation which is disregarded by many cities at the cost of lives and limbs of citizens. Particularly in the largest cities, where the noise of vehicular and street railway traffic creates confusion at the busy twilight and early night hours, the municipal governments have a duty to meet in the provision of brilliant lighting, and they should not avoid it or leave it to private or semi-private organizations. Strong police regulations for the control of traffic and their systematic enforcement would do much to supply the confidence needed by pedestrians who have to steer their way across crowded streets, but they cannot take the place of good lighting. Furthermore, the quality of thorough protection of crossings which traffic squads should establish has not yet been attained in most cities, and it will require years to develop in the smaller cities the public respect for regulations on this subject which is necessary. All that the electric railways can do to induce their cities to improve street lighting will be well-directed effort in the public service of eliminating conditions that lead to accident.

## WANTED, MORE A. E. R. A. MEMBERS

Is there any reason why an electric railway company or an electric railway man should not be a member of the American Electric Railway Association? We have never heard a good reason for staying outside the association, but there are a dozen good, compelling reasons for going into it. Besides the specific reasons, there are many of a general character, one of these being the steady growth of the association and the equally steady growth of its useful activities. Seventy per cent of the electric railway mileage of the country is now comprised in the company membership, but only a little more than 35 per cent of the operating companies are within the fold. The average mileage of member companies is 88, while the

average for non-members is only 22 miles. Consideration of these figures suggests that some of the smaller railways are not good bargain hunters, for a road paying only from \$15 to \$75 annual dues gets exactly the same benefits that are enjoyed by a system whose membership costs \$600. That there is strength in union is a national motto that applies as well to railways as to states. The ELECTRIC RAILWAY JOURNAL believes that every traction company not now a member of the American Electric Railway Association should ponder this motto in its application to the duty owing to itself and to the industry at large, consider the work that the association is doing for the welfare of all and the modest outlay required to co-operate in this work, and then decide whether an association membership, besides being in a sense an obligation, is not a good investment as well.

## ONE OBJECTION TO OPEN STORAGE

The economy of open or closed car storage yards probably has been discussed as much as any other problem in electric railway practice. Many theories have been advanced which tend to show the disadvantages of one as compared with the other. Even in localities where the climatic conditions are most disadvantageous to open storage that plan is followed by some companies because they believe that it presents economical possibilities. Recently a prominent engineer, who has had wide experience in handling rolling stock under different conditions, advanced a theory on the deterioration of paints which, if correct, may have some bearing on the question. It had been observed that on a certain road with single-end equipment the rear end required a new coat of paint long before it was necessary on the front end. The difference manifestly could not be due to weather conditions alone, because the entire car exterior was exposed. Paint deterioration was most noticeable during periods when there was considerable moisture in the air or heavy deposits of dew. Further investigation showed that on early trips the cars left the storage yard with a coating of moisture from the dew, and then in passing over the dry streets suction caused a heavy deposit of dust at the rear end. This led to the conclusion that open storage was a fundamental factor in the consequent deterioration because the dust deposit contained quantities of acid, ammonia and alkali, all of which, as is well known, are very detrimental to paint skin in the presence of moisture.

## THE MENACE OF THE SKYSCRAPER

Elsewhere in this issue there is published an extract from a speech made by George McAneny, president of the borough of Manhattan, New York, at the dinner of the New York Chapter of the American Institute of Architects in New York, on Feb. 21. Mr. McAneny said that he pro-

posed to recommend the naming of a commission to inquire into the advisability of regulating the height of buildings in New York. His remarks are of particular interest because he has had considerable to do with laying out the proposed rapid transit routes in that city. He says that in laying out these routes "we have kept the correct principles of city planning constantly in mind and have laid down routes selected by the city and for the city's reasons and not by the operating companies alone, interested as they naturally are in the continuation of the richer short hauls and the concentration of traffic upon those lines that pay best from a commercial railroading point of view." The peculiar formation of Manhattan Island and the very great prices which land fetches in New York have worked naturally to the development of the skyscraper, but the railroads do not relish its development to anything like the extent that Mr. McAneny would have us believe. The concentration of these buildings in one locality brings operating problems that are almost unsurmountable and imposes on the management conditions which are seldom, if ever, offset by any accruing advantage. The skyscraper and the handling of the crowd which it disgorges at practically fixed hours is a condition which must be met by the operating companies, while the short haul, which Mr. McAneny assumes to be the concomitant of the skyscraper, is a theory. Who that is familiar with Cleveland and Detroit would assume that the local railways benefit by the congested store and office section at the Public Square in the former city and on lower Woodward Avenue in the latter? Surely both the cities and companies in these cases would benefit if the offices and stores were thinned out and spread along the Euclid and Woodward Avenue lines respectively. The best interests of the city are generally the best interests of its railways, and the day is probably not far distant when Seattle and Nashville—we think it is—will lament their present boast that the tallest buildings in the Far West and in the South respectively are to be found in these cities.

#### NEGOTIATIONS FOR CONSOLIDATION IN CHICAGO

Negotiations between representatives of the Chicago companies and the city authorities concerning the proposed consolidation of elevated and surface properties have reached the point where some consideration is being given to the details of a new ordinance. The intention is that the relations between the companies and the city shall be governed by a new franchise ordinance instead of by the 1907 ordinances, which affect only the surface companies, and by the existing contracts with the elevated lines. This will permit uniform treatment of questions which were not settled satisfactorily in the existing measures or in such a way as to promote consolidated operation.

The 1907 ordinances have been in effect long enough to demonstrate features of incompleteness which can be corrected in a new measure. For some time during the pending negotiations it has been argued generally that a plan for amortization of some of the capitalization of the surface railways should be included in a new ordinance. The reason for this course was made plainer by the statement of Bion J. Arnold last week. Mr. Arnold said that practically 25 per cent of the outstanding capitalization of the present

railways represented intangible values and that the absence of a provision for decapitalizing these values was the great weakness in the 1907 ordinances. He recommended that the earnings above the allowed returns to the companies on their investments be used to amortize the excess value. After the retirement of intangible values the earnings, if desired, could be applied to the reduction of capitalization.

In the Chicago case it is proposed, in effect, to accept an agreed cost of property, to allow a definite rate of return thereon, and to apply earnings above that sum toward reduction of the amount of the investment as it will stand on the books. Whether the earnings remaining after a provision for the return on the investment are applied to the actual retirement of capital obligations or are used for additions and betterments to the property is immaterial as far as the principle is concerned; the final result of the one policy would be to reduce the capitalization to a figure representing the value of the tangible property and the result of the other policy would be to increase the investment in the property to a figure representing the value of the outstanding capitalization. Thus eventually, in either case, if the policy was continued the required length of time, capitalization and tangible value would be the same.

An arrangement for amortization of this character would mean a valuation with determination of the relative proportion of tangible and intangible values. But if that is made with the express understanding that the object of the determination of intangible values is to work out detailed plans whereby these values may be amortized, the interests of the companies would be protected. The amortization of intangible values over a long period of years, if the capital costs of the properties have been fixed by proper methods of accounting, is a fair way to reduce capitalization because the community should give reasonable protection to the owners of outstanding securities on the property.

Another suggestion made by Mr. Arnold is based on the inadequacy of the provisions of the 1907 ordinances relating to the operating expense charges for upkeep. He suggested that the present allowance of at least 6 per cent of gross receipts for maintenance and repairs and of 8 per cent for renewals and depreciation could be handled more easily if they were combined and that the fund for both purposes should be increased to 16 or 18 per cent. Under the 1907 ordinances it has been necessary to decide what expenditures should be charged to each fund. This requires decisions that must be made arbitrarily at times and involve apparent inconsistencies. Since the object obtained is not so much an arbitrary distinction between maintenance and renewal expenditures as it is the upkeep of the property, the combination of the funds would allow the companies to use money for either object according to the necessities of the moment. If the upkeep of the property from earnings is assured, it is not important whether that is done through a maintenance or a renewal account. The proper solution of these questions will be an important factor in the permanent protection of the capital value of the properties and in the success of their combined operation under a new ordinance.

### EDUCATING THE OFFICE EMPLOYEE

So much is said and written nowadays about the value of publicity that it may be of interest to point out one instance where it has been successfully applied in a somewhat neglected direction, namely, educational publicity for the employee. Two years ago the mechanical department of the Brooklyn Rapid Transit System instituted annual meetings of its officials and office employees. The purpose of these meetings is to review the work done during the past year, to make comparisons with preceding years, to consider the work ahead and to discuss how methods and costs may be still further improved. This is the great get-together meeting of the year, when the *esprit de corps* of the department is revitalized by personal intercourse. It is entirely distinct from the conferences which are held from week to week by the foremen and assistant foremen to discuss pending problems. Furthermore, the office forces are kept in touch with the current work of the department by means of bulletins and circular letters. The annual meeting, however, offers the opportunity of summarizing the year's activities and of explaining to the rank and file the purposes and tendencies of the management. The scope of this information will be appreciated best by noting some of the data which were circulated at the last meeting.

First of all, the announcement was made that the work of the department had been laid out so as to permit as far as possible the employment of a uniform force throughout the year, thus assuring the continued services of good men who otherwise would leave the service because of the ebb and flood conditions which obtain in most railway maintenance shops. Again, the consistency of the management in desiring to have an accurate yet clear and easily prepared system of records was emphasized by the announcement that typewriting machines and desks were to be provided for all shops. Explanation was made of a new system of promulgating instructions which is to consist of a book of rules in addition to such instructions as are issued from time to time on specific topics. The instructions were to be serially numbered and classified according to subject so that the men would be able to familiarize themselves readily with standard practices. The improvements which past betterments in management policies and mechanical practices have brought about were demonstrated in tangible form by a table of car-mile maintenance costs for the fiscal years from 1903 onward and by figures showing parallel reductions in the number of car defects. The tables were accompanied by an analysis to enable the men to appreciate the causes for variations, such as the fact that certain extraordinary improvements were charged to maintenance instead of capital account. Even such points as the policy of specializing each shop for a certain line of maintenance and the consequent elimination of certain shops entirely were explained at length. The new tools bought or under order for the several shops were also named.

It is doubtful whether any other electric railway in the country has taken its office employees so fully into its confidence as has been done in the case cited, but the results have justified this departure. Few occurrences are more humiliating to an intelligent man than to be told by

an outsider about some important change in his own organization. The appetite for news is one of the oldest and strongest passions of the human race, and those who cater to its just gratification are likely to reap an abundant crop of good will and that obedience which comes from knowing the reasons for rules and instructions.

### PROLONGING THE MECHANICAL LIFE OF TIES

Very little if anything is being done by interurban railways to prolong the mechanical life of treated ties, although a few street railways in the larger communities have taken the precaution of using tie plates and screw spikes in the best types of track construction in paved streets. Preservation of mechanical life is of vital importance to obtain the full benefits possible with treated timber. The effects of side sheer and spike renewals must receive careful consideration. Tests to date show that red oak treated with 10 lb. of creosote per cubic foot will give twenty years of service, so far as physical life is concerned. It cannot be expected that rail and connections under heavy traffic will be fit for main-line service for this length of time, and they must be renewed. Neither can anyone expect the spikes to withstand the lateral thrust for anything like this period. This latter condition, as well as rail renewals, will require the replacement of the spikes several times during twenty years. Each renewal or resetting of a spike necessitates its location at a different point on the tie face, and in time it will be impossible for the trackman to keep from driving it in an old hole. The tendency to destroy the wood fiber as well as the shearing action of the rail will destroy a tie's usefulness long before the maximum physical life is obtained.

The best way to reduce to a minimum this mechanical destruction is by employing a tie plate of sufficient dimensions to distribute the maximum load considerably within the safety limits of the wood-fiber bearing value. In addition to this a spike which may be removed and replaced without making a new hole in the tie should be used. It is not sufficient to use tie plates to obtain the longest service; the bearing on the tie must be uniform over the whole surface of the plate. Hewn ties should receive more attention in this particular than sawn ties, and accurate adzing is required on the bearing surface of each tie to produce the maximum result. Sawn ties not only give a true bearing surface but have been found to take preservative treatment better than hewn ties. This may be attributed to the cross-cut fibers in the longitudinal surfaces, which permit a more uniform distribution of the preservatives.

As a final argument of the case in hand we wish to call attention to the bulletin on this subject issued by the Forest Service Department of the United States Department of Agriculture. The subject of prolonging the life of treated timber is discussed in detail, but a concrete example from a cost standpoint emphasizes its importance more than anything else. For instance, it is considered that four years is the average life to be obtained from an untreated red-oak tie which costs 45 cents and twenty years from a creosoted tie of the same timber which costs 82 cents. After these prices are added to the cost of placement and to the

cost of tie plates and interest, it is found that the annual track charge for an untreated tie is 24 cents and that for a treated tie is 9.8 cents. The net result to be gained in this particular instance is obvious, but consider the result when proper precautions have not been taken to produce a maximum mechanical life. Eliminate tie plates from both treated and untreated ties, and the effect of side shear is more than five times as great on the one as the other, and after shearing starts it gains impetus. A casual observation of the ties in any section of track will show that signs of side shear develop after but a few years in service, and one may readily draw conclusions as to the probable depth of this shearing action at the end of fifteen or twenty years.

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#### HOW NOT TO DO IT

We have heard much and we are going to hear more of the importance of bringing about an era of good feeling—based upon a good understanding—between utility companies and the public, and of the best means of accomplishing this aim. The most recent, but by no means the only, indication of how large this subject looms in the minds of railway and electrical men was the joint meeting of the public policy committees of the American Electric Railway Association and the National Electric Light Association, to which reference was made in last week's issue of the *ELECTRIC RAILWAY JOURNAL*.

That good feeling between utility companies and the public can be brought about and maintained on no other foundation than confidence in the honesty, fairness and efficiency of these companies is plain to all. Frequently injustice is done to the public service corporation even when it is not at fault; frequently the sins of the fathers are visited upon descendants who are not only free from blame but who are making every effort to redeem the faults and mistakes of the past. But how can this condition be cured and public confidence gained if fresh cause is given for legitimate complaint and new texts are provided for the anti-corporation sermons of reasonable as well as unreasonable critics?

These observations are suggested by an incident which took place this week in the District of Columbia. Last summer Congress authorized the rehabilitation of a motor bus line to run from the northern section of the city, via Sixteenth Street, to Pennsylvania Avenue and Fifteenth Street. This law requires the coach company, beginning Feb. 24, to give free transfers to the cars of the Capital Traction Company and the Washington Railway & Electric Company. It requires these two railways to honor such transfers and to issue free transfers from their cars to the coaches. A day or two before this coach service (which is operated through streets not served by the railways) was to begin, and while the public was congratulating itself upon the starting of a well-equipped bus line with the advantage of free transfers to the car lines, the traction companies announced that they would not comply with the law, basing their refusal upon the ground that it is unconstitutional. The temper of the public under these conditions is not improved by the publication of a three-year-old letter from one of the companies, refusing to enter into the transfer arrangement later made obligatory by Congress, for

the reason that the proposal did not commend itself on grounds of either "profit or policy."

This may be so, and, further, the law may be unconstitutional, but in popular estimation it is the law until it is wiped off the statute books by the courts. Naturally the Washington public wants to know why the law should not be executed for the benefit of the public, instead of suspended at the demand of the railways, until the courts decide upon its constitutionality. If after a year or two of delay the courts declare the law to be one that it was within the powers of Congress to enact the public has no redress for the deprivation it has suffered. On the other hand, if the railway companies complied with the law and it was later invalidated, they would lose no more than the cost of carrying a few transfer passengers. And against this loss there would be the profit of having obeyed the law.

Back of the companies' refusal to carry out the provision of the coach transfer law is, of course, the fear that it may be construed as establishing a precedent that would menace adequate revenue for the railways. But this does not appease, it only further irritates the public, who can hardly be expected to consent cheerfully to deprivation of a granted privilege because it might be the forerunner of further benefits.

Be it remembered that we are discussing this case as an exhibit of how not to be popular, and with the conviction that electric railways must get more money for their service and give fewer transfers. But this conviction should not blind us to the fact that refusal to obey, until it is adjudicated, a law which confers privileges valued by the public and not in themselves burdensome upon the railways is not a good way to set about securing justice and good will from public opinion.

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#### A NEW ENGLAND POWER NETWORK

It is only within very recent years that the power transmission network has made its way into New England practice. It started its career of usefulness, like many other improvements in transmission matters, on the Pacific Coast, where engineers got used quite early to covering considerable distances and developing powers smaller than would suffice for doing a good business as independent generating stations. Now, however, there are several sizable networks in New England, and of the latest of these we publish a description this week. It is the plant which supplies the Waterbury-New Britain territory and some neighboring towns along its lines. Like all proper networks, it is based on water power but carries steam power for such use as may be necessary in addition. The main plant which serves as a basis for the development is the hydroelectric plant at Bulls Bridge on the Housatonic River. This is equipped with 6000 kw capacity in six units. The generating potential is unusually low, only 1150 volts. A small portion of the energy from this plant is delivered, raised to 6600 volts, for transmission to some neighboring points, while the main body of the output is transformed to 33,000 volts for reaching over to Waterbury and New Britain.

The transmission line is a little out of the ordinary, first in that it is of stranded aluminum cable, which, generally speaking, has found very small use in the United States,

and, second, because the transmission system consists of independent pole lines each carrying one circuit. The poles themselves are of chestnut with wooden cross-arms. It seems to us rather likely that this simple construction will be less subject to complete interruptions than the more customary arrangement of putting both circuits on a single steel tower line. Steel construction is an excellent thing, yet it is rather an open question whether it is worth sacrificing the independence of separate lines for the sake of getting both lines on one steel tower. At Waterbury, on the Naugatuck River, is the steam station, with some 7000 kw capacity in turbo-generators. This capacity is sufficient to handle the whole load now on the system, but ordinarily is used merely as an auxiliary to the hydroelectric plant. The Waterbury generators feed into busbars which are connected by their step-up transformers to the 33,000-volt transmission system. Thence the circuits run on to New Britain. This part of the transmission line is also of aluminum, but both circuits are on a single pole line, the independent constructions not having been carried beyond Waterbury. At New Britain the system is tied through suitable transformers to the transmission plant at the Hartford Electric Light Company.

The transformers in the Hartford plant which operate the New Britain connection receive two-phase current from the Hartford turbo-generators and deliver it as three-phase to New Britain, or the operation can be reversed, if for any reason power should be sent through from the New Britain end. Hartford, as our readers will remember, has besides its big steam plant two hydroelectric transmissions from the Farmington River. The whole system, which stretches out branches in various directions, consists therefore of five stations, two steam and three hydraulic, working together for mutual service, although the Hartford plant is quite distinct from the Waterbury-New Britain plant, except as the two are tied together as a matter of convenience. The very fact that this interconnection has been made, however, adds materially to the usefulness of both systems. It is not in the least necessary that plants should be solemnly merged in order that they may gain most of the material advantages of union. A working agreement for the interchange of power is, so far as the public is concerned, just as valuable as joint ownership and is often to be preferred.

#### IMPROVEMENTS ON BOSTON ELEVATED SYSTEM

Elsewhere in this issue is printed an account of some of the latest developments of the Boston Elevated Railway Company's system subsequent to the completion of the Cambridge subway about a year ago. It would be difficult to cite an example of more rapid progress toward the completion of a comprehensive scheme of urban transit than has been made within the past few years by the Boston company or one that better exemplifies the advantages of unified control and administration in the carrying forward of so great a development. The general characteristics of the Boston system have been maintained throughout the entire period from the opening of the original elevated service in 1901 to the present hour. They are presumably familiar to many of our readers and need not be elaborated

here; but in passing over the earlier history of the Boston rapid transit system it is worth noting that every addition to it has been a new and valuable transportation agency from the public point of view, and that in no single instance have the improvements effected been placed in service at the cost of impoverishing the transportation interests of the community as a whole or by virtue of excessive economies in the service formerly given in local districts. Each new rapid transit line has added free transfer points where it has been articulated with the rest of the system and has from its opening day of service shortened the time of transit between the heart of the city and the outlying districts to an extent little less than revolutionary. Probably no other system in the world gives the possessor of a nickel so large an opportunity to enjoy a varied journey over interconnecting lines of such diversified character, often without even the effort of asking for a free transfer check. Express service on the rapid transit lines and local distributing or collecting service on the closely related surface routes form the key to the Boston problem, and while it may be that the passenger receives almost an unreasonable amount of service for a single fare, there is no question that the facilities reviewed in the article have stimulated traffic and are appreciated by every thinking resident of the New England metropolis.

The Boston management has been quick to learn the lessons taught by experience in developing such a system and handling its daily traffic, and the improvements described show that no amateur hands are in command of the program. Thus, at the Sullivan Square terminal, the principles of handling a complex transfer situation by the adoption of separate loading and unloading platforms, the installation of loop facilities for articulated surface car service, the use of escalators to relieve platform congestion and the separation of inward from outward passenger streams mark an improved station design; at the Green and Dover Street elevated stations increased capacity is the dominant feature of the designs outlined, and, perhaps most notable of all, the consideration given to safety of operation in the design of the East Cambridge elevated extension for surface cars, in its superb track and roadbed construction and signal and interlocking drawbridge equipment, will arouse the interest of every reader who has ever borne operating responsibilities. The extension of the Cambridge subway to the Stadium station, a loop-track and single-platform installation used only a few days each year but capable of handling some 35,000 passengers per hour, deserves mention, as does the moderate power demand of the system in view of its magnitude, together with the design of a new division building on a site where space was highly restricted but exceedingly valuable from the transportation standpoint. These features are all part of the progress of a system no longer distinctly local in its characteristic problems. They are but a part of the larger development of the company's program, but, like other improvements already described in this journal, they are all of individual interest. The topography of Boston has nothing of the commonplace in it, and the transportation development of the larger community is not likely to lack interest as it proceeds, if the treatment of the problems of expansion continues along the present progressive lines.

# Recent Improvements on the Boston Elevated System

A Description of Further Extensions of the Rapid Transit Lines at Boston Since the Completion of the Cambridge Subway, Including Improvements at the Sullivan Square Terminal and Characteristics of the East Cambridge Viaduct

Continuous expansion of the transportation facilities of the Boston Elevated Railway Company furnishes the engineering visitor to the New England metropolis with a never-failing object of interested study. The variety of service rendered and the facility of traffic interchange between surface, elevated and subway lines, the comprehensive development of the system according to a broad and definite program and the rising standards of service rendered the public are some of the external signs of a steady progress which has made the last twelve years the most notable in Boston transportation since the use of electric motive power superseded the horse on the local surface lines a quarter of a century ago. From the opening of the original elevated lines in 1901 to the inauguration of service in the Cambridge subway in 1912, the more important changes and improvements on the Boston system during the period have been described fully in this journal, and the general characteristics of the company's lines and service need not be reiterated in this and a following article which will review some of the latest developments on the system in relation to the existing conditions of service and operation.

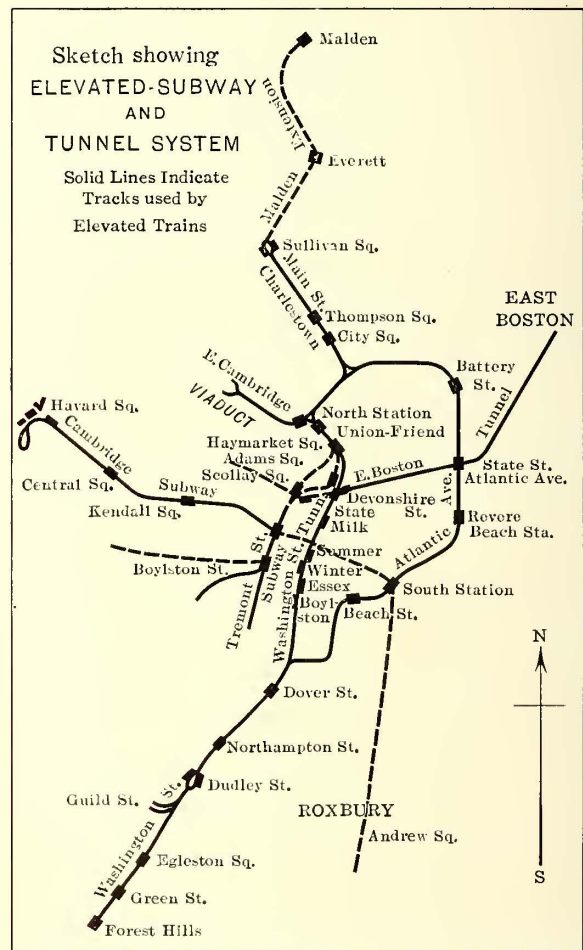
### EARLY EXTENSIONS

The accompanying map shows the principal rapid transit lines of the company, including those under construction or authorized by the Legislature for early building. Elevated trains are operated between Sullivan Square and Forest Hills via the Washington Street tunnel in each direction, and between Sullivan Square and Dudley Street via Atlantic Avenue, and an extension of the elevated structure is in prospect in the near future between Sullivan Square, Everett and Malden. The Tremont Street subway, its branches and the East Boston tunnel are operated by surface cars, and an extension of the latter into the West End of Boston for a distance of about 0.5 mile is now under construction. A subway for train service was opened between Park Street, Boston, and Harvard Square, Cambridge, in March, 1912. On June 1, 1912, an elevated extension for surface cars was opened to traffic between the North Station, Boston, and Lechmere Square, East Cambridge. In addition to the extension of the East Boston tunnel previously mentioned, there are now under construction a subway from the Charlesgate district of the outer Back Bay eastward under Boylston Street to Park Street, and an extension of the Boston connection of the Cambridge subway from Park Street to the South Station, under Winter and Summer Streets. The latter subway is to be extended without delay to Andrew Square, Dorchester. These new subways will furnish rapid transit across town and greatly improve the handling of traffic between the heart of the city and suburban points at present unprovided with the quickest service to and from the business center. The Boylston Street subway will be traversed by surface cars, while the extension of the Cambridge subway connection to the South Station and Andrew Square will, according to present plans, be utilized by multiple-unit trains.

### BENEFITS OF THE RAPID-TRANSIT ROUTES

As previous articles have pointed out, these rapid-transit lines are all operated upon the scheme of providing express service with few stops between the heart of the city and distributing stations from 3 miles to 5 miles distant, the utmost facility for free transfer being allowed at the latter points between high-speed trains or cars and rolling stock provid-

ing service of a more local character to and from the outlying suburbs. Between all the intermediate stations of the rapid-transit lines a local service is also furnished by surface cars giving and receiving transfers issued in connection with the high-speed equipment operated overhead or underground. A tabulation of the average saving in time per passenger between the terminal points of certain rapid-transit routes is given below, and it will be noted that



Boston Improvements—Map of Principal Lines

the combined saving for the few runs taken exceeds an hour.

### SAVING IN TIME PER PASSENGER ON RAPID TRANSIT LINES

Character of Route	Between	Miles	Saving in Minutes
Elevated and tunnel	Dudley Street-Sullivan Square.....	4¾	26½
Elevated	Forest Hills-Dudley Street.....	2½	8
Subway	Harvard Square-Park Street.....	3¼	15
Tunnel (East Boston)	Court Street-Maverick Square.....	1¼	24½
Elevated-Viaduct	North Station-Lechmere Square....	1½	6

In general, it may safely be said that every passenger entering and leaving the city of Boston's business district by a rapid-transit line saves roughly half an hour as a result of these developments, provided he begins his journey 3 miles from his destination. The Boston suburban area extends to a circumference of at least 10 to 15 miles' radius from the City Hall, depending upon local conditions. The population of the entire district, or Greater Boston, metropolitan area, is about 1,500,000, and the average number

of rides per capita per annum is now about 206. The present system of the company covers about 472 miles of track used by surface cars and 35 miles used by trains, or 507 miles of total track as of June 30, 1912. During the fiscal year ended on this date the company carried 310,310,009 revenue passengers, operated its cars 54,790,173 revenue miles and made 6,073,706 round trips. The revenue car hours were 5,091,005 and the total revenue from car operation was \$15,527,825. The total investment in the system, including expenditures for additional facilities now under construction, and upon which fixed charges must be paid, is about \$120,000,000.

By the construction of the original elevated system in 1901 between Dudley Street and Sullivan Square, half a million people were in effect brought 2 miles nearer downtown Boston, and the two largest steam railroad stations in the city, the North and South terminals, were connected

at Faneuil Hall Market Square, and the entire tunnel, with staggered station platforms, close proximity to the street surface and short length of about 1 mile, became for the public convenience an elongated terminal under the busiest section of the most crowded thoroughfare in New England. In November, 1909, the Forest Hills elevated extension was opened for traffic, and improvements were made at the Dudley Street station, which enabled the capacity of the latter to be raised to 1640 cars per hour, the Forest Hills terminal station accommodating 1140 cars per hour. The opening of the Cambridge subway in March, 1912, provided a striking improvement in transit facilities on the west of Boston proper and substantially transferred the entire central portion of Cambridge between Harvard Square and the Charles River Basin to the heart of the greater city.

The opening of the East Cambridge extension on June 1, 1912, relieved some of the most narrow and congested



Boston Improvements—Train Shed at Sullivan Square Terminal; Passages to Southbound Train Platform at Right; Bridge at Rear

by a direct line and brought within seven minutes of one another, compared with a previous running time of about twelve minutes on the surface under the most favorable daytime conditions. The opening of the East Boston tunnel at the end of 1904 immediately eliminated a journey, including a surface car and ferry boat transfer, requiring thirty minutes, and a district populated by 80,000 people was changed from the least to the most accessible ward of Boston. The inauguration of service in the Washington Street tunnel in November, 1908, not only effected the savings in time previously outlined but enabled the capacity of the elevated system to be increased by 70 per cent through the provision of station platforms long enough to accommodate eight-car trains in place of the five-car limit imposed by the operation of trains through the Tremont Street subway. Connection with the Tremont Street subway was established for passenger interchange at Haymar-

streets in the community and provided a marked improvement in service between the suburban territory tributary to the Lechmere Square district and the business center of Boston. Residents of many parts of Somerville were thereby brought five minutes nearer the downtown area than could be done by the Sullivan Square and elevated train route, and in connection with the beginning of service on the extension important improvements were effected in the transfer facilities at the North Station between surface and subway cars and elevated trains operated to widely varying destinations.

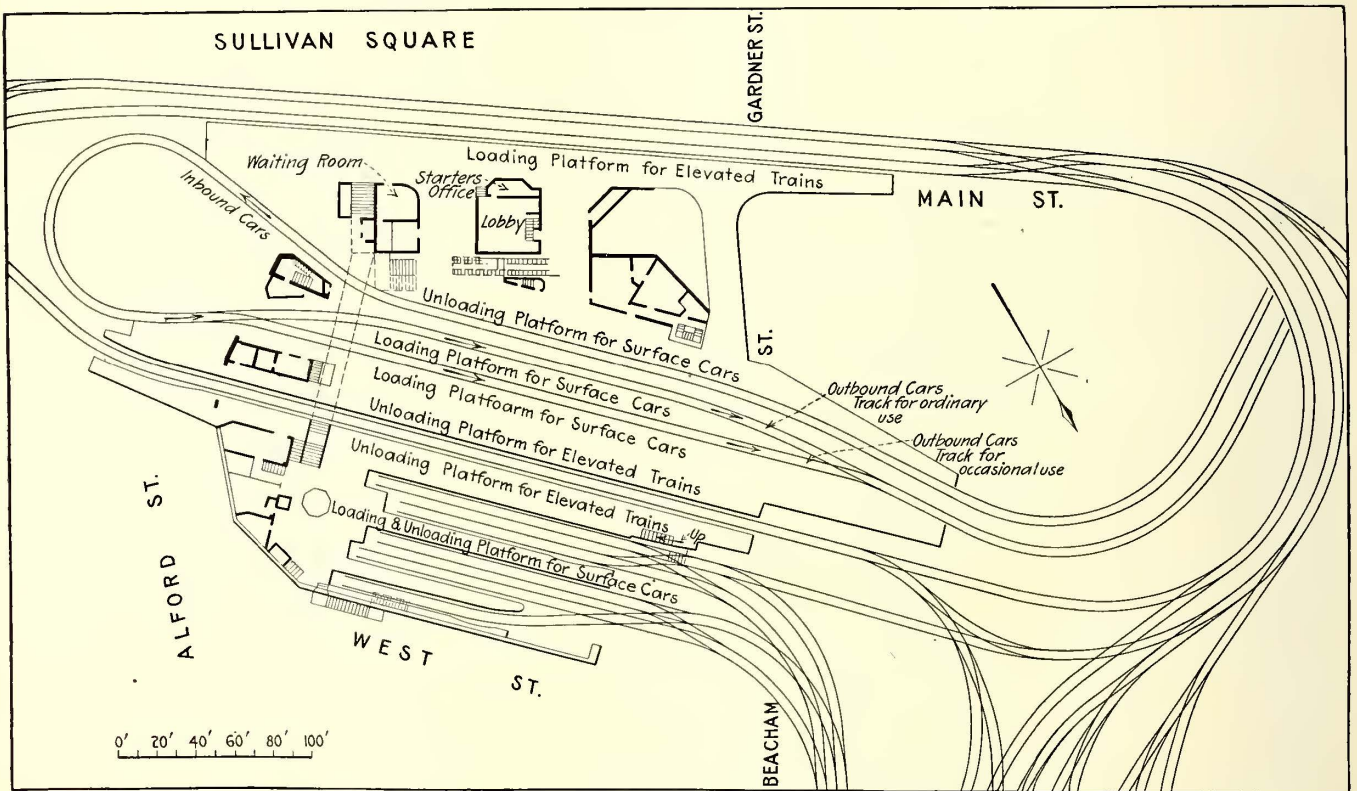
The Boylston Street subway, now under construction by the Boston Transit Commission, will relieve one of the most congested thoroughfares in the city and furnish greatly improved transit facilities between the suburban districts of Allston, Brighton, Brookline and parts of Newton, Watertown and Waltham and the business district. It is

estimated that a saving of about ten minutes in running time will be effected in each direction, compared with the present surface schedules, and in the rush hours the economy in running time will appear still more marked. The subway begins at an incline in Commonwealth Avenue near Charlesgate West, and after passing under an outlet of the Fenway watercourses continues under Newbury Street to Massachusetts Avenue, after which it runs diagonally into Boylston Street and thence follows a straight line eastward under the Back Bay, passing through Copley Square, and approaching Park Street via the Public Garden and Boston Common district, terminates, according to present plans, at Park Street, which is the most important traffic center on the system. The details of the Park Street terminus have not as yet been determined.

The extension of the Beacon Hill tunnel, or Boston connection of the Cambridge subway, to the South Station, now under construction, will at once effect a great reduction in the time required to reach the largest railroad terminal in Boston from the Cambridge and outlying districts, besides providing easier and quicker access from Back Bay

to six minutes, the present schedule of the surface cars being sixteen minutes. A station will be provided for the populous city of Everett at an intermediate point in the line. With the completion of this extension the company will have in operation eleven continuous miles of double-tracked elevated structure between Malden and Forest Hills, and the time of transit from terminus to terminus will be about thirty-five minutes, compared with about one hour and twenty minutes by surface cars under the most favorable conditions.

The extension of the East Boston tunnel to an outlet in the West End in the neighborhood of Hancock Street will provide additional facilities for one of the most densely populated districts of the city of Boston, and will connect the Bowdoin Square region with the north and south rapid transit service. At present the traffic capacity of the East Boston tunnel is considerably limited by the use of a stub-end terminal at Court Street, sixty cars per hour being the maximum. The completion of the extension, which will be about 1/2 mile in length westward from Scollay Square, will furnish an outlet permitting a much greater freedom



Boston Improvements—Plan of Track Layout at the Sullivan Square Station

points through transfer facilities at Park Street. At present the South Station can be reached for a single fare by a roundabout route from Park Street, involving a surface transfer at Bolyston Street, or by a circuitous trip through the Tremont Street subway and over the Atlantic Avenue elevated lines. The time required to make this journey is little, if any, shorter than that imposed by a direct walk between the two stations, but with the opening of the subway extension the South Station will be brought within three minutes of Park Street and within eleven minutes of Harvard Square, Cambridge. Similarly, a notable reduction in running time will be effected by the further extension of the subway from the South Station to Andrew Square for residents of South Boston and Dorchester, at present largely dependent upon surface line routes in entering and leaving the business center.

The Malden extension of the elevated lines from Sullivan Square will be 3 miles long and will reduce the running time between Malden Square and Sullivan Square

of car movement in the tunnel and will enable the company to establish a through service, if it considers it expedient, between East Boston and Cambridge.

The improvement in rapid transit facilities in recent years has resulted in a reduction in the one-way running time to the figures given in the following table, which shows the schedules and distances involved between various outlying rapid transit terminals and the business center of the city. The interstation time and distance are also given for the elevated train service between the North and South steam railroad terminals.

RUNNING TIMES ONE WAY ON PRINCIPAL RAPID TRANSIT RADII			
Between	Miles.	Minutes	M.P.H. Schedule Speed
Forest Hills-Summer Street.....	4.8	15½	18.6
Dudley Street-Summer Street.....	2.26	7½	18.1
Dudley Street-South Station.....	2.95	7	22.1
North Station-South Station.....	1.75	8	15
Maverick Square-Court Street.....	1.42	5½	15.5
Harvard Square-Park Street.....	3.25	8	24.4
Sullivan Square-South Station.....	3.08	11	16.8
Sullivan Square-Milk Street.....	2.31	9	15.4
Lechmere Square-Scollay Square.....	1.06	6	10.6



## IMPROVEMENTS AT SULLIVAN SQUARE

The improvements at the Sullivan Square elevated station were outlined in the *ELECTRIC RAILWAY JOURNAL* of Dec. 18, 1909, page 1218, and were placed in service in August, 1912. In brief, the station was rearranged to provide for the separation of inward and outward traffic; new platform facilities were put into use, and the installation as a whole was altered to be in readiness to handle the train service on the future extension to Everett and Malden. The surface cars, formerly berthed on the west side of the train shed on stub tracks, are now operated around a loop with complete separation of their unloading and loading functions, and the incoming and outgoing trains make separate stops for unloading and loading at platforms connected chiefly by an overhead bridge. On the east side of the train shed the surface car service remains substantially as before, but temporary arrangements have been made to permit the loading of elevated trains on the main arrival track from surface cars on the east side of the train shed, prior to the opening of rapid transit service to and from Malden. The interurban car service on the lower level of the station has also been much increased. The accompanying plan of the station shows the final arrangements adopted, which include the relocation of the train starter's office to the west or loading train platform and which provide for a substantial increase in the space available for the public on the western platform areas of the building. The elevated tracks are arranged to permit looping trains through the station or continuing them to Malden upon the com-



**Boston Improvements—East Cambridge Viaduct Extension from Drawtender's Tower**

pletion of the extension to that city, and as stated before, the conditions have been much improved on the public platforms by the establishment of service in and out of Boston via the East Cambridge viaduct.

The southbound train platform at Sullivan Square affords the most extensive accommodations for passengers of all those on the system. It is 350 ft. long and about 12 ft. wide at its extreme northern end, the width increasing to a maximum of nearly 60 ft. on the southern end. Three passageways from 15 ft. to 30 ft. in width connect the train side with the portion devoted to surface car unloading, and in addition a stairway 10 ft. wide connects with the bridge utilized by passengers on the east side of the main train shed. Eight-car trains can easily be loaded at this platform, and it is equipped with a waiting room, news stand and other public conveniences. On account of the frequency of the train service it was unnecessary to provide more than nominal waiting room facilities. The platform is connected with the surface or street level below by two ascending type Otis escalators operated at a speed of 80 ft. per minute and having a capacity of 4500 passengers per hour each. The escalators are of the step type, with treads 16 in. deep and 24 in. wide, the vertical rise of each escalator being 21 ft. 9 in. and the length of the incline 43 ft. 6 in. Each escalator is driven through gearing by a

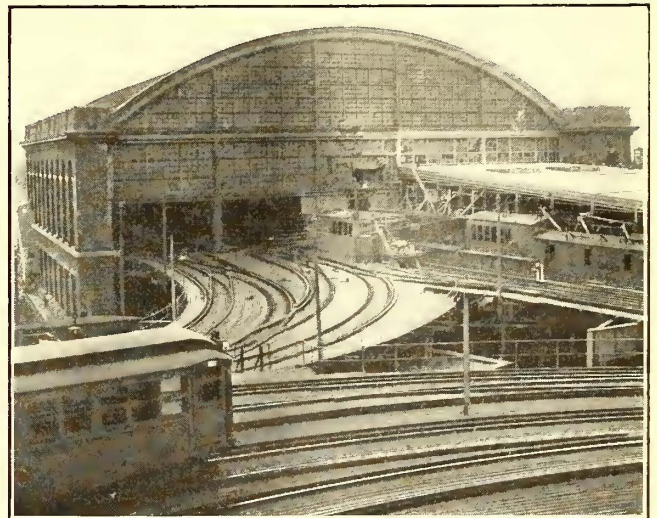
15-hp, 550-volt d.c. motor located in a concrete chamber off a mezzanine floor under the trainmen's lobby, shown in the plan already mentioned, behind the starter's office. These moving stairways are operated continuously during the hours of train and car service. By furnishing a quick means of ascent from the discharging surface cars which enter the terminal on the street level, they do away with



**Boston Improvements—Southbound Train Platform, Sullivan Square Terminal**

traffic congestion on the loading and unloading areas served by the latter cars.

The west train platform is overlooked by a starter's office 8 ft. wide and 25 ft. long, raised about 6 ft. above the platform level and equipped with large bay windows commanding an unobstructed view of all approaching trains. The starter's office is furnished with one Bell and two company private telephones, two receiving and sending telegraph sets connected with the dispatching offices, towers and other important operating centers, a track model 6 ft. long of the elevated lines entering and leaving the station,



**Boston Improvements—Extension of West Surface Car Platform at Sullivan Square to Handle Additional Traffic**

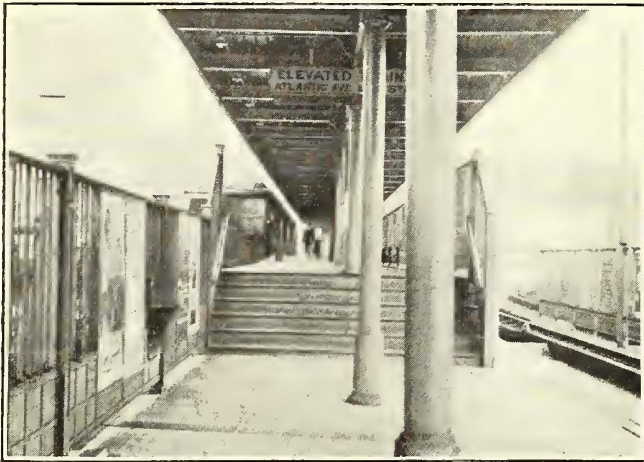
with 3-cp. 10-volt, 5.8-watt miniature lamps located in the positions corresponding to the automatic block signals outside the terminal for a distance of about  $1\frac{1}{4}$  miles on the approaching side of the elevated structure, and a number of switches and keys controlling the operation of platform destination signs, train gongs and bells, and miniature lamps indicating the elevated train route displayed in the

terminal over the arrival track in the center of the train shed. The latter indicator is operated manually from an interlocking tower which controls the switch and signal positions on the surface car approach tracks and it is illuminated by ten 8-cp, 55-volt lamps. The route signs set up from the starter's office are controlled by electromagnets

at the railing. A locker room for trainmen is provided under the westerly platform. At Sullivan Square an emergency lighting connection is made with the local central station service, so that the platforms will not be thrown into darkness in case of an interruption of the regular railway service.

EAST CAMBRIDGE VIADUCT, TRACK AND DRAWBRIDGE

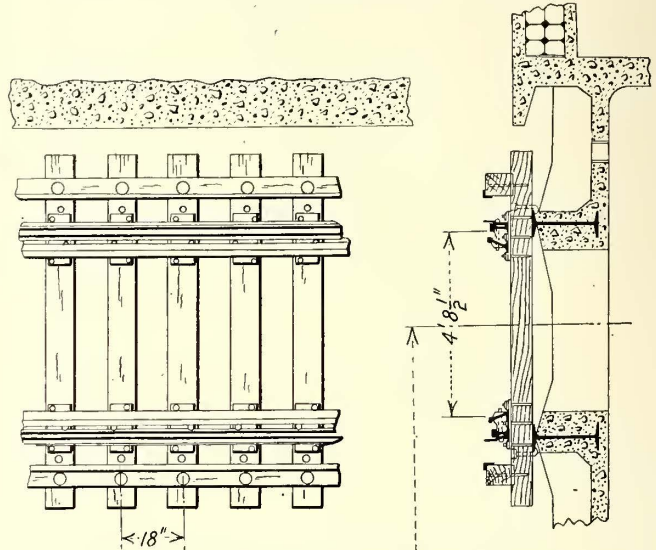
The East Cambridge extension illustrates the latest practice of the company in the block signaling of surface cars and in track and roadbed construction for viaduct service. Furthermore, it is a striking contribution to the bridge architecture of Boston. The most conspicuous feature of the extension is a reinforced concrete viaduct about 1700 ft.



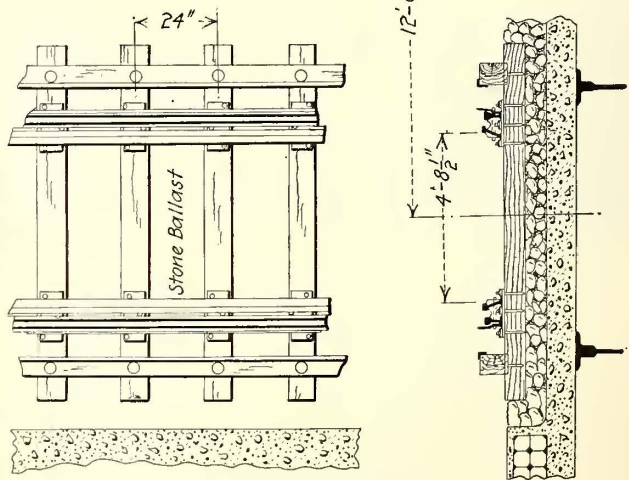
Boston Improvements—Shuttle Train Platform for Short Connection Between Atlantic Avenue Trains and Viaduct Car Platform

governed by switch positions set by the train starter on duty at the bay window.

The main train shed is lighted by about thirty 660-watt inclosed-arc lamps of the direct-current type, hung about 21 ft. above the platforms. The latter were extended on the west side of the station to a total length of about 365 ft., and the space now available permits fourteen surface cars to be loaded on this side of the building at any one time. The platform extensions are illuminated under an additional roof, shown in the engraving on page 361, by 16-cp incandescent lamps placed in rows about 14 ft. apart, the

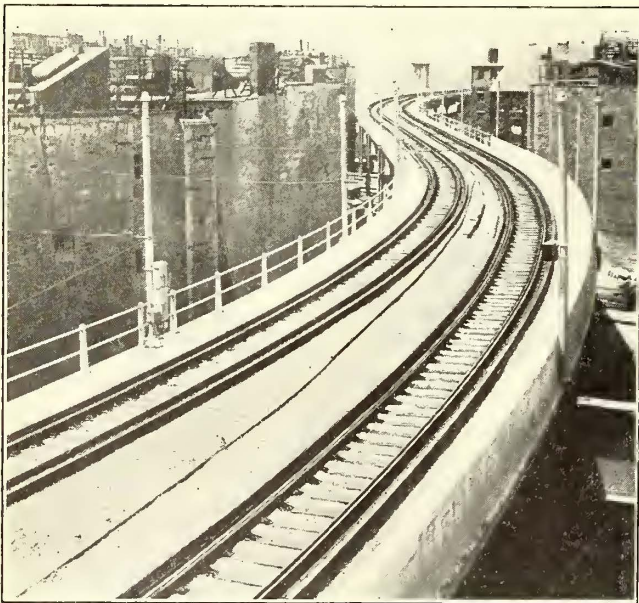


Half Plan and Section on Charles River Bridge



Half Plan and Section on Elevated Structure

Boston Improvements—Typical Cross-Sections on East Cambridge Extension



Boston Improvements—Elevated Section of East Cambridge Extension

lamps being about 6 ft. apart longitudinally and about 14 ft. above the floor. The bridge connecting the east platform with the west train platform crosses the train shed at its southerly end at a height of 15 ft. above the floor. It is 11 ft. wide and is provided with illumination by ten 16-cp lamps carried 9 ft. above the floor and mounted on standards

long located on the down-stream side of the Charles River dam and provided with a two-leaf bascule drawbridge of the Strauss trunnion type. The viaduct is one of the most imposing street railway bridges in the world. The total cost of the extension, which consists of an elevated section running westward from the North Station and approaching the viaduct proper after a turn to the north from Causeway Street, besides the viaduct itself, was about \$3,500,000. This viaduct has eight spans and is built with a clear open space beneath from end to end, so that future longitudinal use of the under area may be had if desired. The general design of the bridge was the work of Peabody & Stearns, of Boston, architects for the Boston Elevated Railway Company. The design was evolved from a long and careful study which included various materials of construction and

different span lengths. On account of the established location of the lock of the Charles River dam, the draw had to be placed eccentrically in the bridge. An ordinary steel elevated structure would have been the most direct and

floor is of the open type, as shown in the accompanying drawing, while a ballasted floor is used on the elevated railway section approach to the viaduct.

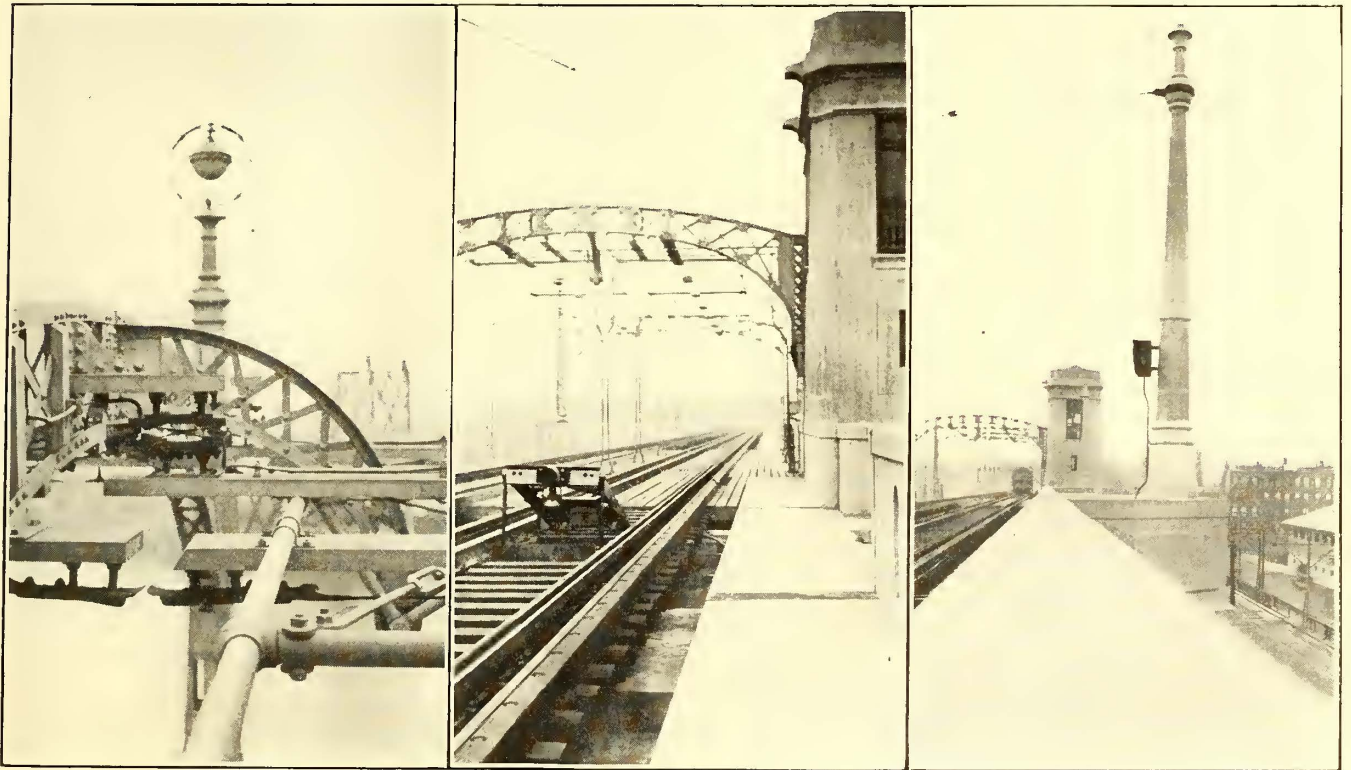
Following the decision to use an open floor on the viaduct,



Boston Improvements—General View of Viaduct on the East Cambridge Extension

economical method of providing for the clear passageway below, but the inferiority of the appearance of such a construction necessitated its being ruled out. The original design for the floor was a solid reinforced concrete slab carrying ballast. This was abandoned mainly for the reason

the possibility of using reinforced concrete stringers to carry the ties was considered but was not adopted. It was thought that it would be difficult, if not impracticable, to get the tops of these members sufficiently true to line and grade to secure uniformity of cross ties, and the easy re-



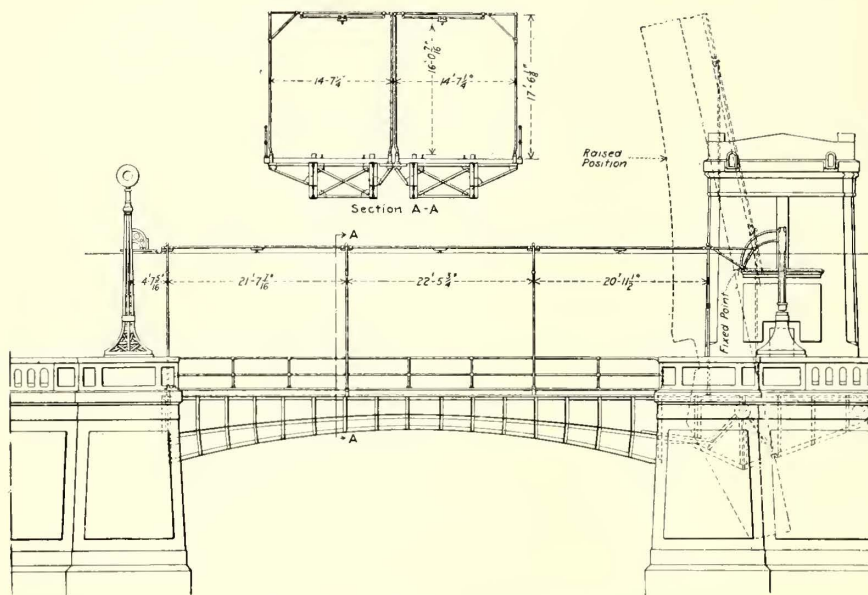
Boston Improvements—Installations on the East Cambridge Extension, Showing Feeder Tap Contact at Draw, Motor-Operated Track Bumper and Block Signal Approaching Draw

that it would have been troublesome to free it from snow, although incidentally the saving in weight by using the type of open floor adopted was of great advantage in reducing the load upon the foundations. On the bridge proper the

newal and attachment of ties would have presented grave difficulties. In the construction adopted, in which steel I-beam stringers were embedded in concrete, a standard elevated railway floor system was made possible. The

foundations are of concrete carried on 5790 wooden piles. The bridge is 31 ft. wide between piers. On account of the failure in the Boston district of concrete exposed to salt water it was decided to face the piers with granite from a grade 2 ft. below mean low water to a point 5 ft. above the finished roadway on the dam. Above this finished grade the superstructure is of reinforced concrete made of

in a vertical position, the reinforcement being attached to the iron pole itself. Wooden suspension braces are used on the catenary section. The messenger cables are of 5/16-in. steel and stranded. At each span a 1/2-in. cross-suspension steel cable is used. The trolley is suspended about 18 ft. above the rail with both types of construction. On the ordinary overhead trolley section of the extension



**Boston Improvements—Pantograph Mechanism on Draw Span of the Charles River Bridge**

crushed Chelmsford granite and granite dust. The elevated structure on the extension is carried over Prison Point Street, the tracks being supported by four plate girders of 72-ft. 8-in. span and 6 ft. depth, the outsides being provided with balustrades formed of lattice girders incased in concrete.

On the elevated structure section of the extension the track is laid upon 6 1/2-in. x 8-in. x 8-in. treated yellow pine ties placed 24 in. apart on centers in stone ballast, the ballast extending from the top of the tie to the top of a concrete floor 6 in. below the bottom of the tie. The flooring is 8 in. thick and on one side surrounds a cable conduit the top of which is placed 3 in. below a footwalk for track maintainers and other employees. On the bridge or open section the ties are bolted to 20-in. longitudinal I-beams 4 ft. wide, the openings between floor beams varying from 12 ft. to 14 ft. The cable conduit is carried under a walk at the side, a clearance of about 6 in. being allowed between the walk and the tie end. On the open section the ties are spaced 18 in. apart on centers.

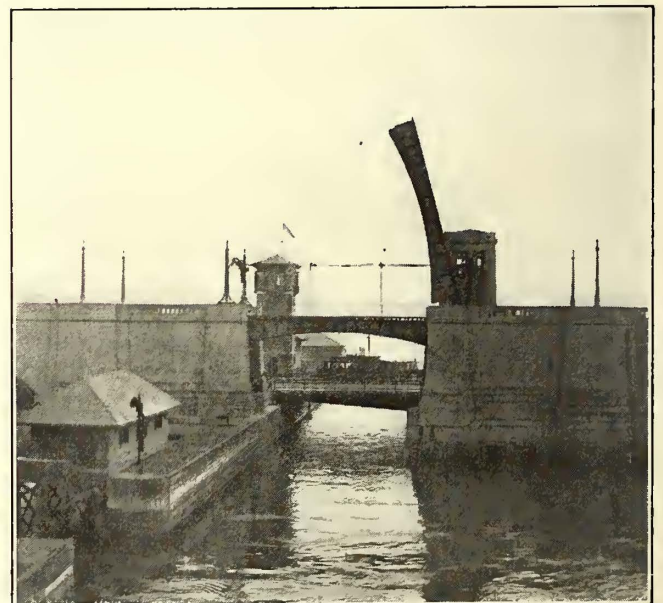
The extension is built for double-track service, and the track consists of 33-ft., 85-lb. A. S. C. E. rails laid in Duquesne joints and fastened to the ties with screw spikes. Inside guards are provided throughout the entire structure, these being in each case composed of a 57 1/2-lb. Z-bar inclined toward the service rail at an angle of about 60 deg. On the outside of each rail head a wheelguard weighing 47 lb. per yard is installed and about 6 in. from the guard a 6-in. x 8-in. timber with a 3/4-in. x 2 1/2-in. x 2-in. angle on the inside edge is bolted to the ties as shown in the track cross-sections. An elevation of 3 in. is provided for outer rails on curves. The service rails are bonded at each joint by two 300,000-circ. mil copper bonds.

Two No. 00 B. & S. trolley wires are used, one over the center of each track. A section of about 1000 ft., including the bascule approaches, is of catenary construction, the standard span being about 150 ft. Reinforced concrete trolley poles are used on the bridge, these being about 20 ft. long. They comprise in each instance a standard iron pole incased in concrete sheathing. The trolley poles were cast

the span between successive cross suspensions is about 50 ft. Where the draw occurs the trolley wires are supported by a pantograph which folds up with the draw and is designed to keep the trolley taut at all times. The pantograph is composed of 2-in. extra heavy wrought-iron pipe framing with malleable-iron swiveled ball fittings and cross bracing of 3/4-in. diagonal wrought-iron rods fitted with sleeve nuts to permit adjustment of tension. The trolley pans are attached to wrought-iron bases carried by the framing, and the latter is supported by pipe columns hinged at top and bottom and arranged to fold toward the deck of the bascule leaf as the latter is raised. The feeder tap contact at the end of the draw to supply power to the draw sections of trolley wire consists of a pair of semi-elliptical copper contacts carried on phosphor-bronze springs supported on slate bases, the latter being supported by bolts on 3-in. maple strips which are attached res-

pectively to the fixed and movable portions of the draw structure. A view of this device is shown in a halftone view on page 363, and the main features of the draw pantograph are shown in an accompanying drawing.

The draw proper is of steel construction and is 75 ft. in over-all length. It is raised and lowered by two Westing-



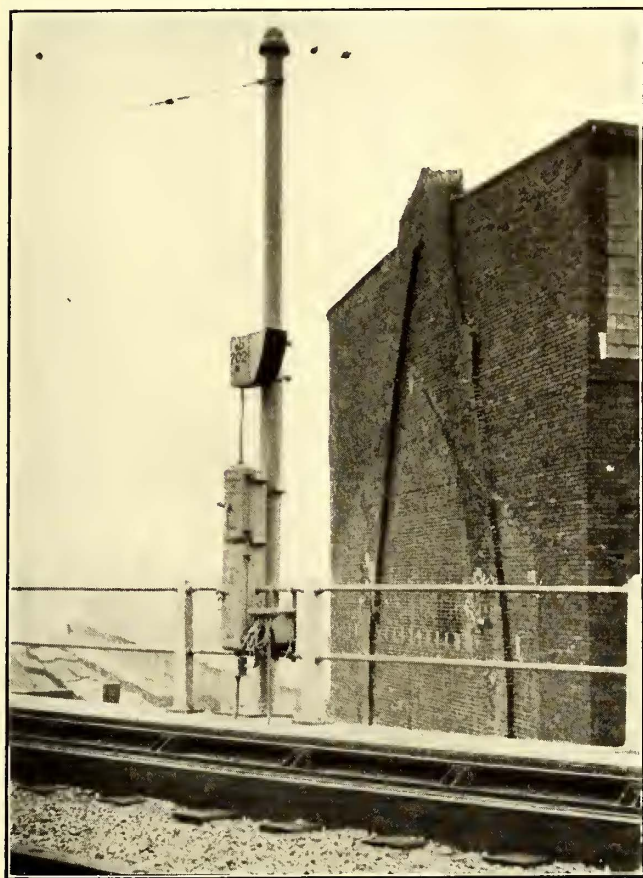
**Boston Improvements—Draw Open on Outbound Track, East Cambridge Extension**

house 40-hp, 550-volt, d.c. motors located, with gearing, brakes and rheostats, in the lower portion of a three-story drawtender's cabin of reinforced concrete situated at the side of the viaduct. The draw is equipped with an underhung or pivoted counterweight weighing 110 tons and is provided with a lock operated by a 3-hp, 550-volt, d.c. motor located under the roadbed on a covered platform and con-

necting with the lock shaft by a worm gearing. The bascule leaves may be raised separately or together, and while both 40-hp motors are ordinarily operated in raising the draw but one is necessary for the work.

A special feature of the draw, which was described in the *ELECTRIC RAILWAY JOURNAL* of Sept. 21, 1912, page 461, is a motor-operated bumper located in the center of the approach to the opening on each side and about 30 ft. from the bascule. Each bumper consists of a riveted steel frame pivoted to two castings bolted to the ties. Normally the top of the frame is a little below the top of the rail, but before the draw is raised a 3-hp motor raises the bumper in the track, completely blocking the passage of the car, the frame forming an angle of about 20 deg. against traffic. About ten seconds are required to raise or lower the bumpers.

The control of the draw movements and of the locks, bumpers and signals governing the approach of cars is



Boston Improvements—Typical Block Signal, East Cambridge Extension

centered in an operating room in the drawtender's tower, where a three-panel switchboard is mounted parallel to the tracks, so that a clear view can be had in each direction. The lock, signals and main motors are all interlocked to prevent any possible accident. In the cycle of opening and closing the draw all approach signals are set at danger by the operation of hand levers in an interlocking machine in the tower; the bumpers are then raised, the bridge leaves unlocked and the bascule opened. In closing, the reverse takes place. The interlocking is greatly facilitated by the use of contactors in the more important circuits. The bumper motors start on line voltage without the use of rheostats. Magnetic brakes are provided on the main draw motors, and in addition an emergency braking outfit is installed, with foot lever control in the operating room. Indicating lamps are provided to show the draw operator the exact status of all apparatus, and an automatic bell signal, which is continuously in circuit when the draw is open, is

in service. Emergency bell signals are also provided in boxes on the viaduct to enable the draw operator to call the attention of motormen in exceptional cases. The signals cannot be set free while the draw is raised. Between 6:15 and 9:10 a. m. and between 4:15 and 7:40 p. m. the draw cannot be opened on account of the rush-hour traffic then handled.

The draw was built by the Pennsylvania Steel Company, of Steelton, Pa., and the interlocking equipment was supplied by the Union Switch & Signal Company, of Swissvale, Pa. The entire operation of setting the danger signals, unlocking the draw, raising the bumpers and the draw itself occupies less than a minute. Electrically illuminated navigation signals are provided with control from the operating room, and the latter is connected with the Sullivan Square terminal station and with the locking room of the Charles River Basin by special telephone lines.

#### SIGNALS OF EAST CAMBRIDGE EXTENSION

The East Cambridge extension is provided with sixteen blocks of automatic signals controlled by track circuits and operated by alternating current. The signals are of the shielded lamp type, without semaphores, and utilize a single rail. Each signal consists of two bulls'-eyes, respectively green and red, surrounded by a narrow hood and mounted about 9 ft. above the rail on a trolley pole at the right of the track. Behind each bull's-eye are mounted two 8-cp, 55-volt incandescent lamps, the lenses being 5 in. in diameter in each case. The track circuits vary from 350 ft. to 800 ft. in length, and the relays, resistances and transformers used in connection with the several blocks are mounted at the side of the structure, the wiring being carried to and from the signal casings in pipe conduit. Energy for the operation of the signal system is supplied through the Kendall Square substation of the company, from which a 550-volt rubber-covered cable of from No. 4 to No. 0 section is run to the viaduct and thence along the elevated section to the North Station. Near the latter point, and beyond the Causeway Street entrance of the structure, two middle sidings are in service, and each of these is provided with a hand-operated electric bull's-eye signal, governing movements toward the main line and interlocked with the main-line signals outside. The signal circuits are run in the conduits at the side of the viaduct and elevated structure before mentioned. The power supply for the extension is independent of the surface and subway feeders in the vicinity. A 1,000,000-circ. mil feeder runs from the Lincoln power station to the draw and a 500,000-circ. mil feeder from the Kendall Square substation to the other side of the draw. There are no return cables in service on the extension. "Slow" signs equipped with five 4-cp lamps each are in service near the Causeway Street curve of the extension.

#### SECOND ARTICLE

A later article will describe the new transportation facilities at the North Station, the principal features of the new headquarters building of the Seventh surface lines division and of the new Stadium station, the present power demands of the Boston system and other improvements.

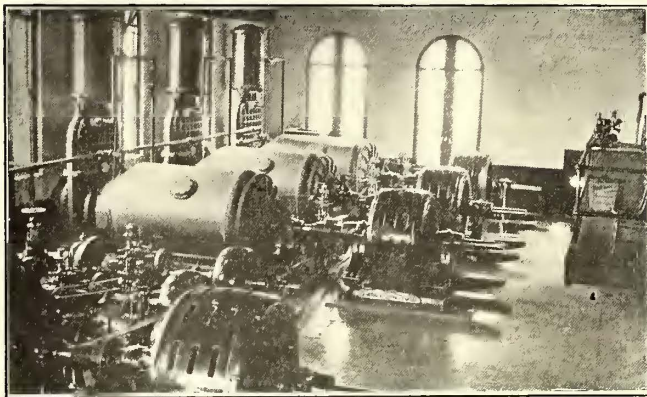
Sir E. White, a member of the London County Council, of which body he was chairman in 1911, said at a political meeting on Jan. 31 that the latest figures showed there was a falling off of tramways receipts of nearly £90,000. The loss on the workmen's cars was £85,000 a year. The tramways contributed an enormous sum to the tax funds of the district through which they passed, whereas the omnibuses contributed nothing. The actual cost which a tramcar had to bear in this way was £202 per annum, while the amount paid by the omnibus in the form of license and the petrol tax was only £50. Sir Edward expressed the opinion that it was a mistake for London to have been responsible municipally for the tramways. He would rather the tramways had been run by what they called the "trusts."

# A Modern Power Network—the Waterbury-New Britain System\*

A Description of the Waterbury-New Britain Power Generating and Transmission System—A Combination of Three Hydroelectric and Two Steam-Electric Plants with a Total Output of 26,200 Kw—Energy Is Transmitted at 11,000 Volts and 33,000 Volts to Be Converted at Substations for Use on Both A.-C. and D.-C. Circuits

BY CHARLES RUFUS HARTE, ASSISTANT ENGINEER NEW YORK, NEW HAVEN & HARTFORD RAILROAD

The present-day practice of supplying electrical energy for a large territory from a central station materially improves the efficiency of the service. On the other hand, the increased seriousness of a breakdown at the center leads the well-conducted system into extensive insurances. Spare capacity is installed to the extent of one or more main units; piping and wiring are so arranged that the service



Connecticut Power—Interior of Bulls Bridge Station

of any piece of apparatus can, in necessity, be taken up by the other machines of the same class, and, where practicable, connections are made with similar plants in adjoining territory. A system comprising all these methods of protection is that which supplies electrical energy to the Waterbury-New Britain district.

#### BULLS BRIDGE HYDROELECTRIC PLANT

The original plant is the hydroelectric development on the Housatonic River at Bulls Bridge, just above Gaylordsville. The head of a narrow gorge gives ideal conditions for the low-arched concrete dam, while a low swale to the westward provides a large flood passage controlled by flashboards on the crest of the concrete spillway. From the dam a canal skirts the hillside on the east side of the river for a distance of some 2 miles, ending in a large forebay.

From the forebay the water is led to the station by a steel penstock 13 ft. in diameter to the first turbine connection and decreasing thereafter at each turbine connection to 5 ft. diameter at the last, after which it turns up vertically as a standpipe, with its lip at the level of the main dam crest, this standpipe serving both to assist in governing and to relieve the penstock from shocks due to sudden closing down of the gates.

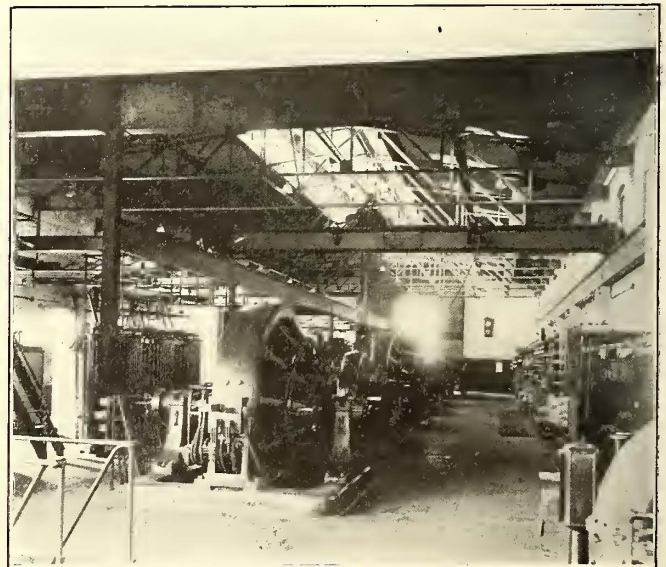
This concrete station contains six horizontal main units, the water end of each consisting of a balanced pair of runners controlled by a type B Lombard governor, direct-connected to a General Electric revolving-field, three-phase, sixty-cycle, 1150-volt generator of 1000 kw capacity, running at 400 r.p.m. Field current at 110 volts is furnished by two exciters driven by independent cone-flume turbines, one having in addition an induction motor for emergency use. In the fall, when the eels are migrating, these smaller turbines, although of nearly 200 hp each, are at times actu-

ally choked to a standstill by fragments of the eels chopped up by them.

A 60-in. gate valve with hydraulic operating cylinder on each supply tap permits cutting out any main unit without interference with the others, and the completion of contracts already let for an additional penstock and standpipe each 8 ft. in diameter, with valve connections to the present penstock and part of the turbines, will permit operation of at least part of the plant under almost any adverse circumstances, besides greatly assisting in the task of governing. Incidentally, the 96-in. butterfly valves in the connections are among the largest of this type ever built.

Facilities for overhauling the apparatus and for making repairs are given by a hand-operated crane which spans the building.

The current from the generators is led by cables in floor conduits to two sets of busbars with switches so arranged that either bus can have any combination of generators and transformers connected through it. From these busbars the current passes to be transformed to higher voltages. A part is raised to 6600 volts for transmission to the New England Lime Company's plant at Boardman's Bridge, and a little later this line, operating at 11,000 volts, will both serve the lime company and furnish current to the New Milford Electric Light Company. By far the larger proportion, however, is stepped up through six 850-kw single-phase water-cooled transformers to 33,000 volts, at which potential are operated the lines to Waterbury, 27 miles away, and to New Britain, 50 miles distant. As there are



Connecticut Power—Waterbury Substation

seven transformers, much leeway is given for emergencies and repairs.

#### TRANSMISSION LINE FROM BULLS BRIDGE

The transmission line consists of two three-wire circuits of stranded aluminum, those to Waterbury having conductors ½ in. in diameter, each circuit having its separate and independent pole line, except for thirteen poles in Wash-

\*Abstract of a paper read at a meeting of the Connecticut Society of Civil Engineers, New Haven, Conn., Feb. 12, 1913.

ington, where right-of-way troubles compel the use of one line of poles for both. The poles are chestnut, the majority being 35 ft. long, the wires forming an equilateral triangle 60 in. on a side where but one circuit is on a pole, the triangle being 48 in. with two circuits.

The insulators are designed for a working potential of 45,000 volts and are carried on an oil-treated oak pole top pin 3 in. square by 20 in. long, and by a 4-in. x 5-in. two-pin cross-arm. On angles the pole pin is replaced by a short two-pin arm set parallel to the general direction of the line. This arm is bolted against the pole without gaining and can rock a little to adjust itself to differences in pull in the adjacent spans. The Washington double-circuit poles have steel angle-iron arms and insulators 14 in. in diameter by 12 in., designed for 60,000 volts.

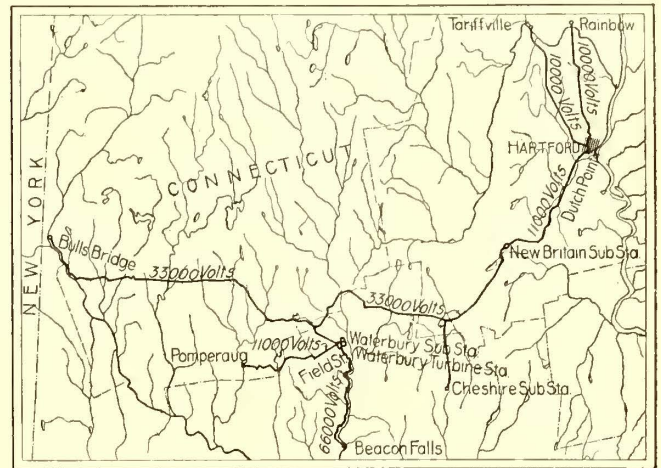
**WATERBURY STEAM PLANT**

At Waterbury a steam station containing two 1500-kw Westinghouse-Parsons, one 3000-kw General Electric-Curtis and one 4000-kw Allis-Chalmers-Parsons turbo-alternator, generating three-phase, sixty-cycle current at 2300 volts, is able to carry the load of the entire system, but normally takes only what the Bulls Bridge plant does not. The present turbine room has space for another unit when needed. The station is of brick, on concrete foundations, and its construction was notable chiefly for its speed, ground having been broken May 26, 1910, and the first unit started Dec. 18 of the same year. It is located on the Naugatuck River, which furnishes the condensing water, a low weir forming a suitable pool. The weir proper is of concrete, with a cut-off curtain of steel piling about 30 ft. deep.

On the easterly side of the station, about 150 ft. from the river, which is on the westerly side, is a well 12 ft. in inside diameter, with concrete walls 1 ft. thick, the lower 8 ft.

a sunken hopper, from which it goes, through crushers and screens, to a supply bin and then by traveling weigh hoppers to the Jones underfeed stokers.

The eight 500-hp Bigelow-Hornsby boilers are in groups of two on opposite sides of a firing alley and are equipped with Foster superheaters, while Sturtevant economizers behind the batteries utilize the last available heat of the



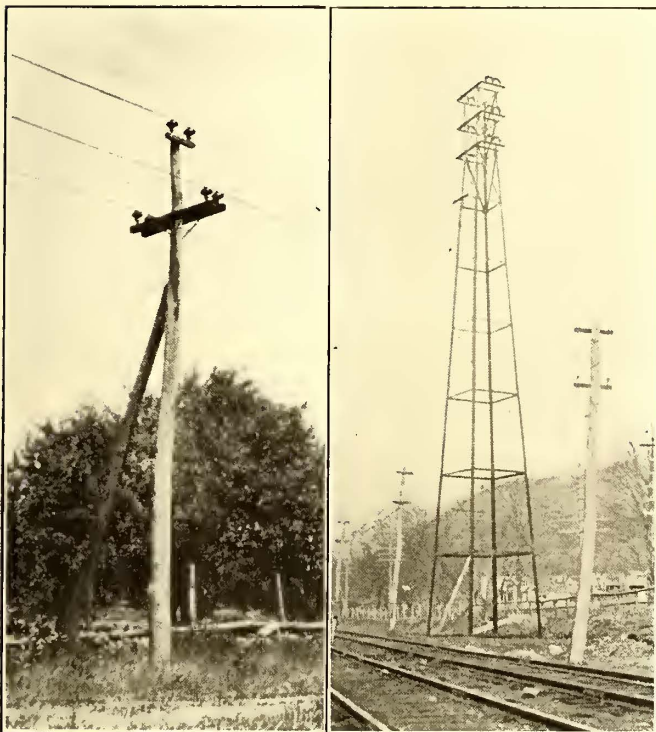
**Connecticut Power—Map of Territory Tied in from Bulls Bridge to Hartford via Waterbury and New Britain**

gases after they have left the boilers. Forced-draft fans in the basement, one driven by a Terry steam turbine, the other by an electric motor, and engine-driven induced-draft fans in a gallery overhead insure proper movement to and out of the short steel stacks. The boiler room basement, in addition to the forced-draft apparatus, has an industrial railway for removing the ashes and contains the feed-water pumps and the main steam and water systems. The feed-water system is connected with the city service and the well, the latter being for emergency use only.

The turbo-alternators are carried on high concrete foundations pierced by arched passages in which are set the Alberger condensers, the pumps being on the floor just outside. The cooling water is led in from the head of the pool by a long open channel with concrete walls, through a screen chamber, into the intake tunnel, which is about 4 ft. square. A similar parallel tunnel delivers the discharge to the pool at the dam. The small turbo-alternators run at a speed of 3660 r.p.m. and the two large ones at 1800 r.p.m. The turbines effect their own cooling through a fan wheel on the main shaft and a system of ducts leading out of doors. Field current is furnished by a pair of turbine-driven exciters, each of 100 kw capacity.

**TRANSMISSION LINE FROM WATERBURY PLANT**

The main units at the Waterbury plant feed into interconnected sets of 2300-volt busbars, which are connected through suitable air-cooled transformers to the 33,000-volt busbars. From the latter run two three-wire circuits of 3/8-in. diameter stranded aluminum wire to New Britain. For the first 2 1/2 miles they are on the Bulls Bridge-Waterbury line poles, after which they branch off on a single-pole line, with a triangle of 48 in. on a side. The main lines go through to New Britain, a branch leaving at Mildale to feed the Cheshire substation. Except at Waterville, where a single span of 570 ft. clears the Naugatuck River, the plant of the Waterville Corporation and the Naugatuck division of the New York, New Haven & Hartford Railroad, there are no special constructions on this line. The Waterville span, in No. 0000 stranded hard-drawn copper cable, has a sag of 14 ft. and is carried by Archbold-Brady anchor towers 90 ft. high on concrete foundations. At New Britain the lines connect with 33,000-volt busbars, from which a series of air-cooled transformers feed the 2300-volt



**Connecticut Power—Single Pole with Top Cross-Arm on Bulls Bridge 33,000-Volt Line, and 90-Ft. Steel Tower at Waterville on New Britain Line**

being pierced by a series of some 270 holes 3 in. in diameter. The lining has a steel cutting edge at the bottom. It was cast above the surface in sections 8 ft. long and was sunk by undermining the edge, which is at present 38 ft. below the surface.

Coal, in original cars, is delivered by the steam railroad to a private siding and is hauled by an electric motor to





## NEW ENGLAND STREET RAILWAY CLUB MEETING

The regular monthly meeting of the New England Street Railway Club was held at the American House, Boston, on Feb. 26, with President Thomas Lees in the chair, a total of 233 members and guests being present. The occasion was marked by the largest attendance in the history of the club except that at the annual banquets. Following the election of eight new members, the address of the evening was given by P. F. Sullivan, president Bay State Street Railway Company, Boston, Mass., his subject being "Scientific Management." Mr. Sullivan delivered an eloquent speech upon the importance of striving after increased efficiency in the larger fields of human progress, reviewing the development of modern civilization from the era of conquest to the present day and showing the necessity of co-operation among the forces working to carry the industrial world forward. He paid a high tribute to German methods of industrial, scientific and governmental administration and contrasted the inefficiencies of American national, state and municipal government with the former.

Turning more particularly to public utilities, Mr. Sullivan outlined the interrelation and mutual dependence of the public, capitalists and employees, sketching in bold strokes the need of a better understanding of the purposes and needs of each. Capital, he said, had been to blame for many of the misunderstandings which had borne fruit in labor troubles; it had voluntarily assumed many risks for which it had to bear the penalty, if there be one, and too often the interests of the employee had been overlooked. By recourse to the principle of collective bargaining, the employee had come to the front as a factor in affairs, and the future depended upon his education and upon the exercise of a spirit of fraternal interest and understanding by all parties. The education of foreign-born employees in the spirit of American institutions was a responsibility which the employer should no longer overlook.

Mr. Sullivan outlined the manner in which governmental inefficiencies and extravagance increased the cost of living, and he discussed the so-called vicious circle of wage increases to meet rising living expenses, followed by still further increases in the cost of daily life resulting from such additional wages. The lines forming the Bay State company's system paid in 1888 taxes amounting to 2.5 per cent of the gross income, and these could be compared with taxes of the present time which represented 6.4 per cent of the gross revenue. Had the same proportion been maintained, there would have been a saving last year of about \$355,000. He added that in no other part of the world was the voting power of capital so small as in the United States, and to neglect to educate the voter was to fail to realize the possible efficiency of the man behind the ballot as a factor in the right conduct of affairs. Capital had been short-sighted where it had failed to train the human machine and to conserve its powers with the same skill and interest that it had applied to machinery in general.

The speaker called attention to the fact that twenty-six street railways in Massachusetts earned or paid no dividends, according to the last returns of the Railroad Commission. The causes were named by some as hostile legislation, an unreasonable public and labor difficulties; but if these companies had paid no taxes and if their wage disbursements amounted to only half the present totals, they would still be unable to pay dividends. These particular roads were built under a statute in which capital had almost a controlling voice. Capital was not forced to build, and it had to take the consequences of having done so. There were onerous conditions facing the transportation companies, but unfavorable as they were, worse experiences lay ahead unless the employer and employee could be brought together. No other capital was so poorly paid, he said, as the \$200,000,000 invested in Massachusetts street railways.

Mr. Sullivan closed with an earnest plea for the harmonizing of labor and capital through the bringing about of a mutual understanding which will do away with the present threatened crisis in modern industry.

## DESSAU-BITTERFELD 60,000-VOLT CABLE

Some experiences with the high-tension underground cable installation of the Dessau-Bitterfeld single-phase section of the Prussian State Railroads, as described in the *ELECTRIC RAILWAY JOURNAL* for Nov. 25, 1911, are presented by L. Lichtenstein in the Jan. 2 issue of the *Elektrotechnische Zeitschrift*.

The energy is transmitted from the power plant to the substation at 66,000 volts, and for this purpose there are available not only the overhead line but two underground cable lines, one of the latter being built by the Siemens-Schuckert company and the other by the Felton-Guilleaume company. Each of these three lines is sufficient to transmit the whole energy so that two lines are always held in reserve. Operation was begun in April, 1912, and since that time energy has been transmitted alternately over the two cable lines for periods of a week each, while the overhead line has been held in reserve. The distance of transmission is 2.5 miles.

The Siemens-Schuckert conductor is an aluminum wire strand of 0.155 sq. in. cross-section. The dielectric consists of impregnated paper and has a thickness of 0.5 in. Around the paper insulation is a lead armor covered with a layer of jute with a coating of asphaltum and lime. The permissible current is 240 amp. For this current the increase in temperature, when stationary condition has been reached, is 25 deg. C. The cable can transmit continually 14,400 kva. The same heating conditions and the same voltage drop could have been obtained with cable using a copper conductor of 0.088 sq. in. cross-section. Aluminum was chosen in order to increase the diameter of the cross-section of the conductor for the purpose of decreasing the effective electric field intensity at the circumference of the conductor. This is with aluminum 4200 effective volts per millimeter, while with copper it would have been 4790 volts per millimeter. The difference is 14 per cent. Of course, when using the copper conductor it would have been possible to get the same value of the electric field intensity by increasing the thickness of the dielectric. If that had been done, the internal diameter of the lead armor would have been 42.9 mm instead of 39 mm. The cable was made in lengths of 2460 ft. Tests of the cable made in the cable works show the insulation resistances at 15 deg. C. to be 4800 megohms per mile, the resistance at 15 deg. C. to be 0.44 ohm per mile, and the capacity to be 0.704 microfarad per mile. From this it follows that the dielectric constant of the insulating material is 3.35.

Each cable was placed in a stoneware pipe filled with sand. After the cables had been laid underground the capacity was found to be 0.2728 mf per mile, the insulation resistance 8620 megohms per kilometer and the resistance 0.424 ohms per mile. From this value of the resistance it follows that the temperature of the cables in the ground is 4 deg. C. (39 deg. Fahr.). This is in good agreement also with the high insulation resistance of 13,792 megohms per mile (against 4800 in the test in the plant). After continuous use for a year and a half there was an accident to a high-tension transformer, and the use of the cable had to be discontinued temporarily. A fault was found in the transformer and in the cable. On this occasion the electric constants of the cable were re-determined and it was found that they had not changed at all in the year and a half they had been in operation and that the cable was otherwise in good condition. The fault must, therefore, have been due to external forces. This is also probable because the other cable developed a fault shortly afterward, while both have since operated satisfactorily.

# Central Electric Railway Association

An Account of the Proceedings at the Annual Meeting Held at Indianapolis, Ind., Feb. 27-28—Abstracts Are Presented of Papers and Reports on Car Equipment Maintenance, Fare Registration, Coupler Installation, Interline Freight, Central Electric Traffic Association, etc.—The Discussions, as Telegraphed, Are Also Included

## ECONOMIES IN MOTOR MAINTENANCE

BY J. C. THIRLWALL, RAILWAY AND TRACTION ENGINEERING DEPARTMENT, GENERAL ELECTRIC COMPANY

An efficient and regular inspection of motors is the prime factor of economical maintenance, yet a first-class system of inspection need not be expensive. Modern motors, equipped with auxiliary oil wells, should run under ordinary conditions at least 1500 miles between armature bearing oilings, which in ordinary city service would bring them into the shop only about twice a month, on heavy interurban service possibly once a week. The regular oiling of bearings is, of course, an essential, and in most cases the cars are in the shop when this is done. At such times it is a matter of but a few minutes' work for one man to remove the commutator cover, to wipe off the inside of the shell, the commutator and the brush-holder insulators with dry cheesecloth, to examine the brushes for wear or breakage and to make certain that the hammer spring tension is what it should be. The ordinary workmen should be able to make this inspection on four-motor equipments in average condition within a half hour. The cost per motor mile of such inspection is almost negligible, amounting to less than \$1 per motor per annum under the heaviest service.

### INSPECTION AND LUBRICATION

In the case of the non-interpole motors, without auxiliary oil wells, the charge will be larger, both because more frequent oilings are necessary and because more should be done to the motor itself at such periods. On account of their increased tendency toward heavy flash-overs, every precaution should be taken to reduce the number of such defects and to minimize their effects and severity. In nearly every case a flash-over is the direct result of heavy sparking or flashing between the commutator and brushes, or between the brushes and brush holder, caused by poor contact or poor commutation. This generates a gas which fills the air space between the commutator or the brush-holder and the nearest exposed portion of the shell or the bare commutator V-ring. Current carries across this gas-filled space, setting up an arc which may go across to the shell or to the V-ring, or from the positive to the negative brush holder. In either case it must go to some uninsulated part of lower potential in order to carry over sufficient current to do any damage.

It is impossible to prevent sparking under the brushes in the case of non-interpole motors, and especially where the commutators are not slotted, but it is possible to prevent this spark from developing into severe "flash-overs" by the complete insulation of all exposed parts on which an arc might find a ground. For all practical purposes such an insulation can be provided by repeated applications of insulating paint or varnish, using a small amount of gasoline for a dryer. This latter point is essential, as the paint must be dry before the car leaves the inspection pit. The paint should be applied to the entire inner surface of the shell that can be reached through the commutator and openings, top and bottom. I should advise at least fifty coats, applied consecutively at each inspection on classes of motors that have had flash-over records, and it is important that before applying each coat the surface shall be carefully wiped clean with a dry cloth, an especially thorough job being done where there are any traces of oil on the shell interior. This should be supplemented by the liberal use of shellac upon the commutator string band and V-ring

and upon the brush-holder bodies where they extend closest to the shell. Care must be taken, of course, to see that neither paint nor shellac gets upon the commutator or brushes, and in every case the inspector should finish by carefully wiping off both. The use of compressed air for blowing out the entire interior of the motor, after removing the bottom hand-hole plate, is also excellent practice, where the shop has facilities for such cleanings. Blowing should always precede all painting or shellacking and be the first step of the inspector's work. Inspectors should be provided with small spring balances to maintain uniform brush tension on all motors for particular service.

All this sounds like a lot of work, but as a matter of fact there are shops in which these points are being daily covered and where one man averages four motors per hour, the cost for labor and material together averaging approximately \$2.50 per annum per motor, making approximately 40,000 miles a year. I will illustrate the economy effected by this system of maintenance. The motors in question had been in service from eight to eleven years. They averaged, for at least two years, four flash-overs per motor per year, each of these flash-overs being serious enough to cause trouble reports to be turned in by motormen. Grounded and short-circuited armatures averaged two per year per motor. A fair annual cost figure for repairs was approximately \$50 per motor.

One year after the commencement of the methods I have mentioned the flash-overs had decreased by nearly 90 per cent. The number of armatures removed and sent to the armature room for repairs had decreased 70 per cent, and the repair bills for the entire year following showed a nearly proportional decrease, averaging only about \$20 per motor, including the cost of bearing renewals. In other words, an annual cost of \$30 per motor was saved by an increased expenditure on inspection of about \$1 per motor, a very good return on the investment. While other factors contributed toward this result, they were mainly refinements of existing methods. Thus in all of the older types of motors a large part of their defects, in particular grounding of coils or of brush holders and short-circuited commutators, is caused by oil from the bearings working along the shaft into the motor, where it is spattered over the entire interior and not only causes rapid deterioration of the coil insulation but facilitates the accumulation of brakeshoe and carbon dust on the brush-holder insulators, on the commutator string band and between commutator segments. To keep oil from the interior of the shell has been one of the most serious problems of the designing engineer, and great improvements in this respect have been made in motors produced during the past few years. On the older types the design is such that any great surplus of oil passing through the bearings above that actually required for proper lubrication is certain to enter the motor in greater or smaller quantities. To keep this to the least possible amount, it is essential that the minimum amount of oil consistent with the prevention of hot bearings should be carried in the wells. A shop foreman can make no better use of a portion of his time than in determining what this minimum shall be and in educating his oiler to the stage where he will use the specified amount at each oiling, no more and no less. The greatest care should be given to the commutator and bearing. Experience and common sense show that the work done and the heat produced at the commutator and armature bearing are much less than at the pinion end, and therefore less oil is required for

proper lubrication. In general, it is safe to say that this amount should be approximately three-fifths of that necessary for the pinion end. On motors with auxiliary wells, where the actual level can be measured, the oil level can be carried fully 1 in. lower. On the older types a specified amount must be periodically added, and measures holding the exact quantities determined by the foreman should be provided for the oiler to insure that he will apply the correct amount at each end. The motor inspector should closely watch signs of oil inside the motor and should call attention to the fact when he finds one in this condition. Any great number of motors so reported will be a fair indication that too much oil is being added to the bearings. The reduction of the amount used will not only decrease the lubrication bill but the cost of motor repairs as well, the latter to a very striking degree.

The prevention of hot bearings, or of damage caused by worn bearings, is by no means solely dependent on the amount of oil used. The fit of bearings, alignment of the motor and the proper meshing of gear and pinion are all points that enter into the problem. The proper preparation of the waste, where such is used, the grade of felt used in feeders, or the adjustment of the feed on oil cups, and their cleanliness are points that demand careful study and attention. The actual amount of oil required for proper lubrication of any bearing is almost infinitesimal, provided that the amount can be distributed over the entire surface of the bearing and that the bearing and shaft have no high spots.

Another point on which great economies are often possible is in the selection and care of the brushes. When many chipped or broken brushes are found it will pay to try other grades or different makes until the brush best suited to that particular service is found. In one instance, some two years ago, the brush bill for 100 two-motor cars operating in an Eastern city was reduced from \$4,000 a year to about \$400, a saving of 90 per cent, by changing from a brush that was giving very satisfactory results in all other motors on the system but which in this particular series of cars was averaging only about six weeks' life, because of breakage. This is probably an extreme case, but similar results even on a smaller scale are well worth seeking.

#### THE OVERHAULING SHOP

And now we come to the overhauling shop. No matter how efficient the inspection is made, it should be supplemented by removing the motors from the trucks, opening them up and placing all parts in the best possible operating condition at regular intervals, if the best results both in point of service and of costs are to be obtained. The factor which determines these intervals, or the time between such overhauls, should be the condition of the bearings. If conditions are such that armature clearance can be gaged at each inspection, it should be possible to catch all motors on which bearing wear is excessive before the armatures touch the pole pieces. If by reason of rough track conditions frequent breakage of babbitt occurs in the shells, a definite time limit should be set somewhat less than the average time that trouble-giving bearings have been running since they were installed. In other words, bearing troubles should be anticipated and the motors opened often enough to enable the shop force to maintain the bearings in the very best possible condition. When the motors are opened up for this purpose all parts should be thoroughly cleaned and reinsulated.

The experience of different companies shows that the armatures should be blown out very thoroughly with compressed air, preferably inside a suction box or at least at a considerable distance from the place where freshly painted or shellacked motor parts are placed. Following this blowing, the oil collars should be scraped free of all caked dust and carefully wiped off with dry waste. The string or tape band over the mica ring should be removed,

the mica ring and V-ring heavily shellacked and a new tape band installed, and this should be wide enough to overlap the V-ring about  $\frac{1}{8}$  in., thus insulating it from possible flashes. The tape band and adjacent upright section of the commutator should then have a thick coat of shellac or insulating paint. If this is done and if oil can be kept from the band thus prepared, it is certain that grounds at the end of commutators through the mica insulation can be absolutely eliminated, as a smooth, glazed surface impervious to moisture is presented, which can be wiped clean of dust with a dry cloth at each inspection.

The commutator slots should be cleaned out with a scraper or, preferably, a metal brush and all beading which might tend to short-circuit adjacent segments removed. If there are any flat spots, these should be turned off in a lathe. On all the older types the brush-holder insulators or yokes should be removed from the shell, and if they are not in perfect condition should be scrapped and replaced with new ones. If they are mechanically perfect, that is, neither cracked nor broken and the surface smooth, they should be cleaned off and receive a heavy coat of shellac or of insulating paint, and this should be allowed to dry hard before they are replaced. In fact, it is better to have some fully dried spares on hand, so as to allow the ones treated twenty-four hours in which to dry, using them again in the day following their removal.

The spacing of the brushes on the commutator should be measured to make certain that the number of commutator segments between brush centers agrees with the manufacturer's diagram. Any variation from the original design due to improper alignment of brush holders or shifting or warping of the yoke is certain to result in excessive sparking, with consequent rapid brush wear, overheating and tendency to flash-overs. The tension of each brush-holder spring should be tested with a spring balance and adjusted to the standard fixed upon.

Fields should be examined and if possible tested for short-circuits or baking. If not solidly clamped, shims should be inserted and the coils drawn solidly down upon pole pieces. Leads and terminals should be examined and placed in first-class condition, chafed insulation, loose terminals or broken stranding being the chief points to care for. The leads, fields, armature and the entire interior of the shell should all receive a heavy coat of insulating paint or varnish, and this should be done as early in the day as possible so that they shall have dried before being returned to service. Trouble is frequently caused by the neglect of this precaution, because painted surfaces before drying hard will pick up and retain brakeshoe dust or carbon dust very readily, thus nullifying the very purpose for which the paint is applied, namely, the thorough insulation of all parts.

The damage caused by hot armature bearings and the consequent stripping of coils upon the pole faces, and the damage to cores and to shafts, is so great that the greatest precautions to prevent them are distinctly measures of economy. Some points found helpful in this direction are to use nothing but new waste or feeders in the armature heads, renewing this material at each overhauling, thereby lessening the bad effects of sand or dirt which is certain to be found in greater or less quantities in second-hand waste or felts. With ordinary cleaning, however, these can usually be employed a second time in axle bearings or in the journal boxes. A press by which the surplus oil can be reclaimed from used waste or feeders can be made to save large sums in lubricants, and a settling tank into which live steam can be introduced is still better. The bearings should be carefully fitted to the shafts, which should be calipered, and if high or low spots exceeding 0.010 in. variation from the normal diameter are found the shaft should be trued up in a lathe. All bearings should be babbitted to a smaller inside diameter than the standard size of the shaft on which they are to be used and then

bored out in a lathe or boring mill, this bore to be from 0.010 in. to 0.015 in. larger than the size of shaft as calipered in the overhauling shop. This will automatically compensate for the wear of shafts in service. The boring of bearings out of center will disturb the magnetic balance of the motor and is a practice that should never be permitted. It should not be necessary in remounting the motors on the truck to force the suspension bolt holes in the shell and the suspension bar into line by prying on the shell with a pinch bar. Such prying invites axle-bearing troubles by throwing the bearings out of alignment with the axle. Where difficulty in lining up these holes exists it is better to put a slot in the suspension bar to permit mounting the motor without forcing. On all split bearings the inside contact edges should be eased off to prevent a sharp edge from cutting off the flow of oil. At the end of bearings next the thrust collar a radius should be turned in a lathe, to reduce friction and cutting at this point and to facilitate the working out of oil to the collar.

It is, of course, impossible to go into all of the details constituting the most advanced practice in motor maintenance, but the results obtained on a number of our largest and most progressive electric railways in service efficiency and reductions in operating costs by a close adherence to the general principles advocated in the foregoing discussion are a guarantee of their effectiveness.

### MOUNTING OF RADIAL COUPLERS

BY A. L. PRICE, SALES AGENT OHIO BRASS COMPANY

It has only been within the last few years that the real requirements of a coupler have been appreciated and a coupler adequate to such requirements has been sought. Let us first consider the requirements which have to be met in interurban operation.

#### INTERURBAN COUPLER REQUIREMENTS

For interurban lines we must have a coupler which is not only suitable for individual roads but with which the cars will also be equipped for operation in trains for running over foreign track and for intercoupling with steam cars. The coupler, as selected by your association is not only the generally recognized standard upon your own roads but its resulting successful operation has so impressed those in other sections of the country that it is making itself a nation-wide standard.

Once we know the height at which to mount the couplers and the definite operating conditions to be met in train service we must provide a proper setting for the couplers. Many times this means the raising of the car body, changing the radius of the buffer band, changing the location of steps, changing the location of fender irons, brake staffs, etc., and also altering the pilots. This may sound like making the "tail wag the dog," but the breaks of grades and short radius curves actually exist, and consequently the coupler must have free vertical movement and sufficient lateral swing. I emphasize the point that to a certain extent the car must be made to fit the coupler instead of putting aside for later consideration the selection of any coupler which can be mounted upon it by hook or by crook, with resulting inefficiency in operation. Upon several occasions purchasers have furnished blueprints showing the underframing of their cars without any provision for coupler mounting. After the cars were built and the couplers mounted, the cars were sent around curves whereon the steps were battered to pieces, and later considerable expense was incurred by taking off about 6 in. from the ends of the steps.

Couplers on the different roads ought to be mounted to a standard height. For reasons already known to you, this height was established the same as that of the steam railroads, namely, maximum 34½ in., minimum 31½ in. If you do not care to or cannot for some reason mount your

couplers to the standard height, you will be confronted with a very perplexing problem should you desire to interchange traffic with your electric neighbors or handle steam road cars.

I would direct your attention to one condition which has not been overcome by the adoption of the M.C.B. coupler. A coupler upon steam railroad cars is always rigidly mounted, and when such a coupler is connected with a radial coupler it limits the efficiency of the latter at curves. A radial coupler connected with a steam railroad coupler will not pull a steam car around a curve which has a radius of much less than 80 ft. Of course, the M.C.B. contour lines in themselves provide for a certain amount of radial movement. (Here Mr. Price showed models of coupler heads and explained their operation.)

The dimension of 43 in. has been prescribed as the proper height from rail to car sills, and as soon as this height is decreased and the couplers mounted at the standard height the vertical movement is limited and the value of the coupler impaired. The standard coupler height cannot be maintained where drop platforms are being used. Hence drop platforms on interurban cars are being quite generally discarded wherever train operation is being considered. If the elimination of the drop platform does not bring the height of the sill to the requirement, the car body can usually be raised on the trucks to the proper height. If an attempt to reach 43 in. should show a discrepancy of 1 in. or 1½ in., trains can still be operated, because the depth of the coupler knuckles will compensate for the deficiency, but the coupling usefulness will be impaired, particularly when a new, lightly loaded car is coupled with an old, loaded car on which the springs have settled and the wheels have been turned down once or twice at the shops.

Some endeavor to circumvent conditions by mounting their couplers tightly against the sills or by trying to procure a coupler having the head offset upward from the draft gear immediately in front of the buffer band. This introduces a special design which tends to weaken the coupler, and an added expense which eventually may outweigh the cost of making proper changes in the construction of the cars. Other points which should not be overlooked are delays in repairs in foreign territory, due to inability to obtain non-standard parts, and lengthening of air hose and jumper cables due to the use of a coupler which necessitates a separation of at least 18 in. to 20 in. between cars.

If the sills of the cars are of wood, the anchorage and the supporting pieces for the slide bar often can be sunk into the sills. This assists quite materially in giving the coupler standard height without raising the sills to 43 in. However, when such a scheme is adopted, care should be exercised not to interfere with the vertical or lateral movement of the coupler. As the coupler swings laterally, it is preferable to have its pulling face project uniformly at all points. The standard projection, as prescribed, is 6 in.; therefore, with a coupler 4 ft. 9 in. long the ideal radius for the buffer band is 4 ft. 3 in. (Mr. Price then presented a diagram showing a fairly ready means to determine the angular swing of a coupler.)

Experience indicates that the carrier slide bar should be supported at intervals not exceeding 12 in., thereby tending to distribute the downward strain. Some support their slide bars by means of through bolts passing through the slide bar, then through a spacer and then through the sill. The heads of these bolts should be countersunk flush with the underside of the slide bar that they may not interfere with the sliding of the carrier. In one case the breakage of eight new coupler heads was due to the fact that the through bolts had worked loose and the heads were so low that the carrier could not swing. Thus the point of leverage formed when taking curves was rapidly breaking the coupler bodies.

Another experience developed the fact that stop blocks

were being placed upon slide bars to prevent the coupler from swinging beyond the desired angle, but the stop blocks were not properly placed, so that upon taking a short curve they also acted as a point of leverage to break coupler heads.

It is sometimes found that a through bolt must be placed immediately below the paneling or at some other quite inaccessible point. In some instances a through bolt at one end and a lag screw at the other can be used with supporting castings or forgings.

Application of radial couplers to dump or work cars is quite common and many of these have flat ends. There are also passenger cars, which, comparatively speaking, have ends that are quite flat. When these cars must operate on short radius curves it is often necessary to build false buffers upon the ends to support the carrier slide bars.

#### COUPLERS FOR CITY CARS.

City cars must also provide for vertical and lateral movement of the couplers, but as they have no interchange of traffic no general standard type of coupler is necessary. Therefore, each road can establish a standard for its own particular conditions and work. For instance, if the heights of the cars vary, one standard height should be determined upon for all couplers. It is obviously best that the couplers be mounted so that they maintain a horizontal position.

As the coupler must always swing sufficiently to take the shortest radius of curve and enable the cars to travel this curve, it is quite necessary to determine the location of the very worst break in grade and shortest radius curve on a system and to design the coupler equipment accordingly.

After locating the shortest radius of curve, it is quite necessary to provide space upon the car so that the coupler will swing sufficiently to take such curves and to ascertain how far the coupler will swing. (Mr. Price then exhibited several charts to illustrate this point, and also one showing how the approximate radius of a buffer band on an old car could be obtained when a drafting board was not available).

Finally, I would like to mention particularly a few essentials which correlate general conditions and car coupling conditions with car specifications as they are generally made up.

1. Consider the center track radius thoroughly. A 35-ft. center radius seems to be, so far as I know, the shortest center radius track curve in this territory. Therefore, it might be considered as a standard. If a curve was found at some point of a trifle shorter radius and cars from more than one system should find it necessary to travel over it, it would pay to change its radius, if possible, to 35-ft. center radius to permit its use by any interurban car. It is also very important to know whether the curve is measured for center radius or inside radius.

2. The length of the coupler as prescribed by your standards is fixed.

3. The prescribed projection of the coupler beyond the buffer band is 6 in.

4. The maximum swing of the coupler from center to pull and push cars around curves in a satisfactory manner is 60 deg.

These four conditions seem to be quite positively "fixed conditions." Therefore, why not adopt standard specifications for cars having a specified over-all length, distance between truck centers and standard location of steps so that all interurban cars will embody uniformity? Then there will be no question of their ability to operate over any railway system which constructs its cars according to the same standard. Indeed, this standardization in connection with cars can well be carried to a point where it will take care of the other conditions common to all railways desiring to interchange traffic.

## THE HUMAN FACTOR IN FARE COLLECTION SERVICE

BY JOHN F. OHMER, PRESIDENT OHMER FARE REGISTER COMPANY

Capital is invested in your property to produce revenue; revenue is founded upon your fare collections, and it is to that important part of the operation that I invite your attention. Referring to questions on various subjects submitted to member companies of the American Electric Railway Association at the Chicago convention last October, let us note the wide difference in the opinions of railway managers as expressed in their answers to the statement that "The committee would be glad to have data showing percentages of increase in revenue resulting from operation of prepayment cars, if you are willing to furnish same." Nineteen out of forty did not answer; one answered, "Earnings are falling off, not due to cars"; one answered, "Difficult to determine"; one answered, "Does away with missing fares"; six answered, "Cannot state"; one answered, "Not in position to state"; two answered, "No definite data"; two answered, "Eight per cent"; two answered, "Seven per cent," and others evaded the question entirely.

It is apparent from these answers that most companies do not employ proper means for arriving at definite conclusions as to fare revenue.

The means for operating a railway system should be fitted to meet the conditions. If a plurality of fare mediums is required, then means are required for keeping, in detail, each fare unit under its own classification. To say that transfers have no value unless they are registered, and that if they are not registered they cannot be manipulated, is absurd. Of course, if transfers are recorded with 5-cent fares, or if other fares differing in value are recorded together, then the conductor is tempted to practice manipulation. Most railway managers now realize the advantage of fixing a value for tickets and other fares and of recording them, separately, in their own classification.

At the last meeting of the Transportation & Traffic and Accountants' Associations, held in Chicago in October, 1912, resolutions were adopted recommending the registration of tickets at their respective values.

#### FARE BOXES

The introduction of prepayment cars was accompanied with fare boxes of various types. They were placed in service on the premise that conductors should not have access to the fares deposited, and it was asserted by many managers that if the passenger deposits the fare no record of the deposit is necessary. Many managers are changing their opinions in that respect, however.

Referring again to questions submitted to member companies, I find that in answer to the question "Do you also use an ordinary register in connection with the fare box?" eighteen respond "yes" and ten respond "no"; and to the question "Is cash deposited in fare box accessible to conductor?" two respond "no" and seven respond "yes." To the question "Do you believe conductor should have access to this money?" seventeen respond "no" and fourteen respond "yes." These conclusions indicate that in due time more attention will be paid to the human factor, which is so seriously involved, and that the conductor will assume the whole responsibility in the fare collection service.

Railway managers are aware of the elasticity of the conscience of many car patrons, and yet, under the fare box principle, the public is trusted implicitly while the conductor is deprived of the confidence which should be given to him. The practice of compelling the passenger to deposit his fare often works an imposition on him, increases the opportunities for manipulation, and offers greater temptation to the conductor than any other known method. The human factor and its relation to the traveling pub-

lic must receive consideration. To make your road popular with the public, you must make the conditions just as pleasurable as possible.

The conductor should have your confidence and then he can command the respect of the public and with it render better service. He should assume the sole responsibility for the collection and accounting of fares. If the responsibility is divided, the conductor, the passenger and the man who empties the box are all confronted with temptation, and the road thereby sustains an irreparable loss. It is not the fare box but the system of operation which accompanies it that we oppose.

Devise for your conductor ways and means for keeping a comprehensive, intelligent and businesslike system of his transactions, and then measure his value as a conductor by his record. If the system is right and is properly enforced it will be easy for you to determine the measure of efficiency each conductor in your service has attained; but you must remove from him, so far as possible, all temptation. Not until this is done can you ever expect the best results.

The argument that the conductor need not register or that he can register for a fare other than the one collected has been made against the system of recording each fare, separately, under its own classification. Exclude the means for recording each fare separately, and you encourage the derelict conductor and discourage the man who is inclined to be honest.

We have always advocated a system to be used in connection with the operation of the registers. This system comprises the following practices:

Keeping an accurate, detailed, untamperable printed record of each fare collected, in its proper class.

Conductor recording the fares according to their values and under the proper classification.

Conductor returning to passenger the proper change.

Conductor making an accurate return to the company for all classes of fares collected.

Entailing upon the conductor the necessity of turning in to the cashier each and every fare collected.

Transcribing the data from the printed register record into the books of the company.

Keeping a merit record of the work of each conductor, through which the company is able to measure his moral worth, as determined by the efficiency and accuracy with which he collects and registers his fares.

This system gives a continuous audit on fare collections and provides valuable information concerning the moral worth of each human unit in your business.

The following comparison, for the months of January and February in the years of 1910, 1911 and 1912, of general averages of conductors operating our registers on the Denver (Col.) City Tramway Company and the Syracuse (N. Y.) Rapid Transit Railway shows a gradual improvement, year after year, and is an indication of the results to be obtained from the use of the Ohmer system:

	Denver City Tramway		Syracuse Rapid Transit Railway	
	January, Per Cent	February, Per Cent	January, Per Cent	February, Per Cent
1910.....	94.25	94.43	.....	90.85
1911.....	95.07	95.55	94.72	94.87
1912.....	96.23	96.44	94.91	95.01

A comparison of conductors' general averages from June, 1912, to January, 1913, inclusive, on the Denver City Tramway and the Syracuse Rapid Transit Railway follows:

The Denver City Tramway Co.		Syracuse Rapid Transit Railway Co.	
	General Average, Per Cent		General Average, Per Cent
1912		1912	
June .....	95.57	June .....	94.77
July .....	95.66	July .....	94.99
August .....	95.50	August .....	95.02
September .....	96.23	September .....	95.04
October .....	96.15	October .....	95.47
November .....	96.60	November .....	95.14
December .....	96.48	December .....	95.18
1913		1913	
January .....	96.96	January .....	95.48

We have always contended that the practice of our system tends to concentrate the minds of conductors on their duties and to educate their mentalities in the exercise of their duties other than that of collecting and recording fares.

It may be pertinent to remark that our system has been so satisfactory to the management of the Denver City Tramway that, beginning with Jan. 1, 1913, it adopted a similar merit system for recording the work of motormen who operate coasting recorders.

If all fares collected by the conductor belong to the company, then he should turn in his entire collections regardless of the amount he has registered. For example, your conductor collects \$35.80 and, owing to mistakes made by him, registers only \$32. Which one of these two amounts do you think rightfully belongs to the company? If the conductor is permitted to settle according to his registrations, he will turn over to the company the \$32 and retain the difference of \$3.80.

I can scarcely believe that any manager would adhere to such a method, but nevertheless it is true that many of them do so. It is unnecessary to give the conductor access to the register record. If he is an honest man and is doing his duty, he does not care for the record. If his registrations are right and his returns are made in full, the record will prove his case; on the other hand, if he is a dishonest man, he does not want anything better than access to the register record so that he can make his settlements accordingly.

[Mr. Ohmer concluded his paper with some remarks on the benefits of welfare work in securing the hearty cooperation of the employees.—Eds.]

### INTERLINE FREIGHT BUSINESS

BY C. O. SULLIVAN, TRAFFIC MANAGER WESTERN OHIO RAILROAD COMPANY

The subject assigned represents that class of freight that is handled over two or more lines, and in time, with proper development and attention, will make the most profitable class of business that is handled by the interurban lines, but this development will depend largely on the interurban lines broadening out and being equipped with heavier motors, plenty of cars and longer sidings so located as to facilitate loading and unloading, the building of tracks into industries and securing the location of industries along and on the lines. This class of freight business is today in its infancy on the interurban lines, but there is vast room for development, and this is the one class that must be developed if we would hope to continue to show increases and have a surplus at the end of the years to come.

In the early days of interurban railways the freight business was not thought of as being a big source of revenue, and even to-day there are lines that are still under this impression and handle no freight at all, depending entirely on the passenger and express business for their income.

The interurban lines were built a few short years ago with the thought of handling passengers only, but after a few years this class of business had been developed, in their local territory, to such an extent that it was not showing the necessary increase, and it was then they began to cast around for other classes of business that would produce the desired results.

It occurred to the operators at this time that small packages of merchandise might be handled to increase the earnings. This class of freight was handled for a time on passenger cars with good results; but after the merchant and shipper became acquainted with the fact that they could telephone in the morning and have their supplies in the afternoon, or within a few hours after ordering, the freight business began to develop, unsolicited, to such

an extent that it could no longer be handled on passenger cars. The operators then saw the necessity of putting on freight cars to handle this class of freight business, which consisted of short hauls or local freight business, and freight cars were accordingly started, in most places making one round trip each weekday between the terminals of their local lines.

Realizing that the freight business was profitable, the interurban companies then decided to develop it further by putting solicitors in the field, and through their efforts the local freight business has grown to such proportions that to-day it requires two or three local freight trains each day to take care of this class of business. At this time the interurban railways are handling a large percentage—I think I am safe in saying they handle the greater part—of the local freight handled in interurban territory, and this has been made possible by the prompt delivery which has done much to develop this class of business.

With the development of the local freight business through solicitation, it was shown that there were great possibilities of still further increases in the revenue of the lines in the long haul or interline freight business. This fact was brought out by numerous inquiries made to our solicitors for rates to and from points off their respective lines. Acting on this suggestion, through rates and routes were established, and to-day, with but few exceptions, C.E.T.A. territory is covered by through rates and shipments can be made to and from almost any point in this territory on through rates the basis of which is the same as on the steam lines. We have been unable, however, to establish through rates to some of the territory served by interurbans, but we hope the day is not far distant when such rates will be established, extending into the States of Pennsylvania, New York, Michigan and Illinois as well. If, however, the interurban lines interested are unwilling to establish such rates, I think the fact will probably be referred to the commission, which will order such through rates established, as at this time the shippers are demanding through rates via the interurban lines on account of the prompt service, and in many instances express themselves as willing to pay a rate even higher than that established by steam lines, though, of course, not so high as express rates, on account of the superior service of interurban lines.

The development of interline freight business, less-car-load, has been such that to-day freight is being interchanged at junction points by car loads instead of a few packages as was the condition a few years ago. On many of the lines the interline freight business handled is far in excess of the local freight, and with this class of business in its infancy it surely will be developed to such an extent as to require trains instead of single cars to handle it. Even to-day many of the lines that formerly operated with a single car now find it necessary to handle two or more trailers to take care of the interline freight. In many instances through cars are operated from one large terminal to another over two or more lines which do not handle any local freight at all but are loaded entirely with interline freight. In this connection I might mention the through service that is operated between Toledo and Fort Wayne. These cars are operated for the benefit of long haul or interline freight only from Toledo to Indiana points and make no local stops en route, the distance being 137 miles. There is also the through operation between Toledo and Dayton and Dayton and Toledo, a distance of 162 miles, operating over three lines en route. These cars are operated for interline freight only and do not handle any local freight en route. They leave Toledo and Dayton at 6 p.m. and arrive at the opposite terminals early the following morning, distributing freight at the larger stations en route except on the originating line. This business has developed to such an extent that it now requires two-car trains in each direction to handle the interline

freight, and if it continues to maintain the present increase it will require three cars with the opening of the spring business. Another service of this kind is operated between Indianapolis and South Bend, a distance of 163 miles. This service is also operated over three lines.

The through cars between Indianapolis and Fort Wayne constituted, I believe, the first through interline service to be inaugurated by interurban lines, and my understanding is that it has been very profitable and has done much toward increasing the interline freight business between these points.

The development of the less-car-load interline freight business has brought with it the interline car-load business. This I believe is the class that should have particular attention and development, as it is the most profitable. We receive a higher rate on the less-car-load freight, but we are at the expense of numerous handlings, which bring with them the possibility of loss and damage claims, causing dissatisfaction to shipper and receiver, while with the car-load business the cars are loaded by the consignor, unloaded by the consignee and the only expense is in the transportation. As this class of freight is handled in box or trail cars behind our regular freight motors, this cost is very small.

Car-load freight business has been greatly retarded for various reasons, the most important of which is the lack of standardization of equipment. Especially is this true with respect to the drawbars generally used.

The trouble we have been confronted with in the past was the fact that all cars would not interchange, some lines having one equipment, some another, and in some instances car-load business which could have been secured was of necessity refused because the delivering or intermediate carrier was unable to handle the cars of the initial lines owing to differences in equipment.

To-day these conditions have been corrected on most lines, but there are lines still in this condition of being unable to interchange their cars with those of foreign lines. If the interurban lines expect to continue the development that has been started, this condition will have to be eliminated in all cases, as with the development it will be necessary for cars to be so equipped that they can go to any place in C.E.T.A. territory. If different equipments were used on steam railroad cars, it would result in the costly transfer of loads at junction points, a condition which a shipper tries to avoid, as he wants his freight handled as little as possible. It would also cause delay to shipments and would be the means of great loss of business on this account. I say again this condition must be corrected if we expect to increase our interline car-load freight business.

An agent or a freight solicitor is greatly handicapped in securing new business owing to this condition. He should be in such a position, that when he secures loading for any distant point he can be sure that any available car can be loaded and can be interchanged at any junction regardless of how many roads it may be necessary for the shipment to travel over.

Through the foresight of some lines which have equipped with standard drawbars, I know of car-load shipments that are moving over the interurban lines for 350 miles to 400 miles, and in this distance they travel over three or four lines. These shipments are secured to the interurban lines because of the fact that much better time can be made than by steam railroads.

This is an important factor when shippers are routing their car loads, as has been demonstrated by the numerous fast freight lines that operate over the steam lines. For this service the shipper is willing to pay a higher rate in order to get his commodity on the market at the first possible moment.

While the C.E.T.A. territory is but a drop in the bucket as compared with the steam line territory for interline

business, it is nevertheless true that shippers who were formerly at the mercy of the steam lines to move their freight now appreciate the fact that the interurban lines are here to stay and are able to give them equally good, if not faster, service at rates in most instances on the same basis. This unfortunately was a mistake, made when the rates were first put into effect on interurban lines, as the superior service of interurban lines is as much entitled to a higher rate as is the fast freight service operated over steam lines. As stated before, this we know to be true from the fact that many shippers, in their efforts to have through rates established over the interurban lines to points which are not now reached, have in fact expressed themselves as willing to pay a rate 15 per cent to 20 per cent higher than the regularly established rates on steam lines, in order to get fast and prompt movement of their freight.

Another condition that has greatly retarded the development of interline freight business is the fact that at many places there are no sidings suitable for loading and unloading. In other places where there are sidings these are not long enough to accommodate more than one car and cannot be blocked with a car for loading or unloading, as it might be necessary to use the sidings for passing trains. This is a very important factor in the development of interline freight business. It should have due attention and suitable sidings should be provided.

An instance of this kind with which the writer is familiar was where a car-load shipment was made to a foreign line and, arriving at its destination, was set off on a siding at that point. The siding not being suitable for unloading, it was necessary for the consignee to unload from a siding about 3 miles in the country, which was the available unloading siding closest to the town. This caused the consignee extra expense to haul the shipment to his place of business in the city and he demanded reimbursement from the originating carrier. As you can see, this is another condition that will have to be corrected before we can successfully develop along the line of interline car-load business.

Among other things which have retarded this development of interline freight business have been the different rules and exceptions in effect, and it is only recently that there has been any uniformity in this respect. For this reason an agent before accepting a shipment had to familiarize himself with the rules and exceptions to the official classification governing the movement over possibly one or more foreign lines. This trouble has, however, been overcome, and on March 8 a uniform exception to the official classification will become effective, which will govern the movement over all lines, members of the C.E.T.A., alike.

Another feature which was made effective Sept. 1, 1912, and will greatly assist along the line of development of interline freight business was the adoption by about two-thirds of the member lines of a system of through billing for interline freight. Formerly a shipment had to be rebilled at various junction points, which made the junction agent's work very heavy, but with the new form of billing the shipment is billed at the originating point and this bill accompanies the shipment through to destination. This will eliminate any possibility of the shipment being billed wrongly at junction points, thereby doing away with possibilities of overs and shorts. It will not only relieve the agent of the rebilling but also of the junction settlements, as the latter will now be made through the auditor's office. In fact, this will do away with a volume of work for junction agents, giving him more time to attend to other duties, such as seeing that all shipments received are properly weighed, correctly classified and rated, thereby insuring for the lines all revenue justly due.

In addition to our solicitors, it is necessary for our agents to keep their eyes open for all new business or anything that is getting away from us and keep the traffic department advised of all things of this nature and in making his

daily, weekly or monthly collections to do his best to secure more business. It can be readily seen that in relieving our agents of this routine work they gain more time to increase the business at their respective stations.

Each solicitor should watch his territory for shipments that arrive by other than interurban routes and try, if possible, to secure routing from the consignee for the next shipment; but if the shipment is routed by the consignor, so advise the traffic man at the originating point and he may be able to secure the future shipments. By working together much good can be accomplished and the interline freight business be greatly increased.

One of the greatest difficulties which we encounter to-day in securing interline car-load business for the interurban lines is the fact that many of the industries along our lines have steam railroad tracks into their places of business for loading and receiving car-load freight. We find many cases where the consignee desires his freight routed for interurban line delivery, but the shipper objects to hauling freight from his warehouse to the interurban lines when it can be loaded from the warehouse into the steam-line car with one handling. In order to overcome this, it will be necessary for the interurban lines to develop in this respect by getting factories, elevators and other industries located on their lines, and also by building industrial or factory tracks into plants already in operation. This will insure at least a part, if not all, of the inbound and outbound business of the plant, and if this cannot be handled to destination by interurban lines, it may be possible to arrange delivery through steam lines from junction points.

In many instances the factories in the towns and cities along the interurban lines are not served with a steam line track into their place of business, but are forced of necessity to haul their material to and from the railroad. These are the places at which we should get a foothold and, if possible, build tracks to them. With it made possible for them to load directly into your cars at their place of business, you are sure of a nice increase in tonnage, and if it is necessary to handle it in connection with some steam railroad, this will bring you closer to an interchange with the steam lines. Through this method you will be able to deliver and route business via the steam line that it could not otherwise touch, and by giving it the inbound business routed via its line there will also be an inducement for it to furnish you with equipment for outbound loading from these factories.

I know of interurban lines that to-day are doing this and thus increasing their revenue with car-load business that otherwise they could not handle owing to lack of equipment and an outlet to various destinations over the country not reached by interurban lines.

I was recently told of one of our member lines that has installed such an industrial track to serve a flour mill, a woolen mill, a grain elevator and a large wool warehouse all owned by the same firm. It will handle their entire inbound and outbound business in connection with a steam line, which will increase the business of the electric line approximately 300 carloads per year. The business will be handled on proportional rates made to use in combination with the steam-line rates from the junction point. This is made necessary on account of the steam line refusing to join in through rates, but the combination will equalize the through rates from originating point to destinations made possible by the difference in the through rates between the originating point and the junction with the steam line.

While the steam line is unwilling to establish through rates, it is, however, willing to allow the interurban line to handle its equipment and furnish empties for outbound loading from these factories, as it thereby secures approximately 300 loads that otherwise it could not touch, and by so doing it is made possible for the interurban line to increase its business to the same extent.



Since the building of this track, I am told that the company has been asked to extend this track so as to serve a coal yard, a lumber yard and a planing mill, which have had to haul by team all their material to and from the railroad entering their town, and with this additional business the revenue of the interurban line will be increased approximately 100 car loads more each year, making approximately 400 car loads secured on account of the industrial track built. Such possibilities are scattered over the entire interurban territory and if taken advantage of properly will be the means of large increases in earnings of interline freight business for the interurban lines.

I have endeavored to outline the interline freight business as it is to-day, showing a few of the possibilities for increasing it and also the obstacles that exist to this development. The latter can be easily remedied with a little attention, thereby insuring handsome increases to your lines.

The competition being so keen, it is necessary to keep in close touch with all shippers and receivers, to keep them advised of any new territory opened up by through rates or through service and anything else that might work to their advantage, to correct any imaginary or real trouble they may have and to show them all the courtesy possible, as courteous treatment and attention are what make friends and get us business.

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#### ANNUAL REPORT OF THE SECRETARY-TREASURER OF THE CENTRAL ELECTRIC RAILWAY ASSOCIATION

BY A. L. NEEREAMER

Your secretary-treasurer begs leave to submit herewith his report for the year ending Dec. 31, 1912.

The interurban railway membership at that time consisted of fifty-eight lines, representing 3841 miles, and in addition we have one city line. During the past year we have lost one interurban line of 154 miles. This leaves a net increase of four lines and 169 miles over the year 1911. The four lines do not comprise the entire 169 miles as several extensions have been built and added to the mileage of the lines already members. During the year 1912 we had 131 members in the supply men's department, a decrease of eight members from the year 1911.

Total receipts for the year 1912, including cash on hand on Jan. 1, 1912 of \$1,202, were \$8,446. Total disbursements were \$6,805, leaving \$1,641 on hand on Dec. 31, 1912.

A comparison of the figures will show that we have handled considerably more money in the office in 1912 than we did in 1911, while the operating income remained about the same. This is due to the collection of funds for the official interurban map, joint weight and inspection bureau and the reprinting of several tariffs. These items were paid for out of the funds of the association and recharged to the participating carriers on the customary basis. After the close of business for the year 1912 we had cash on deposit to the amount of \$1,641 and bills receivable in the amount of \$135, making a total balance of \$1,776.

In 1910 a proposition was presented to the association through Mr. Whysall, who was then president, to issue an official interurban map. After due consideration in the executive committee this subject was placed in the hands of the Traffic Association and I am pleased to report that during the past year that association has completed its work and approximately 50,000 of these maps are now in the hands of shippers and the traveling public.

There are still many lines in our territory, particularly in the eastern portion, that are not members of this association, and while your secretary has made every endeavor to secure these lines he has not been successful. The association can be of great benefit to all interurban lines in the territory and every endeavor should be made to increase the membership.

In conclusion the secretary desires to express to the officers, committees and members of the association his sincere thanks for their hearty assistance and co-operation during the year that has just passed.

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#### ANNUAL ADDRESS OF THE PRESIDENT OF THE CENTRAL ELECTRIC RAILWAY ASSOCIATION

BY W. S. WHITNEY

Since the annual meeting of 1912 of your association there has been a net increase in the mileage, represented by new lines and extensions of old lines, of 169 miles over the mileage of the year 1911. The withdrawal of one interurban line lost the association 154 miles. There was a decrease of eight members in the supply department as compared with the year previous.

From the statement of your secretary-treasurer you will note there has been quite a gain in the financial strength, although the expenditures have been increased somewhat by reason of the expenses of the Central Electric Railway Accountants' Association, which was heretofore handled as a separate organization and whose finances did not enter into the accounts of the Central Electric Railway Association.

The prospects are that additional mileage will be added to the association within the next few months; also that some of the present member lines will become parties to the Central Electric Traffic Association, adding strength in that department, which, in my estimation, is one of the most important divisions of the association. This will increase the scope of the territory to be covered by the present interline passenger tariff and also provide additional territory for the increase in the freight business.

These two classes of traffic present the principal avenues for material increase in gross revenue to member lines, offering, as they do, the opportunity to compete with steam lines; and the development of this class of traffic will work to the benefit of all lines in the territory. The results of long-haul passenger business have clearly demonstrated the fact that this class of service can be materially increased by the elimination of transfers, and these increases will be in evidence when there is a decrease in the strictly local passenger business or where it remains stationary.

The same condition is true of freight traffic. There is an adverse feeling in the minds of shippers toward having their shipments transferred at junction points, as the results are unsatisfactory because of the damages arising not only to the packages but to the contents. Through service will serve to increase the earnings from this source. To obtain this desired result it will become necessary to adopt standards for freight equipment to facilitate the exchange of trailer cars between all interested lines.

Early in August, 1912, the joint map published under the auspices of the Central Electric Traffic Association, following the recommendation of former President Whysall, was placed in the hands of the member lines for distribution to the public. There has been a very great demand for this over the entire territory and beyond it. The demand fully justifies the expectations, and I consider this one of the best steps that have been taken to advertise and bring into prominence the interurban service in the territory of the association.

In entering the sixth year of its existence the Central Electric Railway Association does so in sound financial condition with prospects for a continued steady growth.

In conclusion I wish to thank the members of the association individually for the assistance and support given me during my term of office, and I also wish to thank the various committees for the assistance rendered by them in considering the numerous subjects brought up before the association during the year. I bespeak for my successor the same treatment accorded me.

ANNUAL REPORT OF THE CHAIRMAN OF CENTRAL ELECTRIC TRAFFIC ASSOCIATION

BY A. L. NEEREAMER

The past year has been one of great harmony and increased value to the association and much important work has been transacted. The official interurban map was inaugurated at a meeting of the Central Electric Railway Association held in Toledo, Ohio, in March, 1910, and at a meeting held in May of that year was referred to this association to work out the details. A committee was appointed who worked faithfully and diligently upon the proposition until its members were able to see the actual results as a reward of their labor. At this point I desire to extend to these members the compliments which they deserve for their energy and bulldog tenacity. About 50,000 of these maps have been distributed throughout this territory since Aug. 1 and the demand is still heavy.

Of the membership of the Central Electric Railway Association, forty-six lines, representing 3278 miles, participate in the tariffs and other publications of this association. This is an increase of three lines and 164 miles over 1911.

During the past year Official Interurban Railway Equipment Register No. 1 has been published and filed with the Interstate Commerce Commission. This register is participated in by twenty-seven carriers.

The interchangeable 1000-mile ticket is now participated in by thirty-two lines with a total of 2546 miles, a net decrease of two lines and 45 miles.

The joint and local baggage tariff is now participated in by thirty-nine lines, making a net increase of one line over the preceding year. Two lines were eliminated by being absorbed by other companies and three new lines participated in the publication.

The chairman files the official classification for thirty-nine lines, a net increase of seven lines over last year.

During the past year the tariff covering the interchangeable 1000-mile ticket was reissued twice and the joint and local baggage tariff was reissued once. These reissues were caused by changes in the names of companies and to cover the participation of new companies. Eight supplements were issued to the official classification. Of these eight, three were on less than statutory notice granted your chairman by the Interstate Commerce Commission and the various state commissions. This work resulted in the saving of much time and expense to the lines participating.

The interchangeable 1000-mile ticket is again brought to your attention. This ticket is still keeping up its popularity and approximately 18,000 have been ordered and placed in the hands of the agents for sale since its inception, and we believe that the sales of this ticket could be materially increased by the use of judicious advertising.

Among the important subjects which are now in the hands of committees for early definite reports are the following: the joint weight and inspection bureau and the joint interline folder. Both of these subjects are handled by committees representing the parent body but appointed from members of the Traffic Association.

The experiment of the joint weight and inspection bureau at Indianapolis for ninety days during the past summer demonstrated that the interurban companies were not receiving the revenue for the transportation of freight to which they were entitled. The report which was submitted to the member companies at the close of the experimental period showed that there was a total gain of 789,691 lb. with an increased revenue of \$1250. This averaged for every working day during the experiment 11,362 lb. and \$18 increased revenue. It is expected that the committee in charge of this will make a definite report to the executive committee so that this association can expect to receive definite information at the next meeting.

PROCEEDINGS OF THE ANNUAL MEETING

(By Telegraph)

The annual meeting of the Central Electric Railway Association was held at the Hotel Washington, Indianapolis, Feb. 27 and 28, with eighty members in attendance.

THURSDAY'S SESSION

The Thursday session opened with President Whitney in the chair. Following the reading of the minutes of the preceding meeting, six new members were elected. Charles L. Henry, president Indianapolis & Cincinnati Traction Company, then announced that it had been decided to postpone the signal inspection trip over his line. As there were no reports ready from special committees the president then proceeded with the program. On account of the unavoidable absence of J. C. Thirwall, his paper on "Economies in Motor Maintenance," as published elsewhere in this issue, was read by J. B. Cox, of the General Electric Company.

In the discussion which followed, R. N. Hemming, Union Traction Company of Indiana, mentioned the advisability of using air pressure not to exceed 30 lb. in cleaning motors. Higher pressures had a detrimental effect due to sand-blast action. He also said that his company had tried all kinds of string bands and had concluded that impregnated asbestos cord gave the best results. Impregnation filled voids and eliminated moisture.

G. H. Kelsay, also of the Union Traction Company, inquired as to common practice in repairing bruised laminations of armature and field. Was it better to remove laminations and repair or could the work be done without removal?

Mr. Cox replied that the method of repair depended on the extent of damage to metallic surfaces. In some cases it was possible to repair by scraping away the damaged metal. In reply to the question concerning string bands, Mr. Cox said that asbestos cord was good, but if it became saturated with oil or water it was more detrimental than other kinds.

Mr. Hemming then said that his practice had been to remove laminations and straighten them by rolling and applying insulating paint afterward. He did not find it good policy to depend on superficial inspection to determine the extent of injury from short-circuits. Many cases had been found where the injury appeared slight, but removal showed a different result. It was wise to inspect often in order to check further damage once the bruising action had begun. To reduce damage from short-circuits which fuse and destroy the effectiveness of the old-type armature band, he had adopted a combination tin channel wire and solder band which would fail only when burned through.

W. H. Evans, Edgar Allen Manganese Steel Company, asked if it was general practice to overhaul motors in interurban service on a mileage basis. That method had been found satisfactory for elevated, subway and street railway cars, but it was not so successful with interurban rolling stock.

Mr. Cox replied that it was the tendency some years ago to adopt the mileage method for all rolling stock, and that method still held for city cars. The best master mechanics, however, did not depend on mileage records for inspection and overhauling, as the damage might become very serious once it had started. It was now the practice on interurban roads to check conditions often by rigid inspection and by overhauling motors whenever required. He mentioned instances where the bearing life had been increased 100 per cent through close attention, and by overhauling the motors on the cars that showed the worst conditions. Serious damage might be prevented by not adhering to the mileage basis. As a rule, however, mileage records formed an excellent guide for overhauling.

Mr. Hemming then inquired what the effect was of sweating armatures at low temperatures. Would it develop serious results and was it best to wipe the commutators

before returning them to service? He also requested information relative to dipping instead of painting armatures. Would the dipping close vents and increase the temperature?

In reply, Mr. Cox advised wiping the sweat from commutators, particularly when unaccountable trouble developed. Such trouble might be due to moisture. The quantity of moisture which was likely to cause trouble, however, differed with the locality. As to the practice of dipping armatures instead of painting, he recommended the former if closing the air ducts did not raise the temperature above the critical point. Ducts through the laminations did what they were intended for, but they also carried carbon dust into coils with detrimental effect. It was well to close them in case they were not required to keep the armature below the critical temperature. He also advised one coat of paint every time the armature was removed. The drying process was one thing to watch when the dipping method was employed. The armature should be revolved until dry in order to prevent the collection of paint on one side, thus avoiding the possibility of overbalancing.

Mr. Hemming said he had not considered the overbalancing effect in revolving armatures during the drying period after dipping, but simply to gain uniform heating. He also said that he had tried dipping the armatures with the commutator end down and had found that the insulating paint filled pockets which would not drain. This trouble had been eliminated by dipping with the commutator end up.

The importance of the accurate boring of armature bearings was then discussed. In reply to a question as to its effect on the life of armatures and bearings, Mr. Cox stated that accuracy in boring was not so important in railway motors as in stationary motors. Inaccuracy in line would reduce the life of the bearing. The best practice in railway motors was to bore slightly high. Although the attraction of the upper pole pieces would thereby be increased a trifle, the weight of the armature would offset this disadvantage. However, this recommendation would not apply if the motors were worked up to their maximum, because special conditions would then arise.

It was then commented that boring high should not be adhered to in double-end operation. Two motors have an up thrust resulting in more wear in the upper bearings. This suggestion was met by the statement that during a large percentage of the time cars were crossing, which dropped the entire load on the lower bearing.

Following this discussion the association extended a vote of thanks to Messrs. Thirwall and Cox.

#### FARE COLLECTIONS

John F. Ohmer, president Ohmer Fare Register Company, then read a paper on the human factor in fare collection. An abstract of this paper is published elsewhere in **this issue**.

Mr. Henry, in commencing the discussion, asked how the averages showing the improvement in records were compiled. Mr. Ohmer explained that a point was counted against the conductor for every variation between his returns and the records. The object was to remove temptation and to get a complete record.

Mr. Henry said he believed in human nature, but he contended that the object of all precautions of this nature was to check a possible inclination to be dishonest which might develop in any man. This was, however, not a reflection on conductors any more than it was on auditors, treasurers or executive officials. One of the main features of such a plan was that it provided a complete record. Mr. Ohmer said that the conductor was the agent of the company and should be led to co-operate so as to promote the interests of the company.

John F. Keys, general passenger agent Detroit United Railway Company, believed passengers on interurban lines were entitled to receipts for fares. On the interurban

lines of that company a system of duplex tickets was used and it was a rule that conductors should not check their records. The arrangement had some features similar to the Ohmer system and had been working very satisfactorily.

L. T. Hixson, auditor Terre Haute, Indianapolis & Eastern Traction Company, thought it was just as important to have checks for conductors' returns as for office employees'. Mr. Henry said that he was using a receipt of which the stub was not visible to the conductor. If a man continued to make reports of collections seriously different from those which his record indicated as correct it showed that his work was unsatisfactory.

C. V. Funk, Ohmer Fare Register Company, described an incident which occurred after the installation of the Ohmer system on the Columbus, Delaware & Marion Railway where a passenger claimed that he had overpaid a conductor one dollar. The returns of the conductor proved that the statement was correct. A policy which required the payment of all cash on hand permitted the prompt return of such overpayments to passengers by the auditor. F. B. Morgan, Cleveland & Sharon Electric Railway Company, suggested that passengers should be sufficiently interested to see that proper returns were made.

#### INTERLINE FREIGHT

C. O. Sullivan, traffic manager Western Ohio Railroad, then read a paper on interline freight, which is published elsewhere in this issue.

F. D. Norveil, general passenger and freight agent Union Traction Company of Indiana, said that the paper pointed out opportunities of which some roads had taken advantage and many other opportunities of which they should take advantage. Every traffic man on the railways composing the Central Electric Traffic Association was proud of being a member of that organization because it had accomplished the things which it had started to accomplish. The association, he said, came into existence four years ago and the members could point to many things which had been accomplished which could not have been done in any other way. He believed that the association was the best traffic association in existence, combining as it did passenger, freight, express and every other feature of revenue-producing business on electric railways. The companies in the association had the most comprehensive tariffs, rules and regulations existing in the electric railway industry.

Continuing, Mr. Norveil said conditions had changed frequently, new additions had been built, consolidations had taken place and restrictions by commissions were being brought to the notice of the association constantly, yet the association was as near abreast of all changes as any group of transportation companies in the country. All of these conditions had been made possible only by hearty co-operation and by the support of the parent body. One of the last of the many tariffs issued for the joint use of electric railways was the interline demurrage tariff. Unfortunately the railroad commissions of Ohio and Indiana seemed to feel that the national demurrage rules promulgated by the Interstate Commerce Commission contained clauses not in harmony with the conditions of the traffic situation in those States; consequently the national demurrage rule was not acceptable to either of the state commissions. Furthermore, the rulings of the Ohio and Indiana commissions were not in harmony, and it was necessary for railways which had lines within the two States of Ohio and Indiana to have three sets of demurrage rules, one adapted to the Indiana regulations, another to fit conditions in Ohio and still another to be used for interstate business.

Mr. Norveil added that this situation had been cleared up by joint conferences of the various commissions involved, and the association was now in position to issue one demurrage tariff covering all requirements. Mr. Norveil then quoted from a communication received by Chairman Neereamer of the Traffic Association regarding demurrage

rules which, he said, constituted the best argument that could be made as to value of united action and was the best argument that could be placed before lines not now members of organizations. It was to their interest to act together in their interline business. This was the platform upon which the roads must figure on building up the greatest increase of traffic in the future. Every inducement in the form of through passenger and freight train service, more and better facilities for handling traffic, prompt action on claims and all courtesy that employees showed to the public would tend toward the upbuilding and the maintenance of increased revenues.

Charles J. Lavey, traffic manager Cleveland, Southwestern & Columbus Railway, said that the traffic men would like to hear from managers of some roads that did not participate in interline freight business, and in reply, J. F. Starkey, general passenger agent Lake Shore Electric Railway, said that he favored the establishment of a department for interline freight business.

#### FRIDAY'S SESSION

The Friday session opened with a reading of the paper on "The Mounting of Radial Couplers," by A. L. Price, which is published elsewhere in this issue. At the conclusion of the paper G. K. Jeffries, Terre Haute, Indianapolis & Eastern Traction Company, emphasized the importance of standardizing coupler mounting, wheel centers and extreme length of car body over buffers. All of these matters were correlated and should receive attention at the same time. He recommended that the standardization committee take up the work of developing standards and advising the association as to the proper clearances on sharp curves, with special reference to platforms and other permanent structures. Mr. Jeffries also brought out the importance of standardizing coupler mountings to provide for interchangeability of cars, thus making interline business possible.

Mr. Hemming also urged the importance of standardization of coupler mountings and clearances. Numerous details in car design were affected by mounting, particularly as applied to train service operation. He said that truck centers would be affected by car length, and in deciding the distance between truck centers side clearance at the ends and center of car must receive consideration.

Mr. Hemming also recommended that the standardization committee take up the question of car heating and ventilation in relation to the number of passengers on car. This investigation should include size of heaters, piping, kind of fuel, rate of firing, etc.

Mr. Jeffries also called attention to the subject of heating in its relation to amount of passenger traffic. Some cars were too cold and others were too warm, needing additional ventilation. It was hard to arrive at a satisfactory conclusion as the opinions of passengers differed, some wanting cold cars and others warm. At the conclusion of this discussion the standardization committee was instructed to consider the subject and report.

Mr. Keys called attention to the fact that moving-picture films had been secreted under seats by a man who then left the car immediately, and that they had been removed at the end of the run by another man who boarded the car and looked under the same seat for the package. This practice had been broken up. Mr. Jeffries said that the same practice had been discovered on one line running from Indianapolis.

President Whitney announced that L. M. Clark, master mechanic Indianapolis Traction & Terminal Company, would give a demonstration of the oxy-acetylene process of welding and cutting off for the members who were interested.

President Whitney also stated that the place of the June meeting had not yet been decided. A decision would be made later and the members would be notified by Secretary Neereamer.

The report of the standing auditing committee was then presented. It stated that the accounts of the secretary and treasurer had been checked and verified. The committee was composed of Walter Shroyer, L. T. Hixon and E. L. Kasemeier.

Mr. Neereamer then read his annual report as secretary-treasurer. This is published elsewhere. The report was accepted and filed.

Mr. Whitney then read the annual presidential address, which is also published elsewhere in this issue.

Following this address Secretary Neereamer presented the report of the nominating committee, which consisted of F. D. Carpenter (chairman), C. E. Palmer, S. D. Hutchins, A. Benham and E. B. Peck. The officers nominated were as follows: President, Arthur W. Brady; first vice-president, E. F. Schneider; second vice-president, C. L. Henry; secretary-treasurer, A. L. Neereamer; executive committee, H. A. Nicholl, W. S. Whitney, C. N. Wilcoxon, G. H. Crall, R. A. Crume, F. W. Coen, E. L. Kasemeier, J. F. Keys, C. O. Sullivan, A. Benham, S. D. Hutchins and Will H. Bloss.

The secretary was then instructed to cast one ballot for the nominees, who were then declared elected.

President-elect Brady was called to the chair, and after thanking the members for the honor given him, he said he would be well content if he could keep the association in the path of progress it had pursued so successfully in the last few years. He was a thorough believer in the work done by this and other associations. Anybody who looked over the history of the electric railways of this country knew that those in this part of the United States were performing their service for the public much better because of the work of the Central Electric Railway Association.

J. Edward Krause, president of the Hotel Washington, expressed pleasure that the members of the association had been his guests. Of the newly elected officers and committee members, Messrs. Henry, Neereamer, Nicholl, Wilcoxon and Bloss made short addresses expressing thanks for the honor of their election.

The meeting was then adjourned.

At the annual meeting of the Central Electric Traffic Association on Feb. 26 Chairman Neereamer was re-elected and routine business transacted.

### REPORT OF MAIL COMPENSATION COMMITTEE

The special committee of the American Electric Railway Association which appeared before the joint committee of Congress on postage on second-class mail mater and compensation for transportation of mail, on Feb. 7, after consideration of the matter, has asked the joint committee to make a definite recommendation on the subject of compensation for carrying United States mail in independent and compartment cars of electric railway companies. The railway committee asks the committee of Congress to make a recommendation that the Postmaster-General be authorized and directed to allow for space used in electric railway postal cars the rate of 1½ cents per linear foot on all cars not exceeding 30 ft. in length for each mile run in the performance of service, and that a minimum mileage of service should be provided of 30,000 miles per year for each car required in the service.

### INSTALLATION OF SIGNALS IN INDIANA

The Railroad Commission of Indiana has requested the interurban electric railways which it has ordered to install signals this year to close their contracts and proceed with the work. The date set for the completion of the entire block signal protected sections, which was fixed originally at July 1, 1913, was not changed. The conference in regard to the installation of the signals was held Feb. 20, 1913.

## VALUE OF PROPERTY IN NEW YORK REORGANIZATION CASE

The New York Public Service Commission, Second District, has rendered a decision in the case in which the Westchester Street Railroad asked authority to issue capital stock. This company was organized to acquire all but a small portion of the track of the former Tarrytown, White Plains & Mamaroneck Railway, which was sold at foreclosure sale. The Westchester company asked for the authorization of \$912,023 capital stock to meet the cost of purchase and other expenses. In its decision the commission approves the rule laid down by the Legislature in Section No. 55a of the Public Service Commissions law, that the value of an existing property for the purpose of capitalization is to be ascertained by "taking into consideration original cost of construction, duplication cost, present condition, earning power at reasonable rates and all other relevant matters." Taking into consideration all of these matters the value of the property was determined as \$400,000. The decision was written by F. W. Stevens, chairman of the commission.

### VALUE OF THE PROPERTY

In regard to the value of the property Mr. Stevens says in part:

"The determination of the value of property by governmental authority may become necessary in a variety of cases, but for our purposes we may consider only the three principal classes: (1) assessments for purpose of taxation; (2) valuations in the fixing of rates to be charged by public service corporations; (3) valuations necessary in the authorization of capitalization of such corporations. In the first two classes rules for fixing value have been very largely considered by the courts. In the third class such rules have not, so far as I am aware, been laid down by any judicial authority which is binding upon this commission.

"The net result of the cases in the United States Supreme Court in which the method of valuing the property of solvent railroad corporations for the purposes of taxation has come up for consideration is that the commercial method of valuation is the one which is to be followed, as giving the most satisfactory results.

"Liberal extracts have been made in the decision from the opinion of the New York Court of Appeals in the Barker case, 47 N. Y., 70, which, however, should be consulted in full, for the purpose of showing that the real ground of decision was not that the cost of production was necessarily a true basis of value, but that it was the only practical and practicable basis. Whether the court succeeded in finding a just rule is not the question. It adopted the cost of reproduction, with all its known inconsistencies and absurdities. Thus, in one town, 5 miles of track may have been constructed upon level ground at little expense, while in an adjoining town the same amount of track may have been constructed at great expense, including a tunnel, an expensive fill across a deep gorge or a highly expensive bridge across a river. The portion of the road in the town of lesser expense would be of as great value to the operation of the road as the other and would contribute as much of its earning power, and yet the assessment might be but one-tenth or one-twentieth part of that in the adjoining town.

"It must be noted that the opinion of the court, in none of its reasoning, attempts to sustain the position that if the road could be valued as a whole the cost of reproduction would be the controlling factor or even a factor of very much weight.

"Six cases are the only New York decisions which need engage our attention. They cover a period of approximately forty years and give a complete view of the judicial utterances during that time upon the point involved. In five of them the net earnings rule is adopted as the better

and fairer basis of assessment, with a recognition in some of them that cost and reproductive cost may be resorted to for information and instruction.

"Fixing value for the purpose of rate making has been discussed chiefly by the United States courts. The leading case in the United States Supreme Court on this question is *Smyth vs. Ames*, 169 U. S., 466, decided in 1898. This method of arriving at the 'value' of the property of a public service corporation has been very extensively cited as well as lauded in unstinted language. It demands analysis and study. The problem is stated by the learned court to be the ascertainment of the 'fair value of the property being used by it [the corporation] for the convenience of the public.' It then proceeds as follows, the language being divided by me for convenience of reference into numbered paragraphs:

"And in order to ascertain that value (1) the original cost of construction, (2) the amount expended in permanent improvements, (3) the amount and market value of its bonds and stock, (4) the present as compared with the original cost of construction, (5) the probable earning capacity of the property under particular rates prescribed by statute, and (6) the sum required to meet operating expenses, are all matters for consideration and are to be given such weight as may be just and right in each case.'

"Reduced to concise language and stated in terms having a well-known and definite meaning, the court merely says that in determining value the matters for consideration include (1) cost of property; (2) reproductive cost; (3) commercial value; (4) net earning power.

"It does not limit consideration to these matters, but expressly recognizes that there may be others, offering, however, no indication of what they may be. It is beyond question that if we make reproductive cost the test of value a result will be reached in the great majority of cases different from that which would follow either from commercial valuation or from capitalization of net earnings. This is undoubtedly the case in the comparison of any two theories. The capitalization of net earnings will rarely, if ever, produce the same amount as commercial valuation. If one of these methods is adopted in its entirety, such adoption necessarily excludes the others. If all are to be considered, what relative weight is to be given to each?

"Taking the case in hand as a fair example, we find that we have no evidence as to the cost of the property, and it is a fair assumption from the facts known to us that to ascertain such cost with reasonable precision is impossible. The commercial valuation is an impossibility for the reason that the bonds and stock of the corporations which have owned the property never had any market value. The capitalization of net earnings cannot be considered, for in effect there have been no such net earnings. Reproductive cost can be approximated. If the value of property were always equal to reproductive cost, truly a happy state of affairs would exist. There could be no such thing as loss in venture, except from the depreciation by decay or wear of the property itself. A railroad could be built from nowhere to nowhere without business of any kind and yet its value would continue to be what it would cost to reproduce it.

"There is not to my knowledge, in any reported opinion, a thorough discussion of what constitutes value.

"The diversity of judicial opinion as to the rule for determining the value of a complex property used as a unit in the public service for the purposes of taxation and the fixing of rates apparently leaves the commission free to investigate as to the proper method to be pursued in capitalization cases. It is, perhaps, not too much to say that the failure of the courts to analyze carefully the problem has left the situation obscure upon the principle.

"There can be no question that 'value,' with reference to the purposes of taxation, fixing of rates and capitalization, means value in exchange. This was clearly brought

out by Adam Smith nearly a century and a half since and has remained a recognized truth with all economists since his day. The homely speech of the people expresses roughly the same truth that is contained in the most precise and elaborate reasoning of economists when they say 'A thing is worth what it will sell for.'

"In cases where the sole attraction of a property which gives it exchange value, or, in other words, creates a desire for its ownership, is pecuniary gain the measure of the desire, and hence of the ratio of exchange, is clearly the amount of gain which it is believed can be realized. This fundamental consideration indicates that the net earnings rule of valuation, when properly and carefully applied with due regard to all the features of the individual case, is probably the one having the surest support of basic principle. It is also the one which accords with the practice of shrewd, broad-minded, successful men of business.

#### LEGISLATIVE RULE FOR FIXING VALUE

"The Legislature has very recently determined the rule for fixing the value of property involved in reorganizations of insolvent corporations. By amendments to the public service commissions law it was declared that the commission shall determine the amount of capitalization of corporations reorganized under and pursuant to Sections 9 and 10 of the stock corporation law, and the amount of the capitalization shall not exceed the fair value of the property involved. The value of the property is to be ascertained by 'taking into consideration its original cost of construction, duplication cost, present condition, earning power at reasonable rates and all other relevant matters.' The language quoted is from new Sections 55a, 69a and 101a, and definitely determines, so far as the property or reorganized corporation is concerned, that all of the aforesaid matters may be taken into consideration by the commission required to determine the value.

"This rule established by the Legislature for determining value in one class of capitalization cases can well be extended to all capitalization cases coming before the commission.

#### ELEMENTS FOR DETERMINING VALUE PRESENT IN THIS CASE

"The evidence in this case and the records of the commission place before us the following matters from which we are required to determine the value: (1) reproductive cost less depreciation; (2) past earning power of the road, with a general knowledge of the prospects for future growth and business; (3) price which the property realized at open competitive sale."

The decision then takes up the three matters mentioned. The conclusions reached on these points are stated in part as follows:

"At a hearing held Aug. 31, 1911, it was arranged that a revaluation of the road as to its reproductive cost, less depreciation, should be made by the engineers of the company and the engineer of the commission. After prolonged investigation they have agreed upon results which will be accepted. Their conclusions are as follows: Power and car equipment, \$237,739.98; track and way, \$207,954; total reproductive cost less depreciation, December, 1909, \$445,693.98.

"The road as a whole, before it came into the possession of the applicant, was a bad loser, saying nothing of depreciation and unpaid taxes. The net deficit, exclusive of the depreciation, unpaid taxes as stated and fixed charges, for the period 1904-11, both inclusive, was \$37,872. Since the road has been in the possession of the applicant there has been a marked improvement in gross earnings."

The decision then explains the necessity of considering a situation arising from a franchise complication which is in the courts for adjudication. The predecessor company accepted supplementary franchises providing for a rate of fare of 5 cents from White Plains to Mamaroneck. When the present company acquired the property it re-established the fare of 10 cents. According to the state-

ment of the company the enforcement of the lower rate of fare from Dec. 8, 1909, to Sept. 30, 1911, would have turned a net revenue of \$12,339 into a deficit of \$6,077. In view of the judgment of the lower court that the franchise conditions are binding and of the evident view of the applicant that the existence of these conditions causes a serious diminution in the value of the property, the commission treats these conditions as a factor of considerable importance in determining the value of the property.

Chairman Stevens describes the competitive bidding at the foreclosure sale of the property between the Third Avenue Railway interests and representatives of the New York, New Haven & Hartford Railroad and says it is more than probable that the bidders considered the franchises of the company to be of value. As the public service commissions law forbids the capitalization of franchises and the applicant saw fit to pay for the franchises as a part of the value of the property, to that extent capitalization by stock issue is denied.

"With the improvements which the applicant is making on the road," the decision continues, "and with the general efficiency of operation which ought to accrue from good management, this operating ratio should be reduced very considerably, which would make an improvement in net income even without increase in operating revenues. There is, however every reason to believe that the operating revenue will continue to increase."

#### SUMMARY OF CONSIDERATIONS AS TO VALUE

In this summary and conclusions Chairman Stevens said:

"Referring now to the matters before us, from a consideration of which we must determine the value of this property, we have first a reproductive cost less depreciation of \$445,693.98; second, the past earning power of the road, a net deficit from its inception to June 30, 1911, leaving wholly out of consideration all fixed charges and returns upon capital invested, coupled with the reasonable prospect that in the immediate future the loss will be changed to profit to some extent (the net income, however, will be diminished to some extent by reason of the franchise restriction); third, the precise amount which the property realized at open competitive sale was \$882,400.78. It must, however, be found from the evidence that in making this bid the purchaser took into consideration franchise values which we are not permitted to capitalize and also rated the physical condition of the road as much superior to what it was found to be. After full consideration of all these matters, it is the judgment of the commission that the value of the road at the time of the purchase did not exceed the sum of \$400,000. There are some matters of expense connected with the acquisition of the property which are properly capitalizable and should be added to this sum."

A dissenting memorandum was filed by Commissioner Sague, who said in part:

"In this case I think the earning power theory is used to reduce the capitalization below a proper amount. If the present low earning power is used as a basis for reducing capital, it would appear that the corporation might fairly expect permission to increase its capital if a future increase in net earnings appears to justify it. There is, however, no indication in previous decisions of the commission to show that consent to such increase would be given."

The Bureau of Foreign and Domestic Commerce is about to issue a monograph dealing with the manufacture of electrical instruments and meters in Europe. The report is by H. B. Brooks, commercial agent of the Department of Commerce and Labor, who recently inspected thirty-one of the most important electrical works of England, France, Germany and Italy. The products of each concern are treated in detail, and descriptions are given of the building, equipment, labor conditions, kinds of material used and the markets in which the products are sold.

## COMMUNICATIONS

CONSTRUCTION OF AMERICAN AND PRUSSIAN  
ACCUMULATOR CARSFEDERAL STORAGE BATTERY CAR COMPANY  
SILVER LAKE, N. J., Feb. 25, 1913.

To the Editors:

The writer has noted with much interest the communication from Dr. A. Büttner in your issue of Feb. 22, but it does seem idle to consider a single articulated type of lead-acid battery car, weighing as in this instance 25 tons and operated at a maximum speed of 31 m.p.h. on a road in Germany, where lead battery manufacture, railroad wages and electrical energy are all cheaper than in the United States, in comparison with any one of the thirty different types of Beach-Edison cars produced in this country.

Furthermore, it is of no avail to discuss in public print the theoretical features of the two types of cars and batteries—the lead-acid compared with the Edison nickel-steel-alkaline. It is merely a personal assumption for Dr. Büttner to suppose that there is no theoretical reason why lead-acid battery cars cannot climb as heavy grades or operate on short intermediate charges at as high rates as the Beach-Edison cars when it is a fact that our cars are to-day operating regularly in many places over grades varying from 5 per cent to 13 per cent, and current taken from the battery for a given run is being replaced in from three to thirty minutes. Our cars may well stand now solely and exclusively upon their merits, namely, upon the results obtained by the unprejudiced gentlemen who buy the cars from us and who operate them because they earn a profit on such operation.

Lead-acid battery cars were first produced in 1885 and lead-acid batteries were first produced a century ago. The oldest standard Edison nickel-steel-alkaline battery, which is in use to-day, was installed in an auto-truck only seven and one-half years ago. Our oldest standard car, although a previous experimental car was abandoned, was used three years ago on the Washington (D. C.), Spa Springs & Gretta Railroad for a few months and subsequently was sold to the Suffolk Traction Company at Patchogue, N. Y., where it has been in continuous service to this date with the original battery and with no battery renewals whatever.

Now, let us claim credit not for what we plan for the future but for what we have actually accomplished in our short but successful past. These are the records which Beach-Edison cars have established:

First—A car that has remained in continuous service the longest time without battery renewals and at a battery maintenance cost of 2 mills per car mile and that maintains to-day the same capacity as when installed three years ago.

Second—The greatest daily mileage—264.

Third—The greatest mileage per single battery charge on a test run—175 miles.

Fourth—The heaviest grades in regular service negotiated by battery cars; originally  $2\frac{1}{2}$  miles of constant 5 per cent grade. Our more recent installations involve long grades up to 13 per cent.

Fifth—The greatest continuity of service—running one hour, boosting at high rate for thirty minutes—maintained twenty-four hours per day.

Sixth—Battery car service which has not been interrupted by the coldest climates—as in Alaska, Montana, etc.

Seventh—Battery cars which are operated in the hottest climates—Chile and Cuba, with outside temperatures of 95 deg. to 103 deg. Fahr. Battery cars under high rate charging operated continuously eighteen hours a day without undue heating of cells.

Eighth—Fastest speeds. First 12 m.p.h., then 20 m.p.h., then 25 m.p.h., then 30 m.p.h., then 35 m.p.h., then 40 m.p.h., and recently 50 m.p.h. on level track.

Ninth—First storage battery train (multiple unit). Owing to the high energy consumption of the only multiple-unit control available, we developed for this a unique and highly successful control of our own.

Tenth—Largest vehicle of any description ever driven successfully by a storage battery. Railway cars of 50 ft. length singly and in trains.

Eleventh—Greatest number of passengers moved by a storage battery conveyance in regular service—170 passengers in train.

Twelfth—Greatest normal and overload horse-power of motors and battery per ton of dead weight of car—5-hp motors normal per ton; 500 per cent guarantee overload capacity of batteries for fifteen minutes.

Thirteenth—Lowest energy consumption at speed of 25 m.p.h., per train mile (three cars)—2.78 kw-hr. per train mile, 0.926 kw-hr. per car mile, 0.04 kw-hr. per ton mile.

Fourteenth—Lowest operating maintenance expense—7 cents per car mile.

Fifteenth—Longest life of battery in vehicle use at original capacity—seven and one-half years in auto-trucks.

Sixteenth—Only industry and organization ever devoted consistently and exclusively to the development and production of completely equipped battery cars and trains.

Seventeenth—Sold 78 per cent of all battery cars in 1912 and have over fifty separate railroad customers to-day—more than all other self-propelled car manufacturers of the United States combined.

When it comes to theorizing and prophesying, we also have the best of it. We believe that at no very distant day we shall have battery locomotives capable of operating the Twentieth Century Limited train of the New York Central Railroad from New York to Chicago on the present schedules, but we ask only that you credit us with those actual achievements hereinbefore enumerated.

LE ROY SCOTT,  
Assistant Secretary and Sales Manager.

## ELECTRIFICATION IN ITALY

SOCIETA ITALIANA WESTINGHOUSE  
VADO LIGURE, Italy, Feb. 13, 1913.

To the Editors:

We have just seen the article entitled "Heavy Electric Traction on the Continent" in your issue of Jan. 4 and take this occasion to correct and elaborate the statement therein concerning the electrification of the Turin-Pinerolo line of the Italian State Railroads. According to your report, the Administrative Board of the Italian State Railways has been considering the electrification of this line on the single-phase system for the purpose of reaching a decision with regard to the use of three-phase or single-phase for future electrification. In connection with this point, we wish to state that, according to the Oct. 15, 1912, issue of *Revista Tecnica delle Ferrovie*, which is the official organ of the State Railways, it has been decided also to apply the three-phase system to the Turin-Pinerolo line. It is important to note that this decision was taken at a time when the tests of the Loetschberg tunnel single-phase equipment had been made public. The Italian State Railroads have no reason whatever to abandon the three-phase system, which offers so many advantages and from which all inconveniences have been completely eliminated. In Italy the practical application of heavy electric traction is already twelve years old, so that the Italian State Railways possess not only a vast experience but also types of locomotives and overhead material which are the outcome of that experience. In short, the experimental stage in Italy has been passed, the present constructions being the result of many years' practical service.

It may also be well to elaborate your data concerning the present status of electrification in Italy. The Valtellina

line, electrified since 1902, and the Giovi line (Compasso-Pontedecimo-Busalla) and the Mont-Cenis line (Bardonecchia-Modane) are now in service, while the Savona-S. Giuseppe-Ceva division of the Savona-Turin line, as well as the Milan-Lecco line, are in an advanced state of construction. From this it will be seen that Italy has a whole network of state railway lines, operated with identical characteristics, namely, three-phase current, a frequency of 15 cycles to 16½ cycles, and a line potential of 3000 volts to 3800 volts, and using similar types of locomotives. At the present time there are in service nine locomotives built by Ganz & Company, of Budapest, and forty locomotives built by our company, while sixty-one locomotives, of which forty-five have five coupled axles with 2000 hp rated capacity and sixteen have three coupled axles of 2600 hp rated capacity, are also being constructed by our company. These two types of locomotives, practically speaking, are those which will operate all electric service on the Italian State Railways, that is to say, heavy freight trains as well as passenger trains reaching an average speed of 62 m.p.h. In conclusion, it may be of interest to state that the State Railways are about to present to Parliament an electrification program covering further lines.

PONTECORVO.

### SCHEDULES FOR 1912 CENSUS OF ELECTRIC RAILWAYS

The Bureau of the Census has begun to mail schedules to the companies for the 1912 census of electric railways. The census is to be taken under the direct supervision of W. M. Steuart, chief statistician for manufactures.

In the work of preparing to send copies of the schedules to electric railway companies the bureau tried to make a list of all railway companies that are controlled or operated from a central office and to send to that office the blanks for all of the properties controlled. The bureau also intended to send directly to each railway company not operated from a central office the schedule for its report. Where it appeared from the records of the bureau that the railway companies operated central electric light and power stations as separate departments for which they would want to make separate reports, schedules for such stations were included with the railway schedules. While every effort was made to comply with the purposes thus outlined, it is thought that the records may not be entirely complete and may not show in every instance, therefore, whether a lighting department controlled by a railway company is operated as a separate department for which accounts would be kept independent of the accounts of railway operations. Owing to the possibility that the records may not be complete in this respect it is possible that some railway companies will receive schedules for lighting plants in cases where the information is properly included in the report for the railway system, and where therefore no separate return would be required. It is possible also that in some instances the railway companies that operate separate lighting plants will not receive separate schedules for such plants. Questions relating to these matters should be taken up directly with the Bureau of the Census.

E. Dana Durand, director of the census, in his statement giving a reference to the act of Congress which authorizes the census of electric industries, states that the statistics for the 1912 census should relate to the calendar year ended Dec. 31, 1912. Except in the case of a number of employees all questions that relate to a single date such as mileage of tracks, cash on hand, etc., should be of the date of the last day of the year covered by the report.

As in previous cases where a census of electric railways has been taken, Mr. Durand states that the answers to inquiries in regard to financial matters will be held absolutely confidential. The separate reports will be combined so as

to show totals for all companies in each state. The information will be used only for the statistical purposes for which it is given and will not be disclosed to any individual, state or local authority or other bureau or department of the federal government.

The schedule for operating properties covers all electric railways and all street railroads irrespective of the kind of motive power used. The schedule for operating companies for the 1912 census is changed in some details from the previous form used for this purpose, but follows the same general lines as in the past. In addition to the usual statistics relating to types of cars and their equipment, the schedule will show the number of prepayment cars and the number of electric locomotives.

In the computation of car mileage the individual car is to be considered the unit. A motor and one trailer may be treated as a unit, however, if this is the practice of the company. The inquiries relating to financial operations conform generally to the system of accounts adopted by the American Electric Railway Accountants' Association and the Interstate Commerce Commission. All companies irrespective of size are to use the condensed statements provided. A form of balance sheet is also included.

The section relating to employees, salaries and wages says that if possible the number employed on Sept. 16, 1912, should be given. Additional questions are provided in the schedule for electric railways which operate electric light and power plants.

The schedule for non-operating and lessor companies provides for a classification of track, a brief statement of income account and a balance sheet.

### REQUEST FOR SAN FRANCISCO CONVENTION RESERVATIONS

H. G. McConnaughy, secretary of the American Electric Railway Manufacturers' Association, has sent under date of Feb. 25 a letter to all members of the association in which they are informed that the American Electric Railway Association has decided to hold its 1915 convention in San Francisco, in October, during the Panama-Pacific International Exposition. Mr. McConnaughy's letter is accompanied by two report blanks, on one of which the member firm is requested to indicate whether it will make an exhibit at the San Francisco convention and, if so, how many square feet of space it will require for exhibit purposes; on the other the member firm is requested to state the number of hotel rooms of the several kinds specified which it would like to have reserved for the week of the convention. The letter states with regard to the exhibits that a committee has been appointed to complete arrangements as soon as the individual members have expressed their wishes on this subject. The same committee also has agreed to take up the question of hotel accommodations, and it is desirable that the hotel blank should also be filled out and mailed immediately after receipt from Mr. McConnaughy in order that arrangements can be made for hotel accommodations before the options expire.

The information obtained from these blanks will help the committee on convention location of the American Electric Railway Association to make final arrangements for the exact date of the convention and for other matters in connection therewith when it visits San Francisco during the last week in March.

A company named the Chemins-de-fer Electriques de la Champagne has been formed in France to build a system of local railways in the departments de l'Aube et de l'Yonne. The lines will be of meter gage and the extent of the system about 120 miles. The lines will operate with single-phase current furnished by a hydro-electric company.

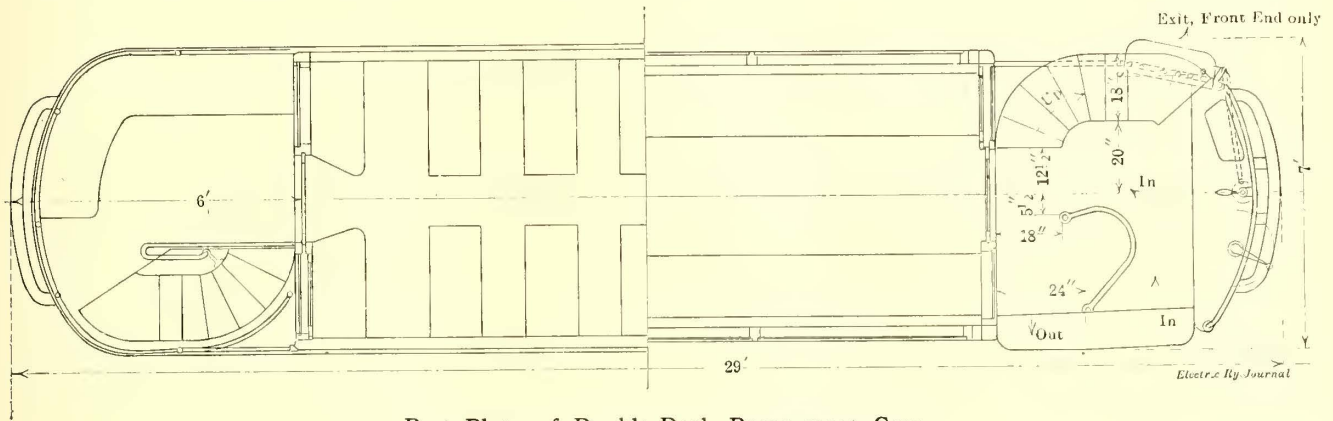


**DOUBLE-DECK PREPAYMENT CARS AT ABERDEEN  
— OTHER DEVELOPMENTS**

The first foreign application of the prepayment idea to double-deck cars was made early in December, 1912, by the Aberdeen Corporation Tramways. At present one converted car is in service, but arrangements have been made with the International P-A-Y-E Tramcar Company, Ltd., London, Eng., for licensing ten cars to be used this spring.

from one end to the other. The stages will be numbered in heavy type so that the conductor, who knows the numbers, will have no difficulty in punching the ticket correctly.

The P-A-Y-E Company has also licensed ten new double-deck cars for the Leicester Corporation Tramways. These cars are to have the exit and entrance arrangements indicated in the accompanying drawing. It is proposed to place the cars in operation during the present winter.



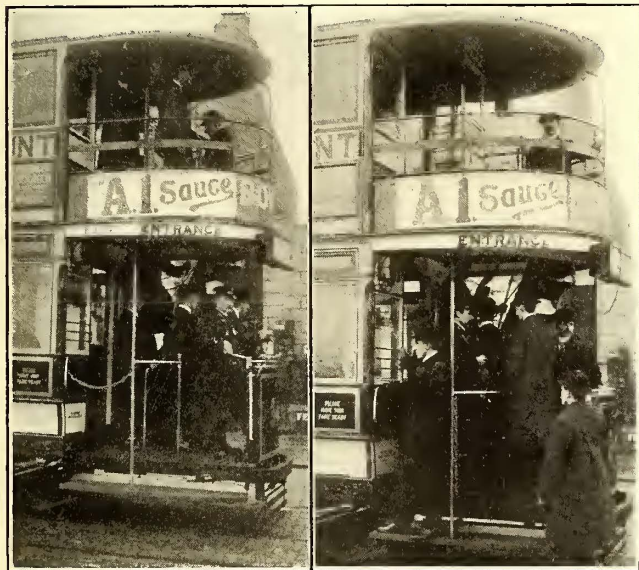
Part Plans of Double-Deck Prepayment Cars

The accompanying illustrations are views of the rear and front platforms of the first car. The view of the front platform shows the passengers leaving at the left, a chain being installed between the stanchion and bulkhead to prevent them from alighting on the devil-strip side. The use of the front platform for exit in addition to the exit aisle on the rear platform is quite a departure from British practice and it is expected to facilitate greatly the loading and unloading of cars.

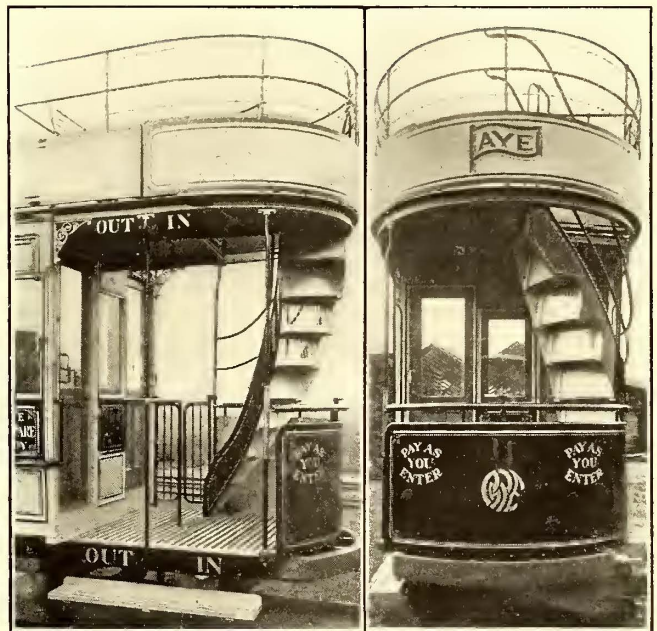
Two kinds of tickets, as hereinafter described, have

Should they prove successful about 175 cars will be remodeled for the same method of operation. Colored tickets will be used in Leicester to take care of the four zones, but numbers will be used in cities with a great many zones like Glasgow. A machine has been developed whereby the correct exit zone ticket will be given out by the conductor under any conditions.

It is reported that the Boulevard Chemin de fer Elec-



Front and Rear Platforms of Aberdeen Double-Deck Prepayment Car



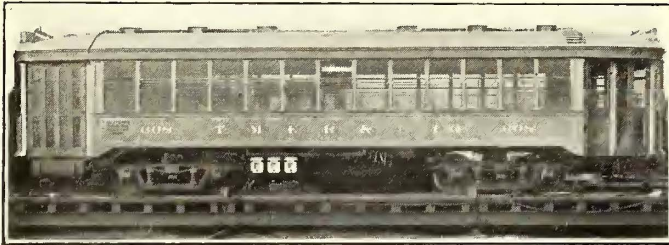
Models of Prepayment Platforms as Arranged for Double-Deck Cars with Drop Platforms

been provided by the licensing company for use on these cars. On bridges and circular routes where more than one penny fare is included in the trip each ticket contains only the names of two stages marked in heavy type along the border. The center of the ticket bears a colored band, the color differing according to the exit zone. It is therefore easy to detect over-riding since all the tickets given up in one zone must be of one color. The second tickets will be used on ordinary routes where the fare is a penny

trique Central, a new suburban line between Paris and the forest of St. Germain, will operate fifty cars on the prepayment principle. At present, it is experimenting with a center-entrance car which handles two classes of passengers. The growth of the prepayment idea abroad is also indicated by the fact that negotiations are now under way for installations in Moscow, Russia, and Shanghai, China. In fact, prepayment designs are being considered by more than thirty foreign electric railways.

## NEW CARS FOR MILWAUKEE

The Milwaukee Electric Railway & Light Company has recently received and put in operation thirty semi-steel cars of the pay-as-you-enter type built for double-end operation. In general, the interior arrangement conforms to that in the cars which the company is now engaged in rebuilding. In the main construction details and general appearance, how-



Milwaukee Car—Side View, Showing General Design

ever, the new equipment is a considerable departure from the earlier cars.

The general dimensions of the new car are as follows: Length of car over corner posts, 33 ft. 8 in.; length of car over bumpers, 47 ft.; width of car over belt rail, 8 ft. 5 in.; height, top of roof to floor, 8 ft.  $1\frac{7}{8}$  in.; height of floor above rail,  $41\frac{5}{16}$  in.; truck centers, 22 ft. 8 in.; distance center to center of posts,  $29\frac{3}{8}$  in.; diameter of wheel, 34 in.; seating capacity, 52; total weight, 49,000 lb., including weight of electrical equipment, 13,100 lb.; weight of car body per passenger, 942 lb.

### BODY CONSTRUCTION

One side of each vestibule is supplied with double folding doors which open out, leaving a clear entrance 3 ft. 8 in. in width. The opposite side is provided with a single folding door which also opens out and leaves a 2-ft. 4-in. opening. The narrow opening forms the exit at the motorman's end of the car and the wide opening the entrance at the opposite end of the car. A rail leading from the center of the bulkhead is so arranged as to separate the passengers boarding from those alighting on the rear platform, as well as to enable the passengers to steady themselves as the car starts, a feature which has been found to be very necessary upon a large open platform. A small platform in the corner adjacent to the bulkhead and opposite the wide entrance door forms the conductor's station. A fare box which is of the "coffee can" type peculiar to Milwaukee and the conductor's door-operating handle are located on the narrow portion of the bulkhead which projects into the car at this point.

One of the novel features is found in the vestibule doors which are built with all glass panels. Polished woven wire glass was set in the lower panels and clear glass in the upper. The wire glass is  $\frac{1}{4}$  in. thick and the clear glass is of 39 oz. crystal plate. Both sets of entrance and exit doors are wired in series with a light signal at the motorman's station. He depends entirely on these signals for starting the car, as the customary bell cord and bells for signals are used in special cases only. Push buttons ring a bell at the motorman's end of the car.

Other unusual features in the platform equipment include the motorman's seat, which is applied to a bracket supported on the hand brake staff. The absence of a bulkhead made it necessary to install on the vestibule ceiling just back of the motorman's station a curtain which may be pulled down and attached to a fastening in the floor. The conductor's station is also supplied with a small folding seat which is hinged to the side of the car so that it may be swung out of the way if desired.

The car body is provided with seats for fifty-two passengers. Fourteen cross-seats with pressed-steel pedestals and upholstered in rattan are spaced at  $29\frac{5}{8}$ -in. intervals

in the center of the car body. Four 7-ft. 9-in. longitudinal seats occupy the remaining space in the body at the ends. One of the cross-seats at the center of the car is removed during periods of low temperature so as to make way for a forced-draft heater. The space under the longitudinal seats is utilized for sand boxes, battery for the motorman's signal, air reservoir and triple valve at one end of the car, and a duplicate sand box, a signaling device and a box to contain wrecking tools at the other end.

The new cars are equipped with complete brake rigging for hand and air brakes. The air-brake system is that of the National Brake Company, arranged for trailer operation. In addition to this, hose connections, piping and fittings necessary for through train line connections to the trailer have been provided.

All wiring and electrical apparatus has been installed to conform to the requirements of the Board of Fire Underwriters, the wiring being installed in conduit which is grounded. A jumper socket for electrical connections to trail cars, for bells, starting signals and lighting circuits, has been installed. This socket is provided with four contacts so that when the jumper plug is applied complete connections are made for the four circuits.

A special feature of the car wiring is the motor connection box. This box and the leads are so arranged as to make disconnections quickly and to eliminate the use of tape on the leads. Essentially the connection box consists of an insulating block on which brass clamp terminals are mounted. A sleeve is permanently applied to the end of each motor lead by sweating it in position. The cover for closing the connection box is of malleable iron insulated and bolted to the center sills.

The car body is mounted on Baldwin trucks on which are mounted four 50-60-hp Westinghouse interpole, box-frame motors. An unusual feature in connection with the rolling stock used on the Milwaukee railway is that in addi-



Milwaukee Car—Interior View of Vestibule

tion to providing an overhead circuit breaker in each vestibule, the motors are protected against overloads by fuses. The motor control is General Electric K-35. Plans and specifications for these new cars were prepared by the mechanical department of The Milwaukee Electric Railway & Light Company under the general supervision of H. A. Mullett, superintendent of motive power and equipment, and they were built by the St. Louis Car Company.

## TWO-UNIT GAS-ELECTRIC TRAIN ON THE PITTSBURGH & LAKE ERIE

The accompanying illustration is an excellent view of the two-unit gas-electric train now in service on the Pittsburgh & Lake Erie Railroad between Pittsburgh, Pa., and College,  $\frac{1}{2}$  mile west of Beaver Falls. The complete system of this division of the New York Central Lines extends from Youngstown in northeastern Ohio to Pittsburgh, where it branches into two sections, one going to Brownsville and the other to Connellsville in southwestern Pennsylvania. The road handles an extensive freight business, its equipment consisting of 249 locomotives and 24,608 freight cars, in addition to 140 passenger and 468 miscellaneous cars.

The service of this gas-electric motor train is unique. It is the first instance where a self-propelled car of the type has been employed in this country on a main-line heavy four-track road for local runs and interpolated between the schedules of limited trains. The motor car differs from the standard sizes heretofore developed by the General Electric Company: It is much shorter and is designed essentially for operation with a trailer. The seating capacity of the combination, however, is greater and equals the best ruling practice of interurban roads.

On the trial trip of the train from Pittsburgh to College, a distance of 31.2 miles, the outgoing run was made in forty-nine minutes, including three stops, at Coraopolis,



Two-Unit Gas-Electric Train on Pittsburgh & Lake Erie

Woodlawn and Aliquippa respectively. Returning with two stops, the Pittsburgh section was reached in forty-two minutes. As the train is equipped with motors of 200 hp total, it is capable of averaging easily 50 m.p.h.

The motor car is 42½ ft. long, 10 ft. 5 in. wide, weighs 36 tons and seats forty-two people. It is partitioned into three compartments—one 20 ft. 5 in. long, designed for a smoker, in which the seats are finished with Spanish leather; a small section for baggage, 6 ft. long, as the traffic requirements do not call for the transportation of bulky express matter, and a cab, 12 ft. long, containing the power plant apparatus. It is equipped with a rear platform entrance. The trailer is 38 ft. long over the body, weighs 22 tons and seats eighty people, making a total seating capacity for 122 passengers. The seats are cushioned with friezette plush. Front and rear platform entrances are provided. Throughout the cars the interior trim is of mahogany, highly finished, and the decks are ceiled with composite board. A preliminary description of this equipment was published in the *ELECTRIC RAILWAY JOURNAL* for Oct. 19, 1912.

A large number of time clocks have been placed on the various tramway lines of Leeds, England. The conductor registers each time he passes a clock, which records the time. This has done away with timekeepers and has assured more regular running of the cars. Similar clocks are in use in Liverpool and Manchester.

There are several applications of electric cranes and hoists in which the exigencies of the service demand, first, constant hoisting speeds with all loads; second, a wide range of speeds with all loads and, third, a very slow creeping speed with all loads. The control of d.c. series motors to fulfil these conditions, and especially the last named, has offered considerable difficulties to crane builders and users. One of the most usual methods of control has been to adopt a series controller with two, or at the most three, resistance notches arranged in parallel with the armature. While this arrangement can be made to give a small torque at low speeds, the increments of torque are necessarily great owing to the small number of notches.

The British Westinghouse Electric & Manufacturing Company, Ltd., in order to avoid jerking or dropping loads and to provide a creeping speed over a wide range of torques, has introduced a controller with two drums, the main drum, comprising the usual series starting and controlling notches and being operated by a crank handle, and the auxiliary drum, which is operated by a small hand wheel arranged to cut resistances in or out in parallel with the motor armature. The two drums are interlocked mechanically in such a way that the auxiliary drum can be operated only when the main drum is in either the first or second hoisting position, that the current is never broken on the auxiliary drum, and that the parallel armature re-

sistance cannot be left in circuit while rheostatic braking is going on, because this would cause the load to drop. Neither can the main drum be moved beyond these two notches unless the auxiliary drum is in the "off" position. There are eight or ten notches, according to size, on the auxiliary drum so that a total of seventeen or twenty-one creeping speeds can be obtained on the hoisting side, not including the other notches on the main series drum. At the same time, the controller can be used as an ordinary rheostatic braking controller if desired.

Two standard ratings of the resistances are furnished, an eight-minute rating and a continuous rating. The former is suitable for starting a motor against full-load torque during a period of eight minutes out of fifteen. The continuous rating will allow either the main drum or the auxiliary drum to be left on any notch continuously and is the rating recommended for general use. An additional field-exciting resistance is supplied if required to insure that a braking effect will be obtained on the rheostatic braking notches at the instant the load commences to lower, and this resistance is in circuit during the time that the controller handle is on any of the rheostatic braking notches.

The New South Wales government has approved a project for the construction of electric underground railways in Sydney, the city section of which is to consist of three lines instead of two, as originally recommended.

## LONDON LETTER

*(From Our Regular Correspondent)*

As a result of the absorption of the Central London Railway and the City & South London Railway by the Underground Electric Railways of London, which brings these companies into the Sir Edgar Speyer group of underground railways, a number of important changes have taken place in the directorates and management. Lord Knollys, Lord Rathmore and Robert Fleming have resigned their seats on the board of the Central London Railway, and Lord George Hamilton, Col. Sir Herbert Jekyll and A. H. Stanley have been appointed in their place. A. H. Stanley has been appointed managing director of the company. H. F. Parshall has tendered his resignation as a director, and the Hon. Sydney Holland has been elected to fill the vacancy. Lord George Hamilton has become chairman of the board. With regard to the City & South London Railway board, J. F. S. Gooday, S. Barclay Heward and Edwin Tate have resigned, and Admiral Sir Cyprian Bridge, T. C. Jenkin, who has resigned as general manager of the company, and A. H. Stanley have been elected in their place. A. H. Stanley has been appointed managing director. Lord George Hamilton has resigned as chairman of the London Electric Railway and Lord Farrer has been appointed in his place. Lord Knollys has been elected to a seat on the board. It will be observed that A. H. Stanley has been appointed managing director of both the Central London Railway and the City & South London Railway, and as he is already general manager of the Baker Street & Waterloo Railway, the Great Northern, Piccadilly & Brompton Railway, the Charing Cross, Euston & Hempstead Railway and the Metropolitan District Railway, he will now be manager of practically the whole of the underground electric railways of London.

It seems somewhat strange that the Metropolitan Railway could not see its way to amalgamate with these interests, but the board of that company decided that it was not to the interests of the company to fuse financially with the Metropolitan and the Underground Railway group. At a recent meeting of this railway it was stated that these fusions of interests were undoubtedly brought about by the serious and increasing competition of the motor omnibuses, which are now controlled by the Underground group, and that the tubes which had been absorbed had suffered very much from this competition. The Metropolitan company's position, on the other hand, was quite different. Less than one-half of the total revenue of the company was derived from traffic in competition with the motor buses, the main part of the receipts being from long-distance traffic, from freight traffic and from exchange with various trunk lines. The relations of the company with the Underground group are friendly and it has an understanding with the Underground group by which they work together in mutual interest, with a view to eliminating unnecessary competition.

Last November the Manchester Tramways Department, in view of the congestion of the tramway traffic in the central area, appointed a special sub-committee to consider and report upon:

(1) The probable increase of tramway traffic during the next twenty years.

(2) The provision necessary to diminish the increasing congestion by (a) widening of existing streets or the construction of new streets; (b) the acquisition of an arterial center; (c) the construction of subways for tram traffic.

3. The extent to which the financial resources of the tramway undertaking can be applied for this purpose.

The committee has issued its report. The number of passengers carried in 1905 was about 127,000,000, whereas in 1912 the number was nearly 175,000,000. If this rate of increase is maintained, the number will reach 386,000,000 in 1932. It has also been proved that the cost of operating cars in the congested central area is expensive, 2.26 units per car mile being required, as against 1.39 per car mile on a suburban portion. It is thus estimated that if all the cars in the central area could be operated at an average speed of 8 m.p.h., a saving of about £20,000 per annum could be effected. It is evident, however, that whatever plan is ultimately determined upon, the cost will be great, as street widening is very costly and the construction of

subways would cost probably about £400,000 per mile. The committee recommended that the general manager and the permanent way engineer be instructed to visit certain cities in the United Kingdom and abroad, study traffic conditions in those cities and report thereon for the further guidance of the committee prior to issuing their final report.

The Corporation of Glasgow has approved the proposals for the extension of the city tramways over nine new sections of roads or streets. In order to carry out one of the proposals it will be necessary to build a new high-level bridge over the River Kelvin. It is also evident that the question of a new bridge over the Clyde—to carry north and south lines of tramways—will have to be faced, as the continued extension of the system from the city outward is throwing into the center and on the present bridges an ever-increasing volume of traffic.

The Hastings Tramways intends to apply at the next session of Parliament for statutory authority to work the whole of its tramway system by means of overhead wires. At the present time the company's tramways along the sea front are worked by the Dolter surface contact system, which the preamble of the proposed bill alleges "is not satisfactory, owing to defects which are inherent to the system." The preamble further states that the board of trade has intimated that it may be necessary to call for the discontinuance of the use of the Dolter surface contact system in the interests of general safety, and it is therefore expedient that such system should be discontinued. It is understood that the Corporation of Hastings, which approved the Dolter system, will oppose any overhead system of electric traction along the sea front.

As a result of the recent poll on the question of Sunday trams, the Bournemouth Town Council will run a service on Sundays from 2 p. m. to 10 p. m., such as in the opinion of the general manager will best meet the convenience of the public. The employees will be paid at the rate of time and a quarter for Sunday work.

The North Eastern Railway has decided to electrify its mineral line between Shildon and Newport (Middlesbrough), a distance of 18 miles. The electrical energy will be purchased from the Newcastle-on-Tyne Electric Supply Company, in connection with the Cleveland & Durham County Electric Power Company and the Cleveland & Durham Electric Power, Ltd. The company has decided to build ten electric freight locomotives at Darlington. The order for the electrical equipment of the locomotives has been placed with Siemens Brothers, who have also secured the contract for the equipment of the permanent way, while the substation apparatus will be supplied by the British Thomson-Houston Company. The railway has decided to equip this line in preference to others, as the traffic is largely self-contained.

At a meeting of the Midland Railway statements were made in regard to the contemplated electrification of the company's suburban routes. The company is already committed to electrify the Southend route and now contemplates the electrification of the line formerly known as the Tottenham & Forest Gate Railway, running from Kentish Town, through Upper Holloway, Crouch Hill, South Tottenham, Walthamstow and Leyton, to East Ham, where connections are made with the main line between Tilbury and London. The main line from Kentish Town to St. Pancras will also be equipped for electric operation. At the same time, it is proposed to electrify the line to St. Albans, passing through Cricklewood, Hendon, Mill Hill and Elstree, and to connect with the extended tube of the London Electric Railway beyond Golder's Green.

Even the South Eastern & Chatham Company has made a move toward the electrification of its suburban lines. A start will probably be made with the company's Metropolitan section, which runs from Moorgate to Victoria. This line taps the thickly populated areas of Camberwell, Brixton, Clapham and Battersea. It is also probable that in the near future the Crystal Palace lines, with extensions to Nunhead and Greenwich, and the lines running from the city to Herne Hill, Penge and Bickley, and New Cross and Bickley, will be electrified. It will be seen, therefore, that practically all of the great railways with terminals in London are already electrifying or considering the electrification of their suburban lines.

A. C. S.

# News of Electric Railways

## Philadelphia Equipment Trust Approved

Both branches of City Councils of Philadelphia, Pa., have passed the ordinance granting consent to the Philadelphia Rapid Transit Company to issue car-trust certificates against its rolling stock to the amount of \$4,200,000. The bill further authorizes the company to acquire from time to time additional equipment "by further leases and agreements which may be made the basis of further issues of car-trust certificates and to guarantee the payment of such certificates with the dividend warrants, said issue not to exceed in any case 80 per cent of the cost of said equipment."

The stockholders of the Union Traction Company, Philadelphia, at a special meeting on Feb. 26, 1913, voted unanimously in favor of the \$4,200,000 car-trust plan. Besides assenting to the proposed issue of equipment-trust certificates, the stockholders voted to release any lien or interest in the 950 near-side cars and eighty elevated cars already bought and controlled. The certificates will be guaranteed by the Philadelphia Rapid Transit Company. It is explained that the Philadelphia Rapid Transit Company preferred to issue short-term car-trust certificates for equipment so as to use the proceeds of the long-term \$10,000,000 loan, of which only \$2,000,000 has been issued, entirely for permanent improvements, in which rolling stock is not included. The car-trust certificates will be issued in the denomination of \$1,000 and are to run for twelve years with interest at 5 per cent per annum.

## Municipal Ownership Resolution in Toledo.

A resolution paving the way to city ownership of the street railways in Toledo, Ohio, has been approved by the Council committees and will come before Council within a very short time. The text of the resolution is as follows:

Resolved, That a committee consisting of the Mayor, director of service, city solicitor, president of the Council and three members of the Council is hereby authorized to consider the advisability of taking over, in whole or in part, the property of the Toledo Railway & Light Company by purchase, condemnation or otherwise, said property of the above mentioned company consisting of its street railway system, electric light and power departments, artificial gas and heating departments, the Toledo, Ottawa Beach & Northern Railway, also its parks, known as the Toledo Beach and the Casino, all the above properties lying within or without the boundaries of the city of Toledo.

"Be it further resolved, That if, in the judgment of the majority of the above-mentioned committee, it seems wise at this time to take over the above-mentioned properties, in whole or in part, then this committee is further authorized to submit a plan to the City Council for purchasing that portion of the above-mentioned properties, as recommended by the said committee, by condemnation or otherwise, and for financing and operating the same by the city of Toledo, so as furnish the citizens and taxpayers of Toledo transportation, light, power, heat and recreation at the lowest possible cost consistent with the best of service."

The city authorities believe that if the amendment to the constitution does not clear the way for immediate municipal ownership, the adoption of home rule government by cities will do so.

It has been decided to operate one of the principal lines for a certain period with pay-as-you-enter cars with a view to their ultimate adoption for all lines.

Replying to a request for better service, Frank R. Coates, president of the company, said that the service has been increased 59 per cent in the last ten years, while the population of the city has increased only 30 per cent. In 1903 there was one car for every 878 persons and in 1913 there is one car for every 716 persons in the city. Each of the cars in use at present accommodates twice as many people as were handled in many of the cars ten years ago.

The ordinance introduced by Councilman Starner some time ago, providing for a 3-cent fare on all lines and universal transfers, was laid over by the committee until the complete report of the operation of the company for 1912 has been presented.

## Kansas City Appraisals

Bion J. Arnold, as special commissioner under appointment by the federal court to value the property of the Metropolitan Street Railway, Kansas City, Mo., reports that a fair sum to represent the capital value for adoption in any new contract with the municipalities where the properties are located would be \$36,700,000, including the Westport Company, and \$35,000,000 without it. These values, in the commissioner's judgment, should be apportioned as follows: Metropolitan System—Kansas City, Mo., \$28,000,000; Kansas City, Kan., \$5,600,000; Independence, Mo., \$350,000; Jackson County, Mo., \$700,000; Rosedale, Kan., \$350,000. Westport Company—Kansas City, Mo., \$1,200,000, and Jackson County, \$500,000. Mr. Arnold says:

"An analysis shows that 81 per cent of the appraised value, 83 per cent of the investment value, 83.8 per cent of the gross revenue, 79 per cent of the car miles and 75.9 per cent of the track miles are located or originate in Missouri. The true division of the recommended fair value cannot be determined by averaging the above percentages, but since the principal elements to be considered in such a division, namely, the actual investment and the gross revenue, are in substantial agreement, your commissioner believes that, taking all the facts into consideration and so long as the property is operated as an entity, the division between Missouri and Kansas on a basis of 83 per cent and 17 per cent respectively is fair and reasonable."

On this basis Mr. Arnold determines the apportionment as follows: Kansas City, Mo., 80 per cent; City of Independence, 1 per cent; Jackson County, 2 per cent, making Missouri's total 83 per cent; Kansas City, Kan., 16 per cent, and Rosedale, 1 per cent, making Kansas' total 17 per cent.

The city's experts place a valuation of \$16,272,593 on the physical property of the Metropolitan Street Railway in Kansas City, Mo., and Jackson County. In making the inventory they took no cognizance of property owned and operated by the company in Kansas, as it is to have no part in the pending franchise negotiations. The city's totals include the Westport Belt and the Independence lines, with more than \$1,000,000 voluntarily added on a basis of 8 per cent for capital that was idle during the period of construction of the lines. The city's estimates are:

	Cost	Present Value
Track, 216,734 miles.....	\$4,133,698	\$2,885,097
Bridges, viaducts, trestles.....	1,036,384	854,493
Grading .....	201,019	201,019
Paving .....	1,784,169	1,083,631
Electrical distributing system.....	1,567,339	1,321,089
Rolling stock .....	3,734,153	2,358,525
Power plant and substation equipment.....	2,484,413	1,907,634
Shop equipment .....	86,896	86,896
Building .....	1,920,095	1,493,224
Furniture, fixtures .....	30,692	26,174
Real estate .....	2,335,009	2,335,309
Right of way.....	112,925	112,925
Condemnations .....	45,250	45,250

Eight per cent added for interest and taxes on capital lying idle during course of construction work, approximately \$1,205,377.

It was arranged to resume the franchise negotiations on Feb. 18. Previous to their resumption Judge Evans, the city counselor, in an interview outlined some of the conditions that the representatives of the city had decided to insist upon. He said that the rate of fare would be one of the essentials of control which the city would demand if the franchise was extended. The city would also demand to become a partner in the management of the company and to have a voice in the expenditures and a certain degree of supervision over the issuance of additional security. The city would also demand a voice in determining the number of cars to be operated and in the regulation of service and schedules. The city would also reserve the right to purchase the property of the company at any time upon reasonable notice of such intention, all disputes to be

settled by the Circuit Court. All rights now reserved to the city in the pending peace agreement would be retained, including the control of the matter of building extensions. In return the company would get an eighteen-year extension of its franchise after the expiration of the present grant in 1925. At a conference on Feb. 18 between the representatives of the city and the officials of the company, the latter made it plain that the conditions noted briefly above were the ones that they would insist should be incorporated in the proposed franchise extension ordinance.

#### Progress in Preparation of Chicago's General Traction Merger Ordinance

The sub-committee of the local transportation committee of the Chicago City Council and Corporation Counsel Sexton are holding regular sessions in connection with the preparation of a skeleton ordinance for the merger of the surface and the elevated railways in Chicago. Bion J. Arnold, chairman of the Board of Supervising Engineers, has been called in from time to time to obtain his views on some of the points to be embodied in the ordinance.

The first important questions to be raised by the corporation counsel in the preparation of this ordinance were as follows: First, whether there shall be a board of supervising engineers as provided in the 1907 ordinance. Second, whether advertising shall be allowed in street cars. Third, rates of fare; shall there be a flat rate for every one, or shall decreased rates be allowed for children? Fourth, the question of charging for street cleaning and sprinkling on the lines. Fifth, whether there shall be a maintenance fund such as provided for in the 1907 ordinance. In discussing these questions the sub-committee, assisted by Bion J. Arnold, decided that the board of control shall consist of a constructing engineer, an operating expert, an expert accountant, a lawyer and a business man. Through this board it is proposed to exercise the power of regulating operation as well as maintenance of the transportation system. It is also proposed that the City Council shall have the authority in all questions of extensions and new construction, although the board would have the right to make recommendations. The Council also would have certain initiative and veto power over the authority of the board in the operation and maintenance of the line.

It was the sense of the committee that politics should be eliminated from the appointment of the members of the supervising board, but at the same time they believed the members should be appointed by the Mayor and confirmed by the Council. At the conclusion of the discussion Mr. Sexton was instructed to incorporate a plan by which only a part of the board's membership shall expire in any four-year period. This arrangement would not permit any incoming administration to change the entire personnel of the board from year to year. It was decided to limit the amount of advertising to be carried.

#### Rapid Transit and City Planning

George McAneny, president of the borough of Manhattan, speaking at the dinner of the New York Chapter of the American Institute of Architects in New York on Feb. 20, 1913, outlined plans for a "city beautiful" on the "civic center" idea. He said that he hoped to see ultimately the appointment of a city-planning commission, which would have such work in charge. Mr. McAneny said that he would recommend the naming of a commission to inquire into the height of buildings. In this particular he said in part:

"The laying out of rapid transit lines that will enable the people to reach more comfortable homes in the outlying and at present more or less undeveloped sections of the city must go hand in hand with the checking of abnormal building in those sections that are now at the city's center. In laying out our so-called 'dual system' of rapid transit lines we have kept the correct principles of city planning constantly in mind, and have laid down routes selected by the city and for the city's reasons, and not by the operating companies alone, interested as they naturally are in the continuance of the richer 'short hauls' and the concentration of traffic upon those lines that will pay best from a commercial railroading point of view.

"When these contracts are signed I think we had better get promptly to work upon the proper regulation of the height of buildings, or at least upon the careful consideration of what ought to be done or can be done, and I believe that you will now find the Board of Estimate quite prepared to make a start.

"One of the assistant engineers of the Public Service Commission told me a few weeks ago that if all the people who will be employed in a building of the type of the Woolworth Building were to leave at the same hour in the evening, it would take the northbound ten-car subway express trains, leaving the Brooklyn Bridge station upon the present headway, a little over half an hour to carry them away. There could be no better illustration of the point of what I am saying.

"Our downtown streets are already so greatly congested, morning and evening and at the noon hour, that they can scarcely hold more, and some of the uptown streets are beginning to present similar problems."

#### Attitude of Boston & Albany Railroad Toward Electrification

J. H. Hustis, vice-president of the Boston & Albany Railroad, appeared before the joint legislative committee on railroads at Boston, Mass., on Feb. 18, 1913, and explained at length the attitude of that company as regards electrification. He said in part:

"To electrify the road for passenger service within the metropolitan district will cost approximately \$6,413,300. Allowing for normal increase in travel and all possible economies under electric operation, it has been carefully estimated that electrification would entail an added net loss in operation of nearly \$550,000 per annum. Gross passenger revenue in the district under consideration is approximately \$1,300,000. To electrify for both passenger and freight service and to operate both services by electricity, as proposed, would add materially to the cost as given. To electrify the Grand Junction branch, running from Cottage Farm to East Boston and passing through Cambridge, Somerville, Charlestown, Everett and Chelsea, would, for grade-crossing eliminations alone, cost approximately \$4,500,000.

"It has been suggested that the burden of this increase in expense be met by increasing fares in the district electrified. On the present volume of traffic this would mean increasing fares fully 40 per cent. The active electric railway competition in the territory affected would not admit of any increase. On the basis of present rates the number of passengers carried would have to be doubled to meet carrying charges on the additional investment.

"That the New York, New Haven & Hartford Railroad proposes to electrify about Boston is given as one reason why the Boston & Albany Railroad should electrify, but the Boston & Albany Railroad's problem is its own and ought not to be confused with those of other roads. Another reason given is that the Boston & Albany Railroad is now controlled by the New Haven, and that the two should be considered an entity. If that were true, it would not be sufficient reason, but it is not true.

"Passenger and freight rates of the Boston & Albany Railroad have remained practically stationary for the past ten years or more. Expenses for material and labor have increased tremendously. During this same period wages have likewise increased, and this has been particularly true during the past several years, when increased wages and improved working conditions have resulted in increased compensation as follows: Engineers, 35 per cent; firemen, 39 per cent; conductors, 34 per cent; trainmen, 42 per cent; cent; yardmen, 54 per cent.

"It must be apparent that the operating management of the Boston & Albany Railroad is satisfactorily handling a very largely increased traffic at rates which are substantially the same as twelve years ago, and with reasonable expedition, regularity and economy. It has suffered in its operating showing, as have all the railroads, in the enormous increases in expenses, yet its unit costs of operation compare favorably with other roads of similar character. The lessee company has, moreover, not allowed the yearly deficit since 1906 to stand in the way of appropriating more money for improvements.

"Matters have reached a point where the volume of business, at the rates which have been in effect for more than a decade, just about enables the company to meet its operating expenses, leaving practically no surplus. Any contraction in its volume of business, any reductions in rates, or any additional burdens, such as that proposed by compulsory electrification, would prevent the road from earning its guaranteed rental and would restore or increase the annual deficit, which on the date of the last report to the Railroad Commission aggregated \$5,000,000."

**Public Relations in Buffalo.**—Mayor Fuhrman of Buffalo, N. Y., is reported to have expressed himself as follows recently: "I am pleased with the attitude of President Connette, of the International Railway. I have had frequent conferences with him and am convinced that the company will make improvements within a year which will make the people sit up and take notice."

**Decision in Toronto Case.**—The Ontario Railway & Municipal Board has dismissed the application of the city of Toronto, Ont., to require the Toronto Street Railway to operate the section of the Toronto & York Radial Railway commonly known as the Queen Street East stub. The commission holds that as no franchise or agreement now covers the line the obligation of the company terminated with the agreement.

**Senate Passes the Physical Valuation Bill.**—The United States Senate has passed the physical valuation bill as amended at the suggestion of Senator La Follette. The measure differs somewhat from the bill already passed by the House, but that body, it is well understood, will agree to the measure as passed by the Senate. The bill provides for the valuation of the property of all common carriers engaged in interstate commerce, including telephone and telegraph companies.

**Another Pittsburgh Subway Ordinance.**—The public service and surveys committee of the Council of Pittsburgh, Pa., on Feb. 20, 1913, laid on the table the proposed ordinance of the Pittsburgh District Railroad for a subway franchise. It has been announced that the project will be considered when the names of the backers of the company have been disclosed. The Council recently sustained the veto by Mayor Magee of the ordinance to grant the Pittsburgh Subway Company a franchise to operate a subway system in the city.

**American Capital in Mexico.**—According to figures compiled by Consul Letcher, at Chihuahua, Mexico, American investments in Mexico represent \$1,057,770,000, as compared with \$321,302,800 by England, \$143,446,000 by France and \$118,535,000 by all other foreign countries. The greater part of the American capital is in railway and mining securities. In the public utility field American capital is greatly exceeded by that of other countries. According to the consular report American capital invested in Mexican tramways, power and electric lighting plants aggregates only \$760,000, as compared with \$8,000,000 in English capital, \$5,155,000 in Mexican and \$275,000 in capital of other countries.

**Members of New England Railroad Conference.**—Simeon E. Baldwin, Governor of Connecticut, who was chosen chairman of the New England Railroad Conference at its first meeting in Boston recently, has appointed George M. Woodruff and Costello Lippitt to represent that State. Eugene N. Foss, Governor of Massachusetts, has named Chief Justice Marcus F. Knowlton and Admiral Francis T. Bowles, retired, to represent that State. Marsden J. Perry and Henry L. Lippitt will represent Rhode Island. The Governors of Maine, Vermont and New Hampshire have not yet announced their appointments. The conference was organized to deal with the general railroad situation in New England.

**Pueblo Company Complimented.**—The Pueblo *Chieftain*, in referring to the construction record of the Arkansas Valley Railway, Light & Power Company, Pueblo, Col., recently said: "One of the greatest conveniences, and at the same time the least paying, is the system of 'owl' cars. It affords transportation for the belated wayfarer and the man whose work keeps him late at night. The tracks have been pulled up and the light rails replaced with heavy steel. The promise that the people of the extreme

southern sections of the city should have transportation facilities has been kept; also the building of a line to City and Mineral Palace parks. New and modern cars have been introduced, and there is not a more courteous, obliging and capable force of motormen and conductors in the United States."

**Traction History in Lexington.**—The Lexington *Herald* published in a recent issue an illustrated article covering more than three pages under the caption of "Traction History in Lexington: Story of Stable Developments." The article was illustrated with numerous photographs of scenes along the line of the company and of the exterior and interior of its carhouse and power house. A complete roster of the officers and heads of departments was also published, together with statistics in regard to the company, covering capitalization, total number of employees, annual pay roll, number of cars, interurban mileage, city mileage, etc. Portraits were published of F. W. Bacon, vice-president of the company; J. R. Allen, general solicitor; Thomas D. Murray, secretary; R. C. Stoll, general counsel; Henry Bush, superintendent of transportation; Capt. Michael Feeney, the oldest employee of the company, and John D. Sallee, general freight agent. The article showed evidence of care and thoroughness in its preparation.

**Additional Municipal Lines Proposed in San Francisco.**—Street railway transportation was a topic of debate at the meeting of the Supervisors of San Francisco, Cal., on Feb. 10, 1913, following the receipt of a message from Mayor Rolph calling attention to the need of securing additional facilities for reaching the exposition site. The discussion resulted in the city engineer and board of public works being instructed to prepare plans and estimates of the cost of building an electric railway on Van Ness Avenue, between Market and Bay Streets, as an extension of the Geary Street Municipal Railway, also to prepare plans for other lines to the exposition. Another resolution passed directed the public utilities committee to report upon the feasibility of carrying out the plans prepared by Bion J. Arnold for handling the exposition traffic. The city attorney was also directed to ascertain what legal rights are possessed by the harbor commissioners to grant the use of the tracks of the belt railroad on the Embarcadero to the municipal railroad, also to compel the United Railroads to exchange transfers with the municipal railway. A resolution authorizing the valuation committee to negotiate with the Presidio & Ferries Railroad for the purchase of its rolling stock at the expiration of its franchise on Dec. 10, 1913, was referred to the public utilities committee.

## LEGISLATION AFFECTING ELECTRIC RAILWAYS

### INDIANA

Another straphangers' bill to take the place of the one recently killed has been introduced in the Senate. The bill specifies that when any steam, interurban or city railway habitually neglects to operate enough cars to seat comfortably all passengers the company shall be subject to a fine of from \$100 to \$500 for each day's offense. Representative Spencer has introduced a bill in the Legislature which would make it unlawful for any interurban railway, city railway or heat and light company in Indiana to require any switchboard operator to remain on duty more than eight hours continuously in any period of twenty-four hours. The Senate has passed the Harlan "blue sky" law.

A statement of more than 1000 words was issued on Feb. 22, 1913, over the signatures of Charles L. Henry, president and general manager of the Indianapolis & Cincinnati Traction Company; Arthur W. Brady, president of the Union Traction Company of Indiana, and Robert I. Todd, president and general manager of the Terre Haute, Indianapolis & Eastern Traction Company and the Indianapolis Traction & Terminal Company, defining the attitude of the interurban electric railways of Indiana toward the pending public utility legislation and pointing out how similar legislation in other states had worked to the embarrassment of the companies and to the detriment of the investors and the traveling public.

## NEW YORK

The abandonment of practically all the workmen's compensation bills pending in the Legislature and the substitution of a so-called compromise measure embodying features of the Murtaugh-Jackson, Foley-Walker, McClellan-Esquire, Carswell and Argetsinger bills was agreed to by the Senate insurance committee on Feb. 26, 1913. Senator Ramsperger, chairman of the insurance committee, in a statement regarding the new bill says it provides a definite schedule of compensation to workmen injured in the course of employment and to their dependents in cases of death, and requires an employer to insure his obligations with stock and mutual companies or with a State-managed insurance fund, or he may carry his own insurance if he can furnish satisfactory evidence of financial strength.

## WISCONSIN

Several amendments to the act relating to stocks and bonds of public service corporations have been introduced in the Legislature, concerning the purposes for which such corporations may issue stocks, regulating the issuing of stocks and bonds and giving the Railroad Commission wider powers in regulating the financial affairs of these companies. Another House measure gives municipalities the power to issue bonds to pay for any authorized subscriptions to corporations for building railroads of any kind, electric included. Another proposed measure requires interurban railroads to transport material used in the construction and maintenance of streets and highways. All street railway companies in the State will be required to issue transfers according to a measure introduced by Senator Lilley by request. Counties are to have the power to construct, purchase or acquire by condemnation any street or interurban railway by a Senate bill which has been referred to the committee on corporations.

## PROGRAMS OF ASSOCIATION MEETINGS

## New York Electric Railway Association

It has been decided to bring forward the date of the quarterly meeting of the New York Electric Railway Association at Lake George to March 6 and 7, 1913, instead of March 11 and 12, as announced in the *ELECTRIC RAILWAY JOURNAL* of Feb. 22, page 225. The proceedings will consist of an informal dinner at 8 o'clock on Thursday evening, March 6, at which addresses will be made by prominent speakers, and a business session on the following day, beginning at 10 a. m., both taking place at the Fort William Henry Hotel. Reservations for rooms should be addressed to Albert Theriot, manager Fort William Henry Hotel, Lake George, N. Y. The program will consist of the following papers and question box:

Paper, "Some Power Distribution Problems," by H. J. Childs, manager power distribution of the United Traction Company, Albany, N. Y.

Paper, "Operation of Trailers in Connection with Peak Load City Service," by George L. Radcliffe, general manager of the Cleveland Railway.

Paper, "Schedules," by J. J. Dempsey, superintendent of elevated lines of the Brooklyn Rapid Transit System.

Paper, "The Successful Claim Agent," by William H. Hyland, claim agent of the Fonda, Johnstown & Gloversville Railroad.

After the reading and discussion of the foregoing papers the question box will be opened to answer the following questions:

What is your attitude toward standard instructions covering the operations of workmen in the inspection and maintenance of equipment?

Should timekeeping be done by the auditor's department or by the department involved?

What are the relative merits of concrete and composition floors for cars as compared with wooden floors?

What is the best kind of joint to use in paved streets for a small road which cannot afford expensive apparatus for installing riveted or welded joints?

Are any injurious results occurring to rails or equipment where the rail is rigidly supported on a concrete foundation?

Is there any good preservative treatment for wooden ties other than creosote?

Is it desirable from the standpoint of the transportation company to reply through the press to public complaints or criticisms relative to traffic matters? What rates are charged for the transportation of newspapers on city and interurban cars, flat rates per package or by weight? Has the "paster" method been found satisfactory?

Is it better to contract with newspapers for transportation for space or to pay cash for all space used?

Has it been found practicable and desirable to contract with hotels or commercial concerns for the "call" of their places of business by conductors of cars?

## Keystone Railway Club

The fifth meeting of the Keystone Railway Club will be held at the Hotel Walton, Philadelphia, Pa., on March 10 and 11, 1913. At the session on March 10 the routine business will be transacted. It will be called at 8 p. m. The session on March 11 will be called at 9.30 a. m. and the following program of papers and questions for the question box will be presented:

Paper, "Electric Railway Management," by William H. Heindle, general manager of the Wilmington-Philadelphia Traction Company, Wilmington, Del.

Paper, "Parks and Their Transportation Problems," by C. F. Crane, superintendent of the Eastern Pennsylvania Railways, Pottsville, Pa.

Paper, "Motor Testing and Trouble Finding," by H. W. Branson, of the Service Engineering Company, Philadelphia, Pa.

The question box will be opened with these questions:

How often should car wheel axles be removed from under high-speed interurban cars? To assure against broken axles is 300,000 miles a safe mileage for axles in service?

Please give information as to whether inside-hung brake rigging, if properly designed, is as good as outside-hung brakes with brake beam holding brake-shoe heads in place, or are brake-shoe heads held better by brake beams?

Can brake shoes be held square against wheels without brake beams as well as with brake beams?

Give best method of field testing. How is it done and what apparatus is best for making this test?

Has any member had any experience with electric welding? Is it a paying proposition in a shop having only fifty four-motor cars to maintain?

Should cars equipped with air brake exceed 100 per cent braking efficiency for interurban service? What is proper braking efficiency for city cars?

## Society for Electrical Development, Inc.

The following program of papers has been announced for the meeting of the Society for Electrical Development, Inc., which is to be held in the United Engineering Societies Building, New York, N. Y., on March 4 and 5, 1913:

Paper, "Aims of the Society," by J. M. Wakeman, general manager of the Society for Electrical Development.

Paper, "Where the National Electric Light Association Comes In," by Thomas Commerford Martin, executive secretary of the National Electric Light Association.

Paper, "The News Value of Electricity," by Frank H. Gale, advertising manager of the General Electric Company.

Paper, "Electricity and the Architect," by Frank E. Wallis, of Wallis & Goodwille.

Paper, "The Dissemination of News," by Dr. Talcott Williams, director of the School of Journalism, Columbia University.

Paper, "Co-operation in the Electrical Industry," by J. Robert Crouse, of the National Quality Lamp Division.

Paper, "An Electrical Advertising Campaign," by William D. McJunkin.

Paper, "Selling a Commodity," by E. St. Elmo Lewis.

Paper, "Merchandising Co-operation," by W. E. Robertson, vice-president of the Robertson-Cataract Company.

Paper, "Efficiency in Local Advertising," by J. C. McQuiston, of the Westinghouse Company.

Paper, "Electrical Development and the Electrical Contractors," by Ernest Freeman, president of the National Electrical Contractors' Association.

The opening address will be made by Henry L. Doherty, president of the society.



# Financial and Corporate

## Stock and Money Markets

February 26, 1913.

The trading on the New York Stock Exchange to-day was considered very satisfactory, and was a pronounced change, strength being shown from the opening. Large numbers of orders to sell bonds were canceled and the bond market was steadier and furnished a basis for a better tone in the stock list. Even the issues of the recently promoted industrials established in some cases materially higher prices. Rates in the money market to-day were: Call, 3 per cent; sixty days, 4¼ @ 5 per cent; four, five and six months, 4½ @ 4¾ per cent.

In the Philadelphia market trading was narrow to-day in the purely local list. Philadelphia Rapid Transit trust certificates gained ⅝, selling at 25⅝.

In the Chicago market to-day Chicago Railways series one and two advanced, but Chicago Railways Company's 5's, series B, dropped 2½ points to 83½. Otherwise the bond list remained firm.

In the Boston market to-day trading was more active with prices firmer.

In the Baltimore market to-day the trading in stocks was very dull and sales totaled only 789 shares while the bond transactions amounted to only \$24,000.

Quotations of traction and manufacturing securities as compared with last week follow:

	Feb. 18	Feb. 26
American Brake Shoe & Foundry (common).....	92½	90½
American Brake Shoe & Foundry (preferred).....	133	130½
American Cities Company (common).....	47½	47½
American Cities Company (preferred).....	75⅞	75¾
American Light & Traction Company (common).....	390	390
American Light & Traction Company (preferred).....	108	108
American Railways Company.....	40¾	40
Aurora, Elgin & Chicago Railroad (common).....	43	43
Aurora, Elgin & Chicago Railroad (preferred).....	87	85¾
Boston Elevated Railway.....	109¾	108
Boston Suburban Electric Companies (common).....	7½	7½
Boston Suburban Electric Companies (preferred).....	65	65
Boston & Worcester Electric Companies (common).....	7	5½
Boston & Worcester Electric Companies (preferred).....	43	43
Brooklyn Rapid Transit Company.....	88½	88½
Capital Traction Company, Washington.....	122¼	122¾
Chicago City Railways.....	150	150
Chicago Elevated Railways (common).....	35	30
Chicago Elevated Railways (preferred).....	91	91
Chicago Railways, pteptg., ctf. 1.....	90	92
Chicago Railways, pteptg., ctf. 2.....	24½	23¼
Chicago Railways, pteptg., ctf. 3.....	7	6½
Chicago Railways, pteptg., ctf. 4.....	3½	3½
Cincinnati Street Railway.....	119	111
Cleveland Southwestern & Columbus Ry. (common).....	6	6
Cleveland Southwestern & Columbus Ry. (preferred).....	30	30
Cleveland Railway.....	104½	103½
Columbus Railway & Light Company.....	19	18
Columbus Railway (common).....	69	69
Columbus Railway (preferred).....	*105	88½
Denver & Northwestern Railway.....	a117	117
Detroit United Railway.....	76	76
General Electric Company.....	139	137½
Georgia Railway & Electric Company (common).....	123	a123
Georgia Railway & Electric Company (preferred).....	83	83½
Interborough Metropolitan Company (common).....	17	17
Interborough Metropolitan Company (preferred).....	59½	57½
International Traction Company (common).....	42	42
International Traction Company (preferred).....	95	95
Kansas City Railway & Light Company (common).....	20	20
Kansas City Railway & Light Company (preferred).....	41	38
Lake Shore Electric Railway (common).....	6½	6½
Lake Shore Electric Railway (1st preferred).....	a91	91
Lake Shore Electric Railway (2d preferred).....	a25½	25½
Manhattan Railway.....	132	132½
Massachusetts Electric Companies (common).....	16½	16½
Massachusetts Electric Companies (preferred).....	77	76
Milwaukee Electric Railway & Light Co. (preferred).....	102	102
Norfolk Railway & Light Company.....	26	*26
North American Company.....	79⅞	77½
Northern Ohio Light & Traction Company (common).....	80	80
Northern Ohio Light & Traction Company (preferred).....	105	105
Philadelphia Company, Pittsburgh (common).....	48	45
Philadelphia Company, Pittsburgh (preferred).....	41	40½
Philadelphia Rapid Transit Company.....	27½	25
Portland Railway, Light & Power Company.....	67	67
Public Service Corporation.....	116	115
Third Avenue Railway, New York.....	35	35⅞
Toledo Railways & Light Company.....	6	2¼
Twin City Rapid Transit Co., Minneapolis (common).....	104½	104½
Union Traction Company of Indiana (common).....	*4½	*4½
Union Traction Company of Indiana (1st preferred).....	*81	*81
Union Traction Company of Indiana (2d preferred).....	*34	*34
United Rys. & Electric Company (Baltimore).....	23¾	23¼
United Rys. Inv. Company (common).....	27	24
United Rys. Inv. Company (preferred).....	53	49½
Virginia Railway & Power Company (common).....	56½	55½
Virginia Railway & Power Company (preferred).....	93½	92½
Washington Ry. & Electric Company (common).....	84	84¼
Washington Ry. & Electric Company (preferred).....	88	87⅞
West End Street Railway, Boston (common).....	81	77
West End Street Railway, Boston (preferred).....	97	97
Westinghouse Elec. & Mfg. Company.....	69¾	69¾
Westinghouse Elec. & Mfg. Company (1st preferred).....	117	115

\*Last sale. a Asked.

## ANNUAL REPORTS

### United Railways Company of St. Louis.

The following report summarizes the result of the operation of the property of the United Railways Company, St. Louis, Mo., for 1912:

Gross earnings:		
Revenue from transportation.....	\$12,156,767	
Revenue from operation other than transportation.....	94,323	
Total.....	\$12,251,090	
Current operating expenses (including depreciation).....	7,828,501	
Surplus over operating expenses.....	\$4,422,589	
Taxes.....	652,222	
Income from operation.....	\$3,770,367	
Income from other sources.....	64,917	
Gross income from all sources.....	\$3,835,284	
Deductions from income:		
Interest on funded debt.....	\$2,695,001	
Interest on notes payable.....	1,195	2,696,196
Surplus.....		\$1,139,088

Robert McCulloch, the president, says in part:

"The passenger revenue for 1912 was \$12,084,080, an increase over 1911 of \$328,190, or 2.79 per cent. Other revenue from transportation increased \$4,164. Revenue from operation other than transportation increased \$4,583, and income from other sources increased \$20,187. The gross earnings and other income for the year 1912 were \$12,316,008, an increase of \$357,125 over 1911, or 2.99 per cent. Total operating expenses (including depreciation) and taxes increased during the year \$490,661.

"The number of passengers carried during the year follows: Revenue passengers, 5 cents, 238,976,636; revenue passengers, 2½ cents, 5,409,928; total, 244,386,564; transfer passengers, 113,001,983; grand total passengers, 357,388,547. The percentage of revenue passengers using transfers during the year 1912 was 46.24 per cent. The passenger car mileage totaled 40,783,189, and the mileage of other cars totaled 314,504, making the total revenue miles 41,097,693.

"On July 1, 1912, 5 per cent bonds of the Cass Avenue & Fair Grounds Railway became due and were extended for a period of ten years, or to July 1, 1922, at the rate of 4½ per cent per annum, reducing the fixed charges \$9,000 per annum.

"The amount charged to the fund for personal injuries, property damages and other expenses connected with the claim department amounted to \$607,237, being an increase of \$101,709 over the year 1911, \$68,699 of which was for settlement of old claims of the St. Louis Transit Company.

"During 1912 there was expended and charged to capital account for added property the sum of \$130,678, as follows: Real estate, buildings, tools and fixtures, \$39,542; road and track, \$68,733; electric line, providing for use of Keokuk power, \$16,106; power plant, buildings and improvements, \$9,707; total, \$134,090, less \$3,411 for equipment which was sold.

"The total mileage in single track on Dec. 31, 1912, was as follows: City track, 348.46 miles; county track, 112.67 miles; total, 461.13 miles. During the year 0.49 mile of track was added and 0.37 mile was removed.

"Since 1904 the amount of track reconstruction, renewal and extensions of track by the company in the city and county has been as follows: 1904, 21.56 miles; 1905, 8.90 miles; 1906, 29.18 miles; 1907, 21.65 miles; 1908, 32.99 miles; 1909, 39.93 miles; 1910, 45.34 miles; 1911, 32.69 miles; 1912, 25.85 miles; total for nine years, 258.09 miles.

"Of the 258.09 miles of track laid during the nine years 1904 to 1912 inclusive, 143 miles were entirely new track of the most modern construction, consisting of heavy rail laid on concrete and paved in the most approved manner. The expenditure for these 143 miles of new track was \$4,147,000. The expenditure during the same period for the remaining 115.09 miles of track, which were not entirely renewed, and for new special work was \$3,047,905.

"During the year the necessary work to keep the overhead and underground lines in thoroughly good repair was performed.

"The necessary work to keep in thoroughly good repair the bridges and buildings belonging to the company was

performed. Among the larger works of this department was the completion of a 25-ft. diameter reinforced concrete culvert at Schmidt Road on the Creve Cœur Lake line. This culvert replaced a high wooden trestle which had become decayed. A new fireproof reinforced concrete wash house was built at Park and Vandeventer Avenues, to take the place of one destroyed by fire.

"In 1903 the company decided that, instead of building additional power plants to supply its increasing power requirements, it would contract with the Union Electric Light & Power Company for that supply. The contract then entered into will soon expire and a continuing contract for power has been made with the Mississippi River Power Distributing Company for water power transmitted from the new dam at Keokuk. Work was begun on a new substation at Gravois and Mississippi Avenues.

"The necessary work to maintain the power stations and substations of this company in thoroughly good operating condition has been performed. Work was commenced on the necessary changes and additions to the power plants and substations to prepare them for the water power expected during the year 1913. During 1912 the company required a total capacity of 70,000 hp for the operation of the road. Of this amount 30,000 hp was purchased and 40,000 hp provided from the stations of this company.

"In addition to the regular repair and maintenance work the following work was done during the year: Twenty-five new steel fireproof cars of the most modern design were built; twelve cars which had been completely destroyed by fire were rebuilt; two steel center-entrance trail cars were built; forty-eight open cars were converted to closed cars, being practically new cars; 587 cars were rebuilt, renewed and painted; six automobile utility wagons were built; 1100 fare boxes were built. All cars were provided with a new fender required by the city authorities.

"During the year 1443 cars passed through the repair shops for truck repairs, body repairs or painting. The physical condition of the property is better than at any previous time and is still being improved."

**Louisville Railway**

The annual meeting of the stockholders of the Louisville (Ky.) Railway was held recently at the office of the company in that city. The officers and directors were all re-elected. The principal business transacted was the decision of the company to make no change in the declaration of dividends upon common stock, although a special committee of directors was appointed a short time ago to determine whether or not the corporation has greater earning capacity than present methods of accounting indicate. The regular quarterly dividend of 1 per cent upon common stock has been declared, along with one of 2½ per cent, semi-annual, upon the company's preferred, both payable on April 1. The important items in the Louisville Railway's report for the year ended Dec. 31, 1912, follow:

Passenger revenue (city lines).....	\$3,004,455
Revenue from mail and advertising.....	17,442
Revenue from interurban lines.....	214,192
Income from other sources.....	129,288
Gross income .....	\$3,365,377
Operating expense .....	\$1,790,037
State, county and city taxes.....	250,294
Interest on debt, paid and accrued.....	535,833
Dividend on preferred stock.....	125,000
Total expenses and charges.....	\$2,701,164
Net earnings.....	\$664,213
Common stock dividend.....	\$545,650
Depreciation machinery .....	45,000
Depreciation cars .....	45,000
Income account .....	28,563
Total .....	\$664,213

Ten new cars have been added to the interurban lines of the company, additional real estate has been purchased and improvements in interurban tracks as well as power circuits have been made. The sale of \$1,000,000 of bonds was recently authorized, it was stated, and the construction of a \$1,000,000 power house has been commenced. The most important line improvements during the year were the construction of the Crosstown line, 7 miles in length, the extension of the Sixth Street line, and the commencement of work at the western terminal of Main Street, together with the erection of a new carhouse at Twenty-eighth Street and Broadway.

**Summary of Stone & Webster Operations for Year**

A combined statement of the capitalization and earnings and expenses of the electric railway, electric lighting, gas and water power companies under the management of Stone & Webster Management Association for the year ended Dec. 31, 1912, follows:

CAPITALIZATION	
Bonds and coupon notes outstanding.....	\$80,742,700
Preferred stocks outstanding.....	33,579,400
Capital and common stocks outstanding.....	59,057,100
	\$173,379,200
EARNINGS AND EXPENSES—1912	
Gross earnings .....	\$23,925,414
Operating expenses and taxes.....	13,839,417
Net earnings .....	\$10,085,997
Interest charges .....	4,075,222
Balance .....	\$6,010,774
Bond sinking and mortgage improvement funds.....	532,820
Balance .....	\$5,477,954
Income from other sources.....	77,405
Balance .....	\$5,555,360
Dividends paid .....	3,699,119
Balance for reserves and depreciation.....	\$1,856,241
Total disbursements for the year 1912, for interest on bonds and notes and for dividends.....	\$7,774,342
Miles of equivalent single track owned.....	1,224.8
Passengers carried (including transfers).....	318,203,000
Total connected electric lighting load, equivalent to 16-cp lamps .....	2,136,960
Total commercial power load, approximately, hp.....	137,400
Total combined power station capacity (of which 110,200 hp is generated by water power), approximately, hp.....	276,780
Total gas output, cu. ft.....	1,306,949,800

**Columbus Railway & Light Company**

At the annual meeting of the Columbus Railway & Light Company, Columbus, Ohio, held on Jan. 28, 1913, Samuel G. McMeen, president of the company, made brief mention of the negotiations begun last May for the consolidation of all the properties now operated by the Columbus Railway & Light Company into one corporation, eliminating the leasing arrangement. He said the plans had been agreed upon by the boards of the various companies interested and were now being perfected by a committee composed of ten men, two from each of the companies, as previously noted in the ELECTRIC RAILWAY JOURNAL.

The total number of revenue and transfer passengers carried during 1912 was 76,357,610, as against 69,162,757 during the year 1911. This was an increase of 10.4 per cent in total passengers. The increase in revenue passengers was 10.8 per cent and in transfer passengers 8.9 per cent. The increase in revenue passengers for the first three months of 1912, at the rate of seven tickets for a quarter, was 8.8 per cent. The increase in passengers for the remaining nine months of 1912 under the rate of eight tickets for a quarter, was 10.9 per cent. This was explained by Mr. McMeen as demonstrating that reduced fare has stimulated use of the service, but not enough to offset the fare reduction.

The gross receipts of the company for 1912 were \$2,944,052, against \$2,812,685 in 1911, a gain of about 4½ per cent. Operating expenses aggregated \$1,596,215, as compared with \$1,503,057 in 1911, an increase of about 6 per cent. Net earnings for the year amounted to \$1,347,837, against \$1,309,628, a gain of 3 per cent. Surplus for the year after the payment of rentals to lessor companies, taxes, interest and depreciation, aggregating \$1,272,823, was \$75,014, which, added to the accumulated surplus of \$101,770, left a net balance to income account of \$176,784. The directors were all re-elected.

The Columbus Railway & Light Company applied to the Public Service Commission of Ohio on Feb. 24 for authority to consolidate its underlying properties in a new corporation, to be known as the Columbus Railway, Light & Power Company. The new organization is really the Columbus Traction Company, which has revised its charter and changed its name to the Columbus Railway, Light & Power Company. The commission is asked to allow the company to increase its capital stock from \$1,000,000 to \$10,226,800 for the purpose of purchasing the capital stock of the Columbus Railway, the Columbus Edison Company and the Columbus Light, Heat & Power Company. The new stock is to be divided as follows: Series A, \$1,163,040 of 6 per cent preferred stock; series B, \$4,353,260 of 5 per

cent preferred stock to be participating up to 6 per cent, and \$3,710,500 of common stock. According to the petition the Columbus Railway now has \$3,500,000 of 5 per cent cumulative preferred and \$3,500,000 of common stock outstanding; the Columbus Edison Company has \$750,000 of 6 per cent preferred and \$750,000 of common stock outstanding, while the Columbus Light, Heat & Power Company has \$516,300 of 6 per cent cumulative preferred and \$210,500 of common outstanding.

The plan of exchange recited by the application provides for \$3,500,000 series B, 5 per cent preferred, to be exchanged for \$3,500,000 Columbus Railway preferred, on a share-for-share basis, and \$3,500,000 common to be exchanged for the common stock of this company on a like basis. Stock of the Columbus Edison Company will be acquired on a share-for-share basis, the new company issuing \$750,000 series A, 6 per cent preferred for the senior securities of that company and \$750,000 series B, 5 per cent preferred for the junior shares. For Columbus Light, Heat & Power Company stock, \$413,040, series A, 6 per cent preferred of the new company will be issued to take up 80 per cent of the preferred; \$103,260, series B, 5 per cent preferred, will be issued to take up 20 per cent of the preferred, and \$210,500 common for the common.

#### Disposition of Southern Pacific Electric Lines

The San Francisco *Chronicle* commented as follows recently upon the disposition of the electric lines of the Southern Pacific Company under the dissolution of the merger in accordance with the dictates of the Attorney-General:

"While Southern Pacific officials anxiously await the detailed programme for the proposed segregation of the Southern Pacific and the Central Pacific, they share the general opinion that in so far as the electric railroad situation across the bay is concerned, the Southern Pacific, as soon as the sale of the Central is concluded, will cease to operate Central Pacific or Southern Pacific Coast lines. The old Southern Pacific Coast lines, it is understood, are to be sold to the Central.

"If this proves correct, the following lines will be operated by the Central Pacific when the segregation program is carried out, if it is carried out: That from Halvern, near Hayward, to Alvarado, with a mileage of 2.63; that from the Alameda Mole to High Street, Alameda, via Encinal Avenue, with a mileage of 6.80; that from the Alameda Mole to Fourteenth Street, Oakland, via Webster Street; that from Pacific Avenue and First Street, Alameda, via Mastie to Eighth Street and Central Avenue, with a mileage of 1.46; that from First and Harrison Streets in Oakland, to Fruitvale, via Alameda, with a mileage of 6.22.

"These lines, it is understood, were named to the United States Attorney-General by Union and Southern Pacific directors as the electric lines to go with the Central Pacific. There was a question, it is understood, as to which should retain them, the Southern Pacific Company having carried out the electrification work at great expense. The two Southern Pacific Coast lines to be sold to the Central are the lines running from the Alameda Mole to Fourteenth Street, Oakland, via Webster Street, and the line extending from the Alameda Mole to High Street, Alameda, via Encinal Avenue. The Southern Pacific, it is understood, will retain its Berkeley lines and all those not named as Central Pacific or Southern Pacific Coast properties.

"The Stockton division lines which the Southern Pacific is slated to lose are the main lines from Tracy to Brighton and that from Lathrop to Fresno. The following branch lines, which, as Southern Pacific branches from the Central Pacific main lines, have no outlets, are scheduled to be sold to the Central Pacific: That from Galt to Ione, Woodbridge to Valley Spring and that known as the Oakdale branch from Stockton to Merced. These branches are between Sacramento, Stockton and Merced and will become Central Pacific branches.

"In so far as the line from Telhama to the Oregon border is concerned, it is understood by Southern Pacific officials that it will be leased for a term of ninety-nine years to the Southern by the Central. This would make it practically a Southern Pacific property, and, it is understood, no joint trackage agreement will be made. The Benicia short line

from Sacramento to Oakland, however, is to be operated under a joint trackage agreement by the two roads."

#### Traction Bill to Permit Chicago's General Merger Being Prepared

In addition to the work of preparing a skeleton ordinance to cover the terms of the merger of the surface and elevated railroads of Chicago, Ill., Corporation Counsel Sexton, of the Chicago City Council, called in the attorneys of the railways to discuss the preparation of a bill which would authorize the general merger. The Chicago City Railway is operating under a special charter and the Chicago Railways under the street railroad act of Illinois. In addition the elevated roads were organized under the steam railroad act. These differences make the merger impossible until a bill permitting the general merger is acted on favorably by the Legislature. The general conference was attended by Corporation Counsel Sexton for the city, William G. Beale, representing the elevated roads, L. A. Busby, representing the Chicago City Railway, and W. W. Gurley, representing the Chicago Railways. The scope of the proposed legislation has been agreed upon and as soon as the bill can be drafted it will be presented to the Legislature.

**Central Arkansas Railway & Light Corporation, Hot Springs, Ark.**—The Central Arkansas Railway & Light Corporation has been chartered in Virginia, with a capital stock of \$10,500,000, by Federal Light & Traction Company interests, presumably to take over the property of the Hot Springs Street Railway and the Hot Springs Water Company. The officers of the Central Arkansas Railway & Light Corporation are: William L. McKee, Brooklyn, N. Y., president; Louis C. Gerry, New York, treasurer; John B. Marsh, New York, secretary.

**Charleston Consolidated Railway & Lighting Company, Charleston, S. C.**—P. H. Gadsden, president of the Charleston Consolidated Railway & Lighting Company, has issued the following statement in regard to the negotiations to transfer the Seashore division of the company to the Charleston-Isle of Palms Traction Company, the organization of which was noted in the *ELECTRIC RAILWAY JOURNAL* of Nov. 23, 1912, page 1084: "The contract with James Sottile, president of the Charleston-Isle of Palms Traction Company, for the purchase of the Seashore division of the Charleston Consolidated Railway & Lighting Company was conditioned among other things upon securing the release of the property by the trustees of the mortgage. At the last moment doubts were expressed by the trustee of its power to release. Mr. Sottile suggested several plans for our consideration which would permit of the formal transfer of the property to him, but none of them effectually met the legal questions involved. It became necessary, therefore, to postpone the date for final settlement and transfer of the property until this question could be satisfactorily determined. In the meantime it was agreed that we should operate the property for the account of the purchaser from Feb. 1 until the final settlement and transfer was effected."

**Chicago (Ill.) Elevated Railways.**—Charles H. Ireland has been elected a director of the South Side Elevated Railroad to succeed Charles V. Weston, resigned.

**Chicago (Ill.) Railways.**—The Chicago Railways has sold \$4,000,000 of its 5 per cent first mortgage bonds to Harris, Forbes & Company, New York, N. Y. The proceeds of the sale will be used for rehabilitation purposes during the current fiscal year and will cover the cost of new track, additional cars, substations and carhouses. The amount of the issue now outstanding is \$49,055,000.

**Choctaw, New Castle & Western Railway, McAlester, Okla.**—B. R. Stephens, general superintendent of the Choctaw Railway & Lighting Company, McAlester, has filed a suit in the Superior Court against the Choctaw, New Castle & Western Railway Company asking for the appointment of a receiver. The company operates 3 miles of standard-gauge road and has one locomotive and two cars.

**Cleveland (Ohio) Railway.**—The Public Service Commission of Ohio on Feb. 19, 1913, approved the application of the Cleveland Railway for permission to issue common

stock of the par value of \$3,600,000 to be sold at not less than par, the proceeds to be used to retire \$3,000,000 of bonds of the Cleveland Electric Railway which mature on March 1, 1913, and to pay for extensions and betterments.

**Columbus, Delaware & Marion Railway, Columbus, Ohio.**—United States District Judge Sater has dismissed the petition for the sale of the Columbus, Delaware & Marion Railway and the foreclosure of mortgages aggregating \$300,000.

**Connecticut Company, New Haven, Conn.**—The announcement was made on Feb. 22, 1913, that the directors had authorized C. S. Mellen, president, "to negotiate a lease of the electric railways owned by the Connecticut Company from New London north to East Thompson, Conn., to the Shore Line Electric Railway. This will give the Shore Line Electric Railway a through line from New London to New Haven and north to East Thompson."

**Georgia Railway & Power Company, Atlanta, Ga.**—The Georgia Railway & Power Company is reported to have arranged to take over the property of the Tennessee Power Company.

**Hudson & Manhattan Railroad, New York, N. Y.**—Kuhn, Loeb & Company and Harvey Fisk & Sons, New York, N. Y., and Robert Fleming & Company, London, Eng., acting as readjustment managers, announce that more than 96 per cent of the first mortgage  $4\frac{1}{2}$  per cent bonds and more than 90 per cent of the preferred and common shares and voting trust certificates of the Hudson & Manhattan Railroad have been deposited under the plan for the readjustment of the finances of the company. Further deposits of bonds and shares will be received temporarily.

**Indiana Railways & Light Company, Kokomo, Ind.**—The Kokomo Public Utility Company, the Kokomo, Frankfort & Western Traction Company and the Kokomo, Marion & Western Traction Company were consolidated recently as the Indiana Railways & Light Company, as previously noted in the *ELECTRIC RAILWAY JOURNAL*, and the new company has organized permanently. The common stock of the company is \$2,000,000 and the preferred stock \$1,000,000, \$350,000 of which is to be issued at once. An issue of thirty-year gold bonds to the amount of \$5,000,000 has been authorized, \$1,780,000 of which has been issued. The new company is carrying on all the business transacted by the three old companies, namely, is operating the electric railway between Frankfort and Kokomo and between Kokomo and Marion, operating the city lines in Kokomo and doing the entire electric lighting and power business in Kokomo, Greentown, Swayzee, Converse, Amboy, Rus-siaville, Forest and Michigantown. The officers of the company follow: George J. Marrott, president; L. J. Kirkpatrick, vice-president; T. C. Reynolds, secretary, treasurer and general manager; P. H. Palmer, assistant general manager, and C. C. Trees, assistant secretary.

**Kansas City Railway & Light Company, Kansas City, Mo.**—The committee acting for holders of certificates of deposit of the 6 per cent notes of the Kansas City Railway & Light Company, due Sept. 1, 1912, announces that it has arranged for the payment by the company on March 1, 1913, at the office of the New York Trust Company, New York, N. Y., of interest on said notes from Sept. 1, 1912, to March 1, 1913, at the rate of 7 per cent per annum. The interest received by the committee will be paid at the same time and place to the holders of the certificates representing the notes.

**Kentucky Traction & Terminal Company, Lexington, Ky.**—The Kentucky Traction & Terminal Company has filed a deed with the county clerk at Lexington conveying permanently to the Kentucky Utilities Company its new power house and all the equipment installed in the plant.

**Louisville (Ky.) Railway.**—The Louisville & Interurban Railroad has decided to increase its capital stock from \$3,750,000 to \$4,000,000 and to issue the stock to the Louisville Railway to compensate that company for improvements made to the property of the Louisville & Interurban Railroad.

**Massachusetts Northeastern Street Railway, Haverhill, Mass.**—The Massachusetts Northeastern Street Railway has petitioned the Railroad Commission of Massachusetts for

authority to purchase the Amesbury & Hampden Street Railway and also for authority to issue capital stock to be exchanged for the stock of the Amesbury & Hampden Street Railway on a share-for-share basis.

**Morris County Traction Company, Morristown, N. J.**—The State Board of Public Utility Commissioners of New Jersey on Feb. 22, 1913, approved the application of the Morris County Traction Company for permission to issue bonds amounting to \$4,179,000 contingent upon the company reducing the capital stock from \$3,000,000 to \$300,000. The bond issue is to be secured by a general mortgage for \$5,000,000 to be given to the Safe Deposit & Trust Company, Pittsburgh, Pa., as trustee. The plan for reducing the capital of the company was referred to in the *ELECTRIC RAILWAY JOURNAL* of Dec. 21, 1912, page 1253.

**New York & Stamford Railway, Port Chester, N. Y.**—The Public Service Commission of the Second District of New York has authorized the New York & Stamford Railway to issue \$573,000 of first and refunding mortgage 4 per cent bonds, the proceeds to be used to meet loans and notes for capital purposes.

**New York (N. Y.) Railways.**—The board of directors of the New York Railways has authorized payments on April 1, 1913, to the adjustment mortgage income bondholders of  $2\frac{1}{4}$  per cent for the six months ended Dec. 31, 1912.

**Northampton (Mass.) Street Railway.**—The Northampton Street Railway has applied to the Railroad Commission of Massachusetts for permission to issue \$150,000 of additional common stock, to be offered to stockholders at par, the proceeds to pay floating debt, for the purchase of equipment and for new carhouses and road improvements.

**Northern Electric Railway, Chico, Cal.**—The Railroad Commission of California has authorized the Vallejo & Northern Railroad to sell its property to the Northern Electric Railway. The Vallejo & Northern Railroad was constructed under a separate organization as an extension of the Northern Electric Railway.

**Public Service Company of Northern Illinois, Chicago, Ill.**—The Public Service Company of Northern Illinois has completed the purchase of the property of the Pontiac Light & Water Company, Pontiac, Ill., and the Bloomington, Pontiac & Joliet Electric Railway.

**Union Railway, New York, N. Y.**—Judge Lacombe, in the United States District Court, has signed a final decree in the suit brought in 1908 by the Lorain Steel Company against the Union Railway for material supplied. In his order, Judge Lacombe discharges Frederick W. Whitridge, appointed receiver of the Union Railway March 31, 1908, and dismisses the suit brought by the Lorain Steel Company.

**United Railways Investment Company, San Francisco, Cal.**—Mason B. Starring, president of the United Railways Investment Company, is quoted as follows: "By the payment of \$200,000 of its serial notes, which matured on Feb. 15, the total issue of the United Railways Investment Company's serial notes has been reduced by more than one-half. The New York Trust Company already holds \$223,000 of the investment company's 5's, purchased for the benefit of the sinking fund. The Pittsburgh Railways by its contract with the new Duquesne Light Company has relieved itself of the necessity of financing its future requirements. The natural gas department of the Philadelphia Company, which earlier in the winter suffered somewhat in its sales to domestic consumers by reason of the warm weather, is now catching up in that respect."

**Toledo Traction, Light & Power Company, Toledo, Ohio.**—As stated previously in the *ELECTRIC RAILWAY JOURNAL*, a Maine corporation, known as Toledo Traction, Light & Power Company, has been organized, and through stock ownership controls the local operating companies in Toledo. What, if any, changes will be made in the operating force in Toledo has not yet been determined. It is expected that the various committees will now disband and all pending legal proceedings be dismissed. Henry L. Doherty & Company, New York, N. Y., acquired a substantial interest in the common stock voting trust certificates of the new company and the future operations will be carried on under their direction.

Washington Water Power Company, Spokane, Wash.—At the annual meeting of the Washington Water Power Company, William I. Frothingham, New York, N. Y., was chosen a trustee of the company to succeed the late Hinsdill Parsons, New York. Benjamin B. Lawrence, New York, was chosen a member of the finance committee to succeed Mr. Parsons. The names of the trustees follow: W. A. White, William I. Frothingham, Francis S. Banks, Frank Lyman, Theodore F. Hicks, Harold T. White, Jonathan Bulkley, Oscar F. Zollikoffer, Benjamin B. Lawrence, Guy Du Val, Edwin C. Merrill, all of New York; Philip Cabot, Boston, and Henry M. Richards, D. L. Huntington, J. P. M. Richards, W. J. C. Wakefield, N. Fred Essig, L. M. Davenport, W. S. McCrea, all of Spokane. The Washington Water Power Company operates 109 miles of line and has a total of 193 motor cars and ten trail cars. It sells power and does lighting. Its lines connect Cheney, Spokane and Medical Lake.

**Dividends Declared**

Chicago (Ill.) Elevated Railways, quarterly, \$1.50, preferred participation certificates.

Elmira Water, Light & Railroad Company, Elmira, N. Y., 2½ per cent, preferred.

Northern Ohio Traction & Light Company, Akron, Ohio, quarterly, 1¼ per cent, common.

**ELECTRIC RAILWAY MONTHLY EARNINGS**

EL PASO (TEX.) ELECTRIC COMPANY						
Period		Gross Earnings	Operating Expenses	Net Earnings	Fixed Charges	Net Income
1mo.,	Dec., '12	\$81,229	*\$40,382	\$40,847	\$3,920	\$36,927
1 "	" '11	73,494	*38,396	35,098	6,999	20,099
12 "	" '12	793,320	*430,217	363,103	69,661	293,442
12 "	" '11	691,607	*406,802	284,805	81,226	203,579
GALVESTON (TEX.) ELECTRIC COMPANY						
1mo.,	Dec., '12	\$42,794	*\$24,182	\$19,611	\$7,652	\$11,959
1 "	" '11	39,921	*22,336	17,585	8,504	9,081
12 "	" '12	493,995	*270,267	223,728	93,512	130,216
12 "	" '11	443,716	*255,366	188,350	84,763	103,587
GALVESTON-HOUSTON ELECTRIC COMPANY						
1mo.,	Dec., '12	\$183,391	*\$108,199	\$75,191	\$33,722	\$41,469
1 "	" '11	137,104	*85,169	51,935	20,077	31,858
12 "	" '12	2,027,656	*1,182,682	844,975	405,656	439,319
12 "	" '11	1,523,169	*960,591	562,478	230,843	331,735
HOUGHTON (MICH.) COUNTY TRACTION COMPANY						
1mo.,	Dec., '12	\$26,421	*\$15,960	\$10,461	\$5,740	\$4,721
1 "	" '11	24,814	*13,913	10,901	5,227	5,675
12 "	" '12	307,506	*174,735	132,771	67,233	65,538
12 "	" '11	300,963	*178,411	122,552	62,435	59,817
JACKSONVILLE (FLA.) TRACTION COMPANY						
1mo.,	Dec., '12	\$48,626	*\$33,183	\$15,442	\$10,762	\$4,680
1 "	" '11	51,090	*29,695	21,396	9,196	12,200
12 "	" '12	562,537	*378,112	184,026	118,986	65,040
12 "	" '11	567,548	*348,447	219,101	98,851	120,250
NORTHERN TEXAS ELECTRIC COMPANY						
1mo.,	Dec., '12	\$170,933	*\$89,758	\$81,175	\$24,662	\$56,513
1 "	" '11	143,155	*76,428	66,727	20,327	46,400
12 "	" '12	1,790,762	*941,690	849,073	266,073	583,000
12 "	" '11	1,622,875	*889,994	732,881	250,254	482,627
PADUCAH TRACTION & LIGHT COMPANY, PADUCAH, KY.						
1mo.,	Dec., '12	\$27,878	*\$16,632	\$11,246	\$7,334	\$3,912
1 "	" '11	26,835	*14,806	12,029	7,075	4,953
12 "	" '12	286,537	*192,674	93,863	86,353	7,510
12 "	" '11	265,296	*160,749	104,547	81,158	23,378
PENSACOLA (FLA.) ELECTRIC COMPANY						
1mo.,	Dec., '12	\$23,837	*\$14,183	\$9,654	\$6,317	\$3,337
1 "	" '11	34,607	*14,948	9,359	6,317	3,042
12 "	" '12	285,429	*176,459	108,970	76,470	32,501
12 "	" '11	286,716	*179,163	107,563	61,736	45,817
PUGET SOUND TRACTION, LIGHT & POWER COMPANY						
1mo.,	Dec., '12	\$725,642	*\$416,705	\$308,937	\$172,977	\$135,960
12 "	" '12	8,313,848	*4,772,299	3,541,549	1,976,251	1,565,299
SAVANNAH (GA.) ELECTRIC COMPANY						
1mo.,	Dec., '12	\$68,447	*\$49,447	\$19,001	\$17,349	\$1,652
1 "	" '11	62,079	*46,237	15,843	15,591	252
12 "	" '12	747,058	*551,052	196,007	194,795	1,211
12 "	" '11	696,668	*511,034	185,634	184,478	1,156
TAMPA (FLA.) ELECTRIC COMPANY						
1mo.,	Dec., '12	\$66,797	*\$34,361	\$32,436	\$4,791	\$27,645
1 "	" '11	66,390	*34,601	31,790	4,551	27,239
12 "	" '12	753,835	*394,629	359,205	53,757	305,449
12 "	" '11	691,323	*377,767	313,555	59,241	254,315

\*Includes taxes

# Traffic and Transportation

## What the Commutation Ticket Implies

In the matter of the complaint of the board of trustees of the village of La Salle against the International Railway, Buffalo, N. Y., as to tickets for transportation between La Salle and Niagara Falls, in which it was held by the Public Service Commission of the Second District of New York that the company was not precluded by the issuance of the first form of ticket from substituting therefor another more in the form of a commutation ticket, the commission in its decision refers as follows to the subject of commutation tickets:

"The commission expressly disclaims here the giving of an exact definition of a commutation ticket. It is of the opinion, however, that the strip of tickets originally issued by the International Railway cannot be classed as a commutation ticket. We think that the idea of a commutation ticket implies the use of the same by the holder thereof upon each day in the week or month, or at least upon each working day thereof, and that it shall be used for a return as well as an initial trip. The word commutation also implies a sale of the ticket at less than the regular straight fare between the points named therein. A strict interpretation of the word 'commutation' as used in the parlance of transportation at the present time would limit the use of the ticket to one person and provide that it should not be transferable. This is departed from by the ticket now proposed by the respondent to the extent that it may be used by any person holding the book and presenting the same to the conductor.

"In the same manner and in the same parlance a commutation ticket implies the idea that a book entitling the holder to a certain number of rides shall be used within a limited time, and at the end of that limited time those rides which have not been used are forfeited. This provision also is waived by the form of tickets now offered by respondent. It may be used at any time and by any number of persons provided they are together at the time when the book is presented.

"By the terms of Subdivision 3 of Section 33 of the Public Service Commission law a distinction is shown between various forms of reduced rate tickets, and they are described as mileage, excursion, school or family commutation, commutation passenger tickets, half-fare tickets for the transportation of children under twelve years of age, or any other form of reduced rate passenger tickets or joint interchangeable mileage tickets. This would seem to indicate that a commutation passenger ticket was not to be classed with mileage or excursion, school or family tickets, but implied something different. We think that the characteristics which differentiate commutation tickets from the other forms named are those which have been generally indicated above. There may be others which are not here enumerated and the definition is not intended to be exact."

## Accident Prevention Campaign in Atlanta

The Georgia Railway & Power Company, Atlanta, Ga., has started a public safety league of 25,000 members. The company intends to enroll in its league all the school children of the city, all automobile owners and drivers, motorists and conductors and as many citizens as possible. Permission will be secured for lecturers paid by the company to visit the public schools and to speak to the children upon the danger from street cars, automobiles and vehicles. In addition, pamphlets containing the gist of these lectures will be printed and distributed. As soon as the league is well under way it will enter into co-operation with the public safety committee of the Chamber of Commerce for the purpose of putting into effect recommendations that this committee recently made to the public.

W. H. Glenn, manager of the Georgia Railway & Power Company, said recently:

"We desire to go the limit in preventing street car accidents. That we have in a measure succeeded in reducing accidents where the public is under our control is shown by the fact that we have hauled over 300,000,000 passengers without fatal accident to any of them, with the possible exception of two who sprang from rapidly moving cars. We

feel that our efforts should be extended beyond the point where we have control of the public, inside of the cars, and reach those who may be subject to accident in the streets in connection with automobiles, street cars and other vehicles. In order to do this the importance of being watchful while in the streets must be impressed on the public mind, and we think the organization of a public safety league, with as many members as can be enrolled, is the most practical method of educating the public on this subject."

The members of the committee on public safety of the Chamber of Commerce of Atlanta conferred recently with the officials of the Georgia Railway & Power Company in regard to the public safety league which the company is organizing. During the conference the subject of fenders was touched upon, and the officials of the company assured the committee that all cars will be equipped with the fenders that have proved the greatest aids to safety. The new pay-as-you-enter cars are fitted with fenders, and the cars which have been in service will be similarly equipped as speedily as possible. The board of education has agreed to cooperate with the public safety league in the enrolment of children as members of the league.

**Near-Side Stops in Rock Island and Moline.**—The Tri-City Railway, Davenport, Ia., will after March 1, 1913, stop all its cars in Rock Island and Moline, Ill., on the near side of the street.

**Hearing in New Jersey on Height of Car Step.**—The Board of Public Utility Commissioners of New Jersey held a public hearing in Jersey City on Feb. 21, 1913, upon complaints involving the height of steps on cars of the Public Service Railway.

**Free Transportation for Providence Employees.**—The Rhode Island Company, Providence, R. I., has announced that it will arrange to transport its employees free at all times. At present the men are transported free only when they are in uniform.

**Reduction in Fare Ordered.**—An order has been issued by the Board of Public Utility Commissioners of New Jersey directing the Riverside Traction Company, Camden, N. J., to operate one car each morning and one each evening for the convenience of about 400 workmen who ride between Riverside and Palmyra and to charge a 5-cent fare for the trip. The fare has been 10 cents.

**Vaccinating Louisville Employees.**—The employees of the Louisville (Ky.) Railway are being gradually vaccinated, pursuant to a recent order of the State Board of Health to the effect that all employees of electric railways and other public utilities shall be made immune from disease and incapable of transmitting infection to the public. The vaccination of the force of the company is proceeding so as not to interfere unduly with the company's operations.

**Open Vestibule Favored by Men.**—The Railroad Commission of Pennsylvania has advised Mrs. Catherine D. Smith, Reading, who complained that the Reading (Pa.) Transit Company failed to protect its conductors and motormen, that no complaint had been received from these employees and that it had in fact been represented to the commission that the men preferred open vestibules to the closed ones. Under these circumstances and in view of the further fact that the public is not directly interested, the commission refrains from taking action in the matter.

**Transfer Suit in Chicago.**—All the evidence has been concluded in the mandamus suit before Judge Foell in which the villages of Oak Park and River Forest are trying to compel the County Traction Company, Chicago, Ill., and the Chicago Railways to issue universal transfers. A. W. Harris, president of the Harris Trust & Savings Bank, the last witness, said that the operation of the County Traction Company was unprofitable and that any action which would result in reducing the company's earnings would force the property into the hands of a receiver.

**Accident Prevention on Michigan United Traction Company.**—The department of publicity of the Michigan United Traction Company, Lansing, Mich., has started an accident prevention campaign which will extend over six or eight months. A series of blotters and posters depicting common forms of accidents and containing words urging their elimi-

nation will be distributed in the public schools the first of each month. Only one type of blotter will be given out at the different schools at one time and in a similar way a car card will be posted in a prominent place in all the city and interurban cars of the company. The subject matter on the blotters and postal cards will be changed from month to month. In addition a series of advertisements will be inserted in the papers urging the public to join in the safety crusade.

**Certiorari Writ in New York Suburban Fare Case.**—Petitions for rehearings on orders recently issued by the Public Service Commission of the Second District of New York reducing commutation and other rates between points in Westchester County, New York, were filed with the commission by the New York, New Haven & Hartford Railroad and the New York Central & Hudson River Railroad. Both petitions recited that the order is in violation of the constitutions of the State of New York and of the United States, and that under state laws the companies are authorized to charge for transportation of passengers the sum of 3 cents per mile on any part of their railroads in the State, and that the operation of the orders of the commission would amount to a confiscation of property without due process of law. The orders of the commission to the companies were referred to in the *ELECTRIC RAILWAY JOURNAL* of Feb. 15, 1913, page 309. On Feb. 25 the commission denied the application for rehearings. The New York Central Railroad secured a writ of certiorari from the Appellate Court on Feb. 27, 1913, which will act as a stay and permit a review of the case by the court.

**Further Lehigh Valley Transit Improvements.**—The Lehigh Valley Transit Company, Allentown, Pa., has decided to buy new passenger and express cars to care for the rapidly increasing business on the Allentown-Philadelphia division. It also proposes to take all tracks off public highways on the Philadelphia division, except through towns. About 20 miles of track will be shifted to private right-of-way before June 1, 1913, and by the end of the year no trains will be run on the public roads. All franchises have been granted and property secured for these changes. It is anticipated that the increase in business will soon necessitate double-tracking the entire division and all work done hereafter on grading, bridges and right-of-way will provide for this expansion. Most of the line is already laid with 80-lb. rails, and in relaying the rest rails of similar weight will be used. The company will run two-car or three-car trains as soon as the new equipment which has been ordered is received and the necessary revision of curves has been completed. The additional equipment ordered includes six new passenger cars similar to the limited cars now in service, costing \$12,000 each, and three 60-ft. express cars of the same equipment and power as the passenger cars, arranged to run in trains with the latter. It is expected that train service will be begun in April.

**A Gentlemanly Protest.**—The *St. Louis Post-Dispatch* published the following letter recently under the caption "A Gentlemanly Protest": "During my two days' sojourn in your city I have noted with great surprise and amusement the controversy going on in your paper between a bunch of pinheads and the local street railway. How an enterprising and up-to-date newspaper can lend itself to the publication of such buncombe and folly is beyond me. It is needless to dwell upon the absurdity of the demand made by those soreheads and it is needless to say that you know that they are absurd and not feasible. These very pinheads, yourself included, would be the first to rebel against an ordinance for cars that have received their quota of seated passengers to pass up the rest on the corners all along the route. Should one of the seated ones alight there would be a dozen to fight for the vacant seat, anxious to get to his or her destination. I know you will say, 'Let them put on more cars,' but where would they put them? If the street railway should put on double the number of cars now in service, not all passengers could be accommodated with a seat, and where it now requires thirty minutes to go a certain distance, it would require about 130 minutes to go the same distance if the streets were choked with cars. But why tell you this? You, my dear editor, know this as well as I, but the disinterested onlooker realizes that you must have an axe to grind. I dare you to publish this letter."

## Personal Mention

**Mr. W. G. Astle** has resigned as chief clerk in the car shops of the Dominion Power & Transmission Company, Hamilton, Ont., to become storekeeper of the Toronto (Ont.) Electric Light Company.

**Mr. Henri Camp** was named as secretary of the Union Internationale de Tramways et de Chemins de Fer d'Interêt Local at a meeting of the committee of direction held at Brussels on Feb. 1, 1913. Mr. Camp succeeds the late Paul t'Serstevens, who was general secretary. His headquarters will be at the headquarters of the association, namely, 15 Avenue de la Toison d'Or, Brussels.

**Mr. George G. Holding** has been elected secretary and treasurer of the London (Ont.) Street Railway. Mr. Holding has been identified with business interests in Toledo, Ohio, for many years. He entered the service of the Toledo Railways & Light Company ten years ago as pay roll clerk and was advanced until he held the position of chief clerk in the office of the auditor of the company. He resigned from that position to go into business for himself, but subsequently re-entered the service of the company.

**Mr. J. M. McElroy**, general manager of the Manchester (Eng.) Corporation Tramways, is planning to visit the United States and Canada during April to study traffic congestion problems in the larger cities of this country. Mr. McElroy has just completed a comprehensive report on traffic congestion in Manchester and desires to acquaint himself personally with the methods which have been evolved on this side of the water to handle similar conditions successfully. An outline of the Manchester congestion report is published in the London Letter on page 388 of this issue.

**Mr. Charles M. Hatch**, who has been appointed general manager of the Northwestern Pennsylvania Railway, Meadville, Pa., to succeed Mr. C. L. Murray, resigned, was formerly assistant to the president of the Northwestern Pennsylvania Railway. He was previously with the Erie Traction Company, which was purchased by the Northwestern Pennsylvania Railway on Nov. 4, 1912. He served with the Erie Traction Company from 1901 to 1905 as secretary and treasurer, and from 1905 to the time that the property was taken over by the Northwestern Pennsylvania Railway he was general manager of the company.

**Mr. Whitfield Ford**, chief dispatcher of the Morris County Traction Company, Morristown, N. J., has been appointed superintendent of the western division of the company, effective on March 1, 1913, to succeed Mr. C. O. Weidman, who has been appointed general manager of the company. Mr. Ford entered the service of the Morris County Traction Company in May, 1907, as a conductor, and served in that capacity for more than two years. He was promoted to be storekeeper and collector and later was made dispatcher. Previous to entering the service of the Morris County Traction Company he was connected with the Lewisburg, Milton & Watsonstown Passenger Railway, Milton, Pa.

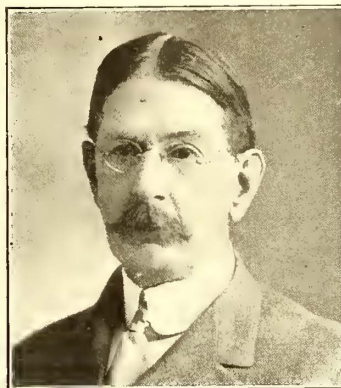
**Mr. C. O. Weidman**, who has been superintendent of the western division of the Morris County Traction Company, Morristown, N. J., has been appointed general manager of the company to succeed Mr. Joseph K. Choate, resigned, who, as noted elsewhere in this column, has been elected a director and vice-president of The J. G. White Management Corporation. Mr. Weidman was previously connected with the Otsego & Herkimer Railroad, which he served for fourteen years. For five years previous to accepting the position of superintendent of the western division of the Morris County Traction Company in January, 1913, he was superintendent of transportation of the Otsego & Herkimer Railroad.

**Mr. J. W. Hulme** has resigned as general foreman of inspection of the Hudson & Manhattan Railroad, New York, N. Y., and has become connected with the car construction department of the New York (N. Y.) Railways under Mr. J. S. Doyle. Mr. Hulme started his career in January, 1900, with the Western Electric Company testing motors and generators, and was sent by that company to the St. Louis Exposition to operate its exhibit. He re-

signed from the company to enter railway work as a wireman with the Metropolitan West Side Elevated Railway, Chicago, Ill. He worked in various departments of this company and resigned as foreman of inspection in 1909 to accept the position of general inspection foreman of construction for the Hudson & Manhattan Railroad. Subsequently he was made general foreman of inspection.

**Mr. O. G. Schultz**, secretary-treasurer of the Morris County Traction Company, Morristown, N. J., is to become the principal executive officer of the company as a result of the resignation of Mr. Joseph K. Choate. Mr. Schultz became connected with the Morris County Traction Company at the close of 1909 to represent the underwriters in controlling the expenditures in construction funds. Shortly thereafter he was elected secretary and treasurer of the company and directed the purchases, construction, securing of franchises and also controlled all expenditures. Since the spring of 1910 all the remaining municipal franchises have been secured and 25 miles of line have been constructed. After he was graduated from the Frieberg School of Mines Mr. Schultz became connected with a mining company at Georgetown. Subsequently he was with the Eddie & James Sampling Company, Leadville, for a short period, and afterward was with the Robert E. Lee Mining Company of the same place. On severing his connection with the Robert E. Lee Mining Company Mr. Schultz established himself as mining engineer and metallurgical expert, and continued in this work in Colorado until 1885, when he entered the bridge and structural iron business in Pittsburgh. In 1890 he was identified with the Schultz Bridge & Iron Company as treasurer and plant manager, and when this company was merged into the American Bridge Company in 1900 he was placed in charge of the Schultz branch as assistant manager. He was also manager of the Keystone branch of this company for a time. Later he took charge of the treasury department and became assistant treasurer of the American Bridge Company in charge of the middle division. He severed his connection with the American Bridge Company in 1904 to take up engineering work in Dutch Guiana, South America, in which he continued until 1907. From 1907 to 1909 he was engaged in special engineering work with headquarters at Pittsburgh. In 1909 he became connected with the Morris County Traction Company.

**Mr. Joseph K. Choate**, vice-president and general manager of the Morris County Traction Company, Morristown, N. J., has been elected a director and vice-president of The



J. K. Choate

J. G. White Management Corporation, formed recently to take over the utility management activities of J. G. White & Company, Inc., New York, N. Y. These elections are effective March 1, 1913. Mr. Choate became connected with the Morris County Traction Company in October, 1912. He was previously general manager of the Otsego & Herkimer Railroad, Hartwick, N. Y. He was born in Salem, Mass., on Aug. 22, 1854. He attended school at Taunton, Mass., and prepared for college, but did not enter college until later in life, when he took a degree in the University of Colorado. Mr. Choate started his business career as a civil engineer, in which capacity he served the city of New York for some time. In 1881 he became connected with the Pennsylvania Railroad as supervisor of track of the New York division. He next became connected with the Erie Railroad and subsequently entered the service of the Union Pacific Railroad as assistant to the general manager. He then served as general manager of the Nevada Central road and afterward as superintendent of the Park division of the Union Pacific Railroad and general superintendent of all Colorado lines. He next spent several years in New York as a consulting engineer, and acting in an advisory capacity on matters of

railway operation he went to the Otsego & Herkimer Railroad, first as consulting engineer, and in 1907 he was made general manager of the company. Mr. Choate is a past-president of the New York State Electric Railway Association.

**Mr. W. J. McCorkindale**, vice-president and general manager of the Marquette County Gas & Electric Company, Ishpeming, Mich., has resigned to become connected with the C. H. Geist Company, Philadelphia, Pa., which controls the Wilmington (Del.) Gas Company and public utility properties in Atlantic City, N. J.; Roanoke, Va.; Nashville, Tenn.; Peoria, Ill.; Delray, Mich., and other cities. Mr. McCorkindale has been connected with the Marquette County Gas & Electric Company, which includes the local railway at Ishpeming, more than six years. The property was in the hands of receivers when he became connected with it, and the work of rehabilitating and modernizing the plant has been carried out under his direction. He immediately became a factor in the civic life of the city and was elected Mayor of the city a few years ago by a majority larger than that which any other candidate for that office ever received.

**Mr. Arthur W. Brady**, president and general counsel of the Union Traction Company of Indiana, was elected president of the Central Electric Railway Association at the meeting in Indianapolis on Feb. 27 and Feb. 28. Mr. Brady was born in Muncie, Ind., in 1865. He entered the academic department of Yale University and was graduated in the class of 1887. In 1888 he entered the law school of the University of Michigan and was graduated in 1889. He began the practice of law in Muncie, Ind., immediately after graduation and remained there until 1902. During the early years of his practice he was elected Mayor of the city and held that office for four years. His first experience in electric railway work was as counsel for the Citizens' Street Railway, Muncie, which was subsequently acquired by the Indiana Traction Company of Indiana. He was also retained as counsel by the Muncie, Hartford & Fort Wayne Railway, now the Bluffton division of the Indiana Union Traction Company. When construction work was begun on the Indianapolis Northern Railway, which is now the Indianapolis-Noblesville division of the Union Traction Company, Mr. Brady was elected secretary of the new company. Shortly after the organization of the Union Traction Company in 1903 Mr. Brady was elected its vice-president and in 1904 he was elected president. Mr. Brady is a director of the Ohio Electric Railway and has been closely associated with the management of the Terre Haute, Indianapolis & Eastern Traction Company and the Indianapolis Traction & Terminal Company, although he has never had any official connection with either of these companies. At the Columbus meeting in 1906 Mr. Brady was elected third vice-president of the American Street & Interurban Railway Association, in 1907 he was elected second vice-president, in 1908 he was advanced to the office of first vice-president, which he held for two years, and in 1910 he was elected president of the American Electric Railway Association.



A. W. Brady

#### OBITUARY

**Albert E. Akins**, first vice-president of the Cleveland, Southwestern & Columbus Traction Company, Cleveland, Ohio, for the last twelve years, is dead. Mr. Akins was among those who assisted in building the Cleveland-Berea Electric Railway, which later became part of the present Cleveland, Southwestern & Columbus Traction Company's system. This was in 1893. He was president of the Electric Depot Company and a director of the Union Savings & Loan Association, Cleveland. He was born in Royalton Township, Cuyahoga County, Ohio, on March 1, 1847, and was educated in the public schools and at Baldwin University.

## Construction News

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

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

#### RECENT INCORPORATIONS

**\*Central Arkansas Railway & Light Corporation, Hot Springs, Ark.**—Chartered in Virginia by the Federal Light & Traction Company interests, presumably to take over the properties of the Hot Springs Street Railway and the Hot Springs Water Company. Capital stock, \$10,500,000; common stock, \$7,000,000; preferred stock, \$3,500,000. Officers: William L. McKee, Brooklyn, N. Y., president; Louis C. Gerry, New York, treasurer; John B. Marsh, New York, secretary.

**Laporte, Logansport & Southern Railroad, Laporte, Ind.**—Articles of incorporation have been filed by this company to build an electric railway between Laporte, Bass Lake, Royal Center, Lafayette and Logansport. Surveys have been begun, and it is reported that an Eastern syndicate will finance the project. Capital stock, \$100,000. Officers: Ora Boseman, president; Warren Travis, vice-president; Carl Lactz, secretary, and A. G. Tamlin, treasurer. [E. R. J., Dec. 14, '12.]

**\*Rockcastle Railroad, Mount Vernon, Ky.**—Application for a charter has been made in Kentucky by this company to build a 30-mile railway from McKee to Livingston. Capital stock, \$10,000. Incorporators: W. Bond, Oakland, Md.; C. C. Williams, E. S. Albright, W. L. Richards, H. B. Furnish and A. W. Brown, Mount Vernon, and H. W. Bowman, Livingston.

**\*North Louisiana Electric Railway, Shreveport, La.**—Application for a charter has been made by this company in Louisiana to build a 100-mile electric railway from Shreveport to Monroe, via Homer. The old Clingman grade between Homer and Minden, 20 miles, is to be used for part of the line. Construction is expected to begin at both ends of this completed grade. The power plant is to be at Shreveport, where the headquarters will be established. Capital stock, \$1,000,000. A. B. Blevins, Jefferson, Tex., president; A. Kinnebrew, Homer, La., vice-president, and G. H. Walker, Shreveport, secretary and treasurer.

**Boston & Providence Interurban Electric Railroad, Boston, Mass.**—Application for a charter has been made by this company in Rhode Island. This railway is planned to connect with the Boston & Providence Interurban Railway, a Massachusetts corporation, which will start from Boston and extend through Massachusetts, meeting the Rhode Island line in Cumberland. It will then extend through Central Falls and the Moshassuck Valley to Providence. Franchises will be asked in Woonsocket, Central Falls, Pawtucket, Providence, Cranston, Lincoln, North Providence and Johnston, R. I. Incorporators: Stuart Pratt, James F. Shaw, Charles A. Stone, Robert Winsor, Edwin S. Webster and E. J. B. Huntoon. [E. R. J., Jan. 18, '13.]

**\*Empire United Railways, Inc., Syracuse, N. Y.**—Incorporated in New York to take over the properties of the Rochester, Syracuse & Eastern Railroad, the Syracuse, Lake Shore & Northern Railroad and the Auburn & Northern Electric Railroad. Capital stock, \$11,600,000. Among the incorporators are Clifford D. Beebe, Hendrick S. Holden and Edward Joy.

**\*South Mills, Portsmouth & Elizabeth City Railroad, Elizabeth City, N. C.**—Application for a charter has been made in North Carolina to build an electric or steam railway from Elizabeth City, N. C., via South Mills, to Portsmouth, Va., about 50 miles. Capital stock, \$100,000. Incorporators: J. F. Pace and O. L. Williams, Portsmouth; E. Anthony, H. A. Shannon, F. C. Harahan, G. F. Riggs and others. W. J. Halstead, South Mills, N. C., is counsel for the promoters.

**\*Kansas-Oklahoma Traction Company, Nowata, Okla.**—Chartered in Oklahoma to build an interurban railway. Capital stock, \$100,000. Incorporators: S. H. Siggins, Warren, and H. A. Siggins, Warren, Pa.; W. E. Ziegler, Coffeyville, Kan.; J. E. Campbell and E. B. Lawson, Nowata.



## FRANCHISES

**Birmingham, Ala.**—The Birmingham Railway, Light & Power Company has asked the Council for a franchise to extend the North Birmingham line in Birmingham to Lewisburg, a distance of 2½ miles.

**Little Rock, Ark.**—The Little Rock, Pine Bluff & Eastern Traction Company has asked the Council for a fifty-year franchise to build its lines over that portion of the Pulaski County free bridge located in Little Rock and over certain streets in Little Rock.

**Fresno, Cal.**—The Fresno, Hanford & Summit Lake Interurban Railway has secured renewals of franchises in all of the county towns through which the line will pass.

**Los Angeles, Cal.**—The City Council has instructed the City Attorney to prepare notice of sale of a franchise for a line for Fifty-fourth Street to the west city limits of Los Angeles. The Los Angeles Railway plans to build this extension.

**Rialto, Cal.**—The Pacific Electric Railway has received a fifty-year franchise from the Board of Trustees to cross all streets on line of its right-of-way through Rialto. The company has asked the Council of Riverside for two franchises.

**Dalton, Ga.**—The Georgia Railway & Electric Company, Atlanta, has received a ninety-nine-year franchise from the Council in Dalton.

**Belleville, Ill.**—The Southern Traction Company of Illinois, East St., Louis, has received a franchise in Belleville.

**Callaway, Ky.**—The Kentucky Southwestern Electric Railway, Light & Power Company, Paducah, Ky., has secured from the Callaway Fiscal Court a franchise in Callaway County. The company will extend its division to Murray in the spring.

**St. John, N. B.**—The St. John Railway has asked the Council for a franchise to extend and double-track some of its lines in St. John.

**Elizabeth, N. J.**—The Council has been asked to grant a franchise to extend the line of the Elizabeth & Trenton Railroad through Elizabeth to join the South Broad Street line of the Public Service Railway in Elizabeth.

**Cincinnati, Ohio.**—The Cincinnati Traction Company has received a franchise from the Council to extend its Avondale line to Bond Hill.

**Cleveland, Ohio.**—The Cleveland & Youngstown Railroad, Columbus, has asked the County Commissioners for permission to extend its franchise in Cuyahoga County for twenty-five years. If the franchise is granted the company will build a new power house and make other improvements on its lines in Cleveland. This railway will connect Cleveland and Youngstown via Cuyahoga, Portage, Trumbull and Mahoning Counties. John L. Cannon is interested. [E. R. J., May 25, '12.]

**Ashland, Ore.**—The F. P. Minney Company, Oakland, has asked the Council for a franchise in Ashland. This company plans to build a line through the Rogue River Valley. [E. R. J., Feb. 8, '13.]

**Newberg, Ore.**—The Oregon Electric Railway has asked the Council for a year's extension of its franchise in Newberg.

**Austin, Tex.**—The San Antonio & Austin Interurban Railway, San Antonio, has received a fifty-year franchise from the Travis County Commissioners over the Travis County bridge over the Colorado River in Austin. This 80-mile line will connect Austin and San Antonio. Vories B. Brown, San Antonio, president. [E. R. J., Feb. 22, '13.]

**\*Denton, Tex.**—J. T. Witt and associates have received a franchise from the Council for an interurban line along the West Dallas Pike to Cement City.

**Richmond, Va.**—The Virginia Railway & Power Company has received a franchise over Franklin Street, Richmond.

**Asotin, Wash.**—F. L. Sturm, representing the Lewiston Electric Railway, has received a franchise from the county commissioners of Asotin County along the county roads between Asotin and Clarkston. This railway will connect Lewiston, Idaho, and Clarkston and Asotin, Wash. [E. R. J., Jan. 18, '13.]

## TRACK AND ROADWAY

**Lethbridge (Alta.) Municipal Tramway.**—This company will build 4 miles of new track in Lethbridge during the year.

**Fairburn & Atlanta Railway & Electric Company, Fairburn, Ga.**—This company has awarded a contract to the J. B. McCrary Company, Atlanta, for the entire electrification of the properties of the company, which operates a 11-mile gasoline railway from Fairburn to College Park. The company will purchase at once 11 miles of No. 00 feeder wire with suitable pole line construction, 11 miles of track bonds, and No. 0000 feeders.

**Alton, Granite & St. Louis Traction Company, Alton, Ill.**—Surveys are being made by this company for an extension from the College Avenue (Alton) terminus to the site of the proposed new asylum at Alton. This line will probably be extended to Bethalto and Fosterburg.

**Alton, Jacksonville & Peoria Railway, Alton, Ill.**—Plans are being considered to have this company's line extended from Jerseyville to Fieldon and Hardin.

**Chicago (Ill.) Railways.**—This company plans to build 12 miles of city track in Chicago during the year.

**Southern Illinois Railway & Power Company, Chicago, Ill.**—This company expects to have its 16-mile line in operation in May. It will connect Eldorado, Wasson, Muddy, Raleigh, Leedford, Harrisburg, Dorrisville and Carrier Mills. The company's power plant and repair shops will be located on the Saline River about 2 miles from Harrisburg. The company will furnish power for lighting purposes and will operate seven cars. Officers: F. R. McMullen, 111 Monroe Street, Chicago, president; W. H. Schott, vice-president, general manager and purchasing agent; A. F. Lindley, secretary; W. H. Schott Company, Chicago, chief engineers. Headquarters: 111 Monroe Street, Chicago. [E. R. J., Sept. 7, '12.]

**Egyptian Traction Company, Eldorado, Ill.**—This company has filed notice of dissolution with the Secretary of State. [E. R. J., Nov. 16, '12.]

**Bluffton, Geneva & Celina Traction Company, Bluffton, Ind.**—Plans are being considered by this company for an extension east from Geneva, Ind., to Celina, Ohio.

**Rockland, South Thomaston & St. George Railway, Rockland, Maine.**—This company will build between Thomaston and Weskeag River, a distance of 2 miles, during 1913.

**Twin City Rapid Transit Company, Minneapolis, Minn.**—This company is asked to consider plans to build a cross-town line in St. Paul between Phalen Park and Como Park.

**Kansas City, Clay County & St. Joseph Railway, Kansas City, Mo.**—It is stated that this company will place its St. Joseph branch in operation on April 1. The track has been completed.

**St. Louis & Hall's Ferry Electric Railway, St. Louis, Mo.**—This company is securing right-of-way and as yet has made no definite plans for the construction of its electric line between St. Louis, Florissant and St. Charles. Its repair shops will be located at Baden City. J. E. Greffet, 824 Chestnut Street, St. Louis, is interested. [E. R. J., Feb. 15, '13.]

**Buffalo & Fort Erie Ferry & Railway Company, Buffalo, N. Y.**—Plans are being made by this company to electrify its railway between Fort Erie Ferry and Fort Erie Beach and extend this line through to Bridgeburg and from Fort Erie Beach to Port Colborne, to connect with the lines of the Niagara, St. Catharines & Toronto Electric Railway, St. Catharines, Ont.

**Buffalo & Depew Railway, Depew, N. Y.**—During the next few weeks this company expects to purchase 10,000 new oak ties and 5000 rail bonds for renewal.

**Elmira Water, Light & Railroad Company, Elmira, N. Y.**—This company has been asked to consider plans to build an extension from a point on the Glenwood line north to Armory Street and State Street, where a connection could be made with the State Street line and the Walnut Street line in Elmira.

**Western New York & Pennsylvania Traction Company, Olean, N. Y.**—The right-of-way has been obtained by this company for its 7-mile line from Olean to Hinsdale.

**Southern Power Company, Charlotte, N. C.**—This company plans to extend its line from Anderson to Atlanta in the near future.

**North Carolina Public Service Company, Salisbury, N. C.**—This company is rebuilding all of its line in Salisbury and 8 miles of new track are being laid.

**Cincinnati (Ohio) Traction Company.**—This company has placed in operation its new College Hill line in Cincinnati.

**Toledo Railways & Light Company, Toledo, Ohio.**—Plans are being considered by this company to build a 6-mile extension from Toledo Beach to Monroe, Mich.

**Dominion Power & Transmission Company, Ltd., Hamilton, Ont.**—In addition to the extensions planned by this company in the northeast and southeast sections of Hamilton it will lay new rails on King Street and on Locke Street and Sherman Avenue, Hamilton.

**Portland Railway, Light & Power Company, Portland, Ore.**—Plans have been completed by this company for the electrification of the Mount Hood line between Montavalle and Gresham, a distance of 9 miles.

**Duquesne & Dravosburg Street Railway, Duquesne, Pa.**—It is reported that this company has completed its line between Dravosburg and Duquesne and will soon place it in operation.

**Pottstown & Phoenixville Railway, Philadelphia, Pa.**—During the next two months this company plans to build 10 miles of new track and seven bridges.

**Wyomissing Valley Railway, Reading, Pa.**—Plans are being made to begin soon the construction of this double-track electric railway from Wyomissing to Hendleton, O. S. Geiger is interested. [E. R. J., Dec. 14, '12.]

**Chambersburg & Shippensburg Railway, Shippensburg, Pa.**—Preliminary arrangements are being made by this company on its 10-mile line between Chambersburg and Shippensburg. It will connect at Chambersburg with the Chambersburg, Greencastle & Waynesburg Railway. The company's repair shops will be at Chambersburg and it will purchase power for its present use. T. M. Mahon, Chambersburg, president. [E. R. J., Feb. 8, '13.]

**Stroudsburg & Water Gap Street Railway, Stroudsburg, Pa.**—It is reported that this company has begun work on its new line from Stroudsburg to North Water Gap to connect with the Analomink Paper Mill.

**Warren & Jamestown Street Railway, Warren, Pa.**—Plans are being made to build a 16-mile line between Sheffield and Kane.

**Monongahela, Ellsworth & Washington Railway, Washington, Pa.**—Grading will soon be begun by this company between Monongahela and Hazelkirk. James Bryant, Pittsburgh, engineer. [E. R. J., Sept. 28, '12.]

**Hull (Que.) Electric Railway.**—This company plans to build an extension to Connaught Park and the Jockey Club race track, to double-track  $\frac{3}{4}$  mile and to build terminal facilities at Connaught Park.

**Rhode Island Company, Providence, R. I.**—This company has offered to build a line from Centredale through Greenville and Harmony to Chepachet and possibly to Pascoag, making a through route from Providence, if the people of the towns of Smithfield and Gloucester will guarantee to the company interest charges on the cost of construction, which is estimated at about \$300,000.

**Knoxville Railway & Light Company, Knoxville, Tenn.**—This company has placed in operation its 3-mile extension from Knoxville to Vestal.

**El Paso-Ysleta Interurban Railway, El Paso, Tex.**—Work has been begun by this company on its 12-mile electric line from El Paso down the Rio Grande Valley to Ysleta. This is a Stone & Webster proposition. [E. R. J., Dec. 14, '12.]

**Ogden (Utah) Rapid Transit Company.**—This company will resume work in the spring on its 6-mile extension from Hermitage in Ogden Canyon to Huntsville. During the summer the company plans to build a 12-mile extension from Smithfield, its present terminus, to the Idaho line.

**Utah Light & Railway Company, Salt Lake City, Utah.**—This company has ordered 2000 tons of rails and other

material. As soon as the weather permits the company will begin work on the extension of its Holliday line from the present terminal to the mouth of the Big Cottonwood Canyon, a distance of 5 miles. The company also plans to extend its Warm Springs line to Bountiful and other towns in Davis County.

**Tacoma, Wash.**—Mayor W. W. Seymour has announced that the City Council has decided to build a municipal electric railway across the Eleventh Street bridge at Sitcum Avenue in Tacoma. Bonds to furnish funds to build the line will be issued if the voters favor the issue at an election which will be held in the spring. No franchise will be granted to any company to operate over the city tracks, but any reasonable rental offer from any company will be accepted if it meets with the approval of the Council. [E. R. J., Feb. 22, '13.]

**Fairmont, Clarksburg & Grafton Railway, Clarksburg, W. Va.**—Right-of-way has been secured by this company from Grafton to Meadville, and work will soon be begun on this 30-mile line to connect Grafton, Meadville, Clarksburg, Fairmont and Bridgeport. Charles F. Sutherland, Morgantown, president. [E. R. J., July 6, '12.]

**Monongahela Valley Traction Company, Fairmont, W. Va.**—The Harrison county court has agreed to this company's proposition relative to the construction of a bridge across the river at Lumberport. The company plans to build a 2-mile extension to Lumberport.

**Wheeling (W. Va.) Traction Company.**—Plans are being considered by this company for an extension from Bellaire to Glencoe.

**Gogebic & Iron Counties Railway & Light Company, Ashland, Wis.**—A 2-mile line between Gile and Montreal, Wis., will be built by this company during 1913.

**Badger Railway & Light Company, Milwaukee, Wis.**—During 1913 this company plans to build a 22-mile line to connect Lake Geneva, Elkhorn and Whitewater.

**Milwaukee Electric Railway & Light Company, Milwaukee, Wis.**—Plans are being made by this company to extend its lines from the terminal at Wauwatosa to the county buildings.

#### SHOPS AND BUILDINGS

**Pacific Electric Railway, Los Angeles, Cal.**—Foundations are being laid by this company for a new depot in Owensmouth.

**Central California Traction Company, San Francisco, Cal.**—A new depot at Kettleman has been completed by this company and another is under way at Dayton.

**Savannah (Ga.) Electric Company.**—This company has closed its general offices on Broughton Street in Savannah and will open its new quarters at the southeast corner of Bay and Whitaker Streets. The new quarters comprise the general offices and the new substation.

**Boston & Worcester Street Railway, Boston, Mass.**—This company has opened a new freight terminal station at 529 Commercial Street, Boston.

**North Carolina Public Service Company, Salisbury, N. C.**—This company has awarded a contract to I. G. Lawrence, Durham, for the construction of a new station in Salisbury. The building will be of brick, 70 ft. x 130 ft., and will contain a carhouse, storehouse and workshop. The cost is estimated to be \$12,000. The company will also build a new carhouse at once at its plant opposite the Southern passenger station in Salisbury. The structure will be 53 ft. x 32 ft. and of brick construction. The cost will be about \$3,000.

**Grand Forks (N. D.) Street Railway.**—Within the next ten weeks this company plans to build a new carhouse in Grand Rapids with a capacity for twenty cars.

**Hocking-Sunday Creek Traction Company, Nelson, Ohio.**—This company's carhouses in Nelsonville were destroyed by fire on Feb. 13. The loss is estimated to be about \$5,000.

**Cleveland, Painesville & Eastern Railroad, Willoughby, Ohio.**—This company has purchased property in Painesville upon which it plans to build a new depot.

**Oregon Electric Railway, Portland, Ore.**—Plans are being made by this company to build a new one-story brick passenger depot in Eugene.

**Portland, Eugene & Eastern Railway, Portland, Ore.**—Plans are being made by this company to build a new interurban passenger station on Fourth Street, Portland. The structure will occupy a whole block and will be several stories high. This building will serve as the Portland home for all the Southern Pacific offices. It is estimated that the purchase of the ground and the erection of the station will involve an expenditure of about \$1,500,000.

**Philadelphia Rapid Transit Company, Philadelphia, Pa.**—This company has agreed to lease from the Fairmount Park Commission, Philadelphia, a plot of ground at Forty-ninth Street and Parkside Avenue for terminal purposes, at a rental of \$3,000 per year, for a period of ten years.

**Pottstown & Phoenixville Railway, Philadelphia, Pa.**—During the next two months this company plans to build a new carhouse.

**Sioux Falls (S. D.) Traction Company.**—Work has been begun by this company on the construction of a new carhouse and offices on North Main Avenue in Sioux Falls. The structure will be 66 ft. x 150 ft.

**Pan Handle Traction Company, Wheeling, W. Va.**—Plans are being made by this company to build a new carhouse in North Warwood.

**POWER HOUSES AND SUBSTATIONS**

**San Joaquin Valley Electric Railway, Stockton, Cal.**—Work will soon be begun by this company on power plant No. 4, to be located in Crane Valley, on the east side of Crane Valley Lake. With the opening of work on power plant No. 4 the company will have three plants in the course of construction. The Tule River plant will be completed the latter part of the year. The No. 2 plant is now being constructed and plants Nos. 1 and 3 are in operation.

**Denver City (Col.) Tramway Company.**—This company is building a new substation on Delaware Street in Denver City.

**Fairburn & Atlanta Railway & Electric Company, Fairburn, Ga.**—This company expects to purchase a 200-kw to 300-kw converter for its power plant.

**Springfield (Ill.) Consolidated Railway.**—This company will soon build a storage station and an all-steel cooling tower at its power plant at Capital Avenue and Tenth Street in Springfield.

**Indianapolis & Louisville Traction Company, Scottsburg, Ind.**—This company's power house in Scottsburg was badly damaged by fire on Feb. 16.

**Calais (Me.) Street Railway.**—This company has completed its new power house in Calais and will soon place it in operation.

**Worcester (Mass.) Consolidated Street Railway.**—This company has ordered two 300-kw rotary converters to be placed in the Lancaster Street power house in Leominster.

**Columbus, Delaware & Marion Railway, Columbus, Ohio.**—During the year this company expects to purchase one 500-kw turbine and three 250-hp boilers for its Marion power house.

**Dayton Power & Light Company, Dayton, Ohio.**—This company will install new substation equipment consisting of a 300-kw rotary converter, transformer and outgoing line equipment, switchboard, etc. The apparatus has been ordered from the General Electric Company.

**Regina (Sask.) Municipal Railway.**—During the next three months this company will build an extension to its power house and build a new power house in Regina. It expects to purchase one 1000-kw motor-generator set and one 400-kw steam-driven unit.

**Rio Grande Valley Traction Company, El Paso, Tex.**—This company plans to build a new substation at West Ysleta. C. W. Kellogg, El Paso, general manager.

**Charlottesville & Albemarle Railway, Charlottesville, Va.**—This company's power plant in Charlottesville was partly destroyed by an explosion on Feb. 14. The loss is estimated to be about \$15,000.

**Richmond & Henrico Railway, Richmond, Va.**—Plans are being made by this company to build an addition to its power house in Richmond. The structure will be 106 ft. x 85 ft. and of brick and concrete construction. The company expects to install additional equipment.

**Manufactures and Supplies**

**ROLLING STOCK**

**Phoenix (Ariz.) Railway** will issue specifications shortly for several new cars.

**Virginia Railway & Power Company, Norfolk, Va.,** is said to be figuring on ten new cars.

**Shore Line Electric Railway, Saybrook, Conn.,** is reported to be in the market for six cars.

**H. F. Hart, Webster, S. D.,** is asking for prices on equipment for a 50-mile line which he proposes to build.

**Springfield (Ill.) Consolidated Railway** expects to purchase seven 30-ft. double-truck city pay-as-you-enter cars.

**New York (N. Y.) Railways** has ordered forty-five storage battery cars from the American Car & Foundry Company.

**Detroit (Mich.) United Railway** has purchased fifty 23-ft. 11 1/2-in. single-truck car bodies from the Cincinnati Car Company.

**Indianapolis & Cincinnati Traction Company, Indianapolis, Ind.,** has ordered three 56-ft. express cars from the Cincinnati Car Company.

**Fairburn & Atlanta Railway & Electric Company, Fairburn, Ga.,** is said to be considering the purchase of thirty double-truck cars, complete.

**Cleveland (Ohio) Railway** has ordered from the Orenstein-Arthur Koppel Company ten work cars for the transportation of construction materials.

**Utica & Mohawk Valley Railway, Utica, N. Y.,** has ordered from the G. C. Kuhlman Car Company four interurban cars with trucks and twenty Brill 39-E trucks.

**Oakland, Antioch & Eastern Railway, Oakland, Cal.,** has ordered four 56-ft. 8-in. combination passenger, smoking and baggage car bodies from the Cincinnati Car Company.

**Michigan United Traction Company, Jackson, Mich.,** has ordered from the St. Louis Car Company twenty pay-as-you-enter arched-roof semi-steel cars for city service in Evansville, Ind., Saginaw, Mich., and Rockford, Ill.

**Wilkes-Barre (Pa.) Railway** has ordered from The J. G. Brill Company three 36-ft. 8-in. semi-convertible car bodies mounted on Brill 27-MCB-2X trucks and four 28-ft. semi-convertible car bodies mounted on Brill 39-E trucks.

**Southern Traction Company, Dallas, Tex.,** has ordered from the American Car Company ten trail passenger cars, eight express cars, two work cars and forty-two sets of Brill 27-MCB trucks. The cars will be equipped with General Electric motors.

**Iowa Railway & Light Company, Cedar Rapids, Ia.,** has ordered from the McGuire-Cummings Manufacturing Company two all-steel interurban cars, four double-truck cars and four single-truck cars for city service. General Electric equipment will be installed on these cars.

**New York State Railways, Rochester, N. Y.,** is in the market for twenty-five cars for use on its Rochester division. The company has ordered ten cars from the Cincinnati Car Company for its Syracuse lines and four interurban cars from the G. C. Kuhlman Car Company for operation on its Utica division.

**Montreal (Que.) Tramways** has specified the following details for the 100 closed prepayment cars which are being built by the Canadian Car & Foundry Company:

Seating capacity.....	42	Axles .....	Can.
Weight (car body only),		Cables .....	Imperial
	19,000 lb.	Conduits and junction boxes,	
Bolster centers, length,			C-H
	20 ft. 8 in.	Control .....	K-35
Length of body....	32 ft. 0 in.	Curtain fixtures....	National
Length over vestibule,		Curtain material...	Pantasote
	45 ft. 6 in.	Destination sign..	E. S. S. Co.
Width over all....	8 ft. 2 in.	Headlights .....	C-H
Height, rail to sills....	34 in.	Motors .....	4-West. 337
Sill to trolley base..	8 ft. 5 in.	Motors .....	Outside-hung
Body .....	composite	Sash fixtures .....	Edwards
Interior trim.....	cherry	Seats .....	Cross and long.
Headlining .....	Agasote	Step treads.....	Mason
Roof .....	arch	Trolley base.....	Nuttal
Underframe .....	steel	Trucks.....	Brill 27-GE-2
Air brakes.....	West.	Wheelguards .....	H-B

## TRADE NOTES

**E. C. Converse** has resigned as a director of the Baldwin Locomotive Works, Philadelphia, Pa.

**M-C-B Company, Chicago, Ill.**, announces that Erle C. Cowgill has resigned as secretary of the company to become general manager of a plantation company in Mississippi.

**Cambria Steel Company, Johnstown, Pa.**, has appointed Harry B. Guy, for many years connected with the Carnegie Steel Company, assistant purchasing agent with headquarters in Johnstown.

**Ottawa Car Company, Ottawa, Ont.**, has appointed W. K. Jeffrey its manager to succeed James Buchan, deceased. Mr. Jeffrey has been connected with the Ottawa Car Company for eight years.

**Dossert & Company, New York, N. Y.**, announce that the Delta Star Electric Company, 617-631 West Jackson Boulevard, Chicago, Ill., have taken over the agency for Dossert connectors in Chicago and adjacent territory, including Milwaukee and the States of Illinois and Iowa.

**Allis Chalmers Company's** personal property was sold at auction on Feb. 27 for \$4,000,000, James N. Wallace, John H. McClementy and Francis S. Bangs, of New York, representing a reorganization committee, being the only bidders. The sale included all raw material, accounts, orders, stocks, bonds and securities of all the company's plants.

**Weir Frog Company, Cincinnati, Ohio**, has increased its manufacturing floor space by about 16,000 sq. ft. This was done to take care of the heavy buying movement and new extensions of the railroads in its territory. The space for the storage of raw material has been nearly doubled to accommodate the demands which are made on the company for quicker shipment.

**Baldwin Locomotive Works, Philadelphia, Pa.**, have made a preliminary statement for the year 1912 showing a total production of \$28,924,000. The net earnings after the payment of bond interest were \$3,698,000, from which dividends aggregating \$1,800,000 were paid as follows: To the preferred stockholders \$1,400,000, to common \$400,000, leaving undivided profits of \$1,898,000.

**O. M. Edwards Company, Syracuse, N. Y.**, has been incorporated, with \$1,000,000 common stock and \$250,000 7 per cent preferred stock, to manufacture freight car equipments, including padlocks, valves, etc. The officers of the company are as follows: O. M. Edwards, president; W. A. Le Brun, first vice-president; E. W. Edwards, second vice-president and assistant manager; J. J. Edwards, secretary and treasurer.

**McMeen & Miller, Chicago, Ill.**, has been incorporated to succeed the engineering firm of McMeen & Miller, which for the past ten years has existed as a partnership between Samuel G. McMeen and Kempster B. Miller. The personnel of the new firm includes Mr. McMeen and Mr. Miller, and, as a new member, Leigh S. Keith, who for several years has been managing engineer of the firm. The organization of the company has been increased so as to include an experienced staff of engineers fitted to handle not only the general work of a consulting engineering business but also the more specialized details of economical and efficient design and construction of steam or hydroelectric stations, high-tension transmission lines and overhead and underground distribution systems. Mr. McMeen, who is the senior member and vice-president of the new firm, is at present located at Columbus, Ohio, where he is devoting practically his entire attention to the affairs of E. W. Clark & Company, Philadelphia, Pa. He is president of the Columbus Railway & Light Company, one of the Clark properties, and has the executive management of all of the allied electric properties in Columbus. He also serves in an advisory capacity in the Clark properties throughout the country. Mr. Miller, who is president of McMeen & Miller, is a graduate of Cornell and for many years was identified, as engineer and manager, with the Kellogg Switchboard & Supply Company. He is perhaps best known as the author of "American Telephone Practice." Mr. Keith, the secretary and treasurer, is a graduate of the Massachusetts Institute of Technology and has been connected with the firm about four years, engaging in a wide variety of engineering work.

## ADVERTISING LITERATURE

**National Tube Company, Pittsburgh, Pa.**, is mailing a folder which discusses the merits of the Kewanee union.

**H. M. Bylesby & Company, Chicago, Ill.**, has issued a Department Bulletin No. 1, which describes briefly the work of its department of examinations and reports.

**Walker & Bennett Manufacturing Company, New York, N. Y.**, has issued a catalog which describes and illustrates four distinct types of car seats for steam and electric cars.

**Chicago Pneumatic Tool Company, Chicago, Ill.**, has issued Bulletin No. 130, which describes some of its products, including airoilene grease, airoilene oil, Chicago automatic oilers and the Little Giant grease machine.

**Galion Iron Works Company, Galion, Ohio**, has issued Catalog No. 16, which describes and illustrates its complete line of cast-iron and corrugated culvert pipe, road-grading machines, drags, rollers, scrapers, plows, tractors, crushers, scarifiers, etc.

**Sanderson & Porter, New York, N. Y.**, have reprinted in booklet form an article from the *Canadian Engineer* entitled "The Jordan River Power Development." This is a description of the hydraulic, generating and transmission features of the Vancouver Island Power Company's plant.

**Electric Service Supplies Company, Philadelphia, Pa.**, has issued its 1913 catalog on Garton-Daniels lightning arresters and other lightning protective apparatus. The catalog contains much information relative to lightning phenomena, installation of lightning arresters, grounding, distribution, inspection and other allied subjects. It describes and illustrates the complete line of Garton-Daniels lightning arresters, a new line of panelboard line arresters, high-voltage and low-voltage choke coils and disconnecting switches, grounding apparatus, etc. The last eight pages are given over to installation diagrams.

**General Electric Company, Schenectady, N. Y.**, has issued Bulletin No. A4086, which is devoted to the subject of type MR circuit breakers for railway service. Bulletin No. A4083 describes and illustrates US-13 roller-bearing trolley bases. Bulletin No. 4085 is devoted to a description of the company's battery-charging motor-generator sets for railway signaling. Bulletin No. A4070 illustrates and describes General Electric electrically operated remote control switch, type R, form C2, adapted for use wherever control from a central point is desired. It is made for both alternating and direct current. Bulletin No. A4081 is devoted to reversing motors for planers, slotters, etc. The publication contains various curves which show the advantage of direct drive over belt drive. Bulletin No. A4072 is devoted to the subject of Edison Mazda sign lamps.

**J. G. White & Company, Inc., New York, N. Y.**, has prepared an illustrated booklet which calls public attention to the recent organization of The J. G. White Engineering Corporation and The J. G. White Management Corporation to assume the functions previously exercised by the engineering construction and management departments of the parent company. A general description of the scope of the various companies is presented in the booklet, and the illustrations reveal in graphic form the different phases of engineering work which the companies undertake. It is pointed out that during more than twenty years of successful accomplishment the American and foreign White companies have carried out important developments in the United States, Canada, Great Britain, South and Central America, Australia, Cuba, Porto Rico, the Philippine Islands, Holland, France, Italy and India.

## NEW PUBLICATION

**Hygiene for the Worker.** By W. H. Tolman and A. W. Guthrie, American Book Company, New York, 1912. Cloth, 231 pages. Price, 50 cents.

The contents of this book cover a wider scope than the title would indicate, as the chapters on food and general hygiene are supplemented by data on fire and accident prevention as well as on first aid to the injured. Dr. Tolman, co-author of this book, is particularly well known for his work as director of the American Museum of Safety, which has given him exceptionally good opportunities to study the prevention of accidents to employees.