RAILROAD GAZETTE

FRIDAY, OCTOBER 26, 1894.

CONTENTS

Contributions.

The International Railway Congress.

29 Abingdon St.,
WESTMINSTER, S. W., Oct. 8, 1894.

TO THE EDITOR OF THE RAILROAD GAZETTE:

May I be allowed to say one word in reference to a statement in your issue of Sept. 28, which, though not incorrect, will, I think be likely to lead to misunderstanding? You say that the action of the Executive of the International Railway Congress in accepting the American Railway Association as a member, "practically admits all the American railroad companies, now members of the Association, to membership in the Congress without further trouble or fees." This is only true to a very limited extent. For according to the constitution of the Congress on single railway administration—and it is as a railway administration that the American Railway Association has been classed—can send more than eight delegates. If any American railroad company wishes, therefore, to send more than a fraction of a delegate it must join the Congress direct and so obtain representation in its own right.

I am glad to say I have already heard that more than one of your great companies propose to send over a batch of their leading officers to represent them; and certainly we, on this side of the water, shall be much disappointed if we do not have the opportunity of welcoming many times eight representatives of American railways in London next June. W. M. ACWORTH.

Secretary of the English Section.

Long Valve Travel and the Locomotive "J. W. Miller."

PROVIDENCE, R. I., Sept. 1, 1894.

TO THE EDITOR OF THE RAILROAD GAZETTE:

In your issue of August 17, I noted with much interest what you had to say about long valve travels in locomotives and their performance. That part that refers to the N. Y., P. & B. Engine, "J. W. Miller," particularly interested me, and I wish to correct some of the statements you make, in order that a correct understanding may be had. Allow me to first give you a brief history of this engine and its inception.

In the fall of 1886, the management of the N. Y., P. & B. R. R. Co., desired an anthracite coal burning locomotive built for fast express service. Accordingly a specification was prepared and contract made with R. I. Locomotive Works for above named type of engine. The construction and general design were just about the same as those in use on the Lehigh Valley Railroad, Wyoming Division. The General Manager required a guarantee of a performance by the builders of 60 miles per hour, with Shore Line trains of 8 cars, which was agreed to. The engine was built according to specifications, except rigid wheel base, this was made 6 in. shorter. Valve motion was not specified. Delivery was made in January, 1887. The following is a description as she came from the builders, followed by the alterations afterwards made and why made by the railroad company: Cylinders, 18 in. x24 in.; rigid wheel base, 7 ft. 0 in.; diameter of drivers, 6 ft. 0 in.; eccentric throw, 6¼ in.; valve travel, 7¼ in.; steam ports, 2 in. x18 in.; exhaust port, 4 in. x18 in.; valves, Richardson balanced, Allen patent, inside lap, none, inside lead, none; outside lap, 2 in.; weight of valves, 220 lbs each; boiler ordinary wagon top style, 54 in. diameter of shell; 218 flues, 2 in. outside diameter, 10 ft. 5 in. long; firebox, 126 in. x43 in.; tubular grates; position of firebox, top of the frame; steam pressure, 180 lbs. per sq. in.; fuel, anthracite coal; total weight ready for train 117,500 lbs.; weight on drivers. 83,400 lbs.

The builders put in valve motion that in their judgment would best do the required and guaranteed work. Upon completion and delivery her weight was objected to, particularly so on account of the short wheel base, resulting in the addition of a pair of trailing wheels, distributing the weight on about 12 ft. 0 in. of wheel base, instead of 7 ft. The reason for this was that at that time the railroad company was renewing its bridges everywhere and removing old light weight rails. For obvious reasons she was not run regularly for about 18 months. During this time it was found that the excessive weight of valve and long lap were not practical for two reasons: First, no man could handle the lever at high speed whether she was using steam or not. Second, if she stopped in a certain position there was not sufficient opening to start the train. To move her back to change position for a start was annoying and caused a loss of time, and something had to be done to put her in condition for service required (not to satisfy the notions of that local Master Mechanic referred to). I proceeded to change the parts that were clearly at fault.

This change was as follows: I put in false valve seats 1½ in. thick, and reduced the ports to 1¼ in. x16 in., exhaust port, 4 in. x16in., made new valves 1 in. outside lap, line and line inside, Richardson balance 4 square inches less than port areas; changed the travel to 6¼ in. New valves weighed 104 lbs. each. The engine then handled easily at any speed, made plenty of steam and the schedule time and better if necessary on any of the Shore Line trains. In the summer of 1888, she was put into regular service on the 10 a.m. train on Shore Line, Boston to New York. She ran this train until the consolidation with the N. Y., N. H. & H. R. R., July 1, 1892, when engines commenced running to New Haven. She ran there a few times, but had to discontinue running her then because she would not go through the engine house on to the table in New Haven; their other table was not accessible at times. She had now completed a mileage of about 50,000, and needed rebuilding, new tires, etc., and had a broken frame. It was decided to take her out of service for that purpose. She was again ready for service in May, 1894. The trailing wheels had been removed and rigid wheel base changed from 84 in. to 102 in.

Engines were now running between Boston and New London (O. C. system). There did not now appear to be any train that I could put her on, except a local run between Providence and Stonington, which was not a suitable train for her. About this time it was discovered that hard coal burning engines were a failure on the O. C. system and the Miller was ordered to South Boston shops for a new boiler with deep fire box, 34 in. x78 in. for soft coal burning, thus precluding the possibility of any more hard coal fuel for the engine Miller. She is still in the shop.

You can easily determine from what I have written whether this engine is a mongrel or not. If she is then the hard coal boiler made her so, and every other eight-wheel American type of engine must be rated as mongrels.

The Miller has never run in freight service, but has been run in passenger service and has got an A No. 1 record. I have it complete for every day's performance that she has ever done, viz.: Miles run, cars hauled, fuel consumed, cause of all delays, time of departure and arrival at terminals, etc., all of which I should be glad to show you or any one who will call and desire to see them. Your report of failure for this engine is not a fact, as I have shown. It is apparent to me where your impressions came from, and why your informer knew better than to say such things and knows that such stories are not fair. The old management of N. Y., P. & B. R. R. will endorse all I have written. I believe in all the improvements that can be made, and have worked just as hard as anybody to that end without making very much noise about it either. In this case I did not innovate on the long valve travel or do it to in anyway criticise the builders. I simply made the changes necessary to get a good working engine and I succeeded, and in all that has been written about this engine no one to my knowledge has made any effort to ascertain facts, consequently misrepresentation ruled and was in many cases accepted as fact. This it would seem suited a good many best. I must add that I doubt that anybody ever before or since has put such conditions of valve and travel into a locomotive. If they did, I can't see how high speed could have been maintained without disaster.

L. M. BUTLER.

Sept. 12, 1894.

. . . . Those other questions you ask I will try to answer. To what I said about the Miller not being able to start her train if stopped in certain positions, the valves were not open enough to admit sufficient steam. I do not know what the intentions of the builders were about reducing lap if found necessary. I am somewhat familiar with some of the large valves you mention, but do not know of any with such excessive weight as the Miller had. Please note, my letter says no man could handle the lever at high speed whether the engine was using steam or not. I am at a loss to understand where you got your information on this point; it could not have come from anybody who knew about it, and I know no one could have known better than myself and the men who ran her. I must maintain she was not a failure and have the records to back it up. She never was run on the guaranteed time and service, because there never has been a train scheduled on this road requiring such performance or anywhere near it. This guarantee was for 62½ miles in 62½ minutes, with one stop between Groton Ferry and Providence. She has made some very good runs, however, with heavy trains in times when late. She was run and well broken in and on different trains before alterations were made, and entered into regular service. She hauled 13 car loads of G. A. R. men from New London to Providence (cars were loaded full) in about 66 minutes, as near as I can recollect. A few other very satisfactory runs as extra and aside from regular time can be found.

L. M. BUTLER.

[Some notes on this subject will be found on the editorial pages.—EDITOR.]

The Elevated Railroads of Chicago.

There has been for several years past a lively interest in the subject of elevated railroads in Chicago. It long ago became apparent that the street railroad system of the city was each year becoming less capable of properly handling the traffic which naturally fell to it, and as the traffic increased, the delays and interruptions became more frequent. This state of affairs naturally led to the incorporation of a number of companies with various schemes for rapid transit. With but few exceptions these contemplated the construction and operation of elevated roads. Out of a dozen or more of such schemes, four show some prospect of materialization: the Chicago & South Side Rapid Transit Railroad Company, the Lake Street Elevated Railroad Company, the Metropolitan West Side Elevated Railroad Company and the Northwestern Elevated Railroad Company.

The two roads first named have now been in operation for some time, although on account of a lack of branch lines and terminal facilities, their success has not been very encouraging. The Metropolitan is under construction and it is expected that by the end of the year it will have about 10 miles in operation, of which nearly two miles is four-track road, the remainder being double track. Construction on the Northwestern has not yet been begun, for reasons that will appear later.

The line of the Chicago & South Side Rapid Transit Railroad Company, or the "Alley Elevated," as it is generally called, was the first to be operated in Chicago, and is well-known to many of the readers of the *Railroad Gazette* as the road between the city and Jackson Park. The first franchise for this road was got March 26, 1888, and permitted the construction of an elevated railroad from a point on Van Buren street, between Dearborn street and Wabash avenue, south to a point between Thirty-seventh and Thirty-ninth streets, from which point it was to be extended in an easterly or south-easterly direction, reaching Thirty-ninth street, then the city limits, at some point between Dearborn street and Forest avenue. A large block of territory [south of Thirty-ninth street having been annexed by the city of Chicago, subsequent to the passage of this ordinance, it was amended April 2, 1891, the company obtaining permission to extend its line, from a point on the main line between Thirty-seventh and Thirty-ninth streets, south to a point between Fortieth and Forty-third streets, east to a point between Grand Boulevard and Michigan Boulevard, and south again to a point between Sixtieth and Sixty-third streets. From this point the road was to be extended in an easterly direction to Jackson Park. This ordinance provided also for two branches: one from a point between Fifty-fifth and Fifty-ninth streets west to Englewood and south to a point on Sixty-third street between Wallace street and Wentworth avenue; the other branch extending south to Seventy-first street from a point on the Jackson Park extension, and lying between South Park avenue and Cottage Grove avenue. An ordinance passed March 21, 1892, authorized the company to build a structure from the alley between Prairie and Calumet avenues, east on Sixty-third street to Jackson Park, the railroad company having got the required consent from the holders of property along the line.

The route from the city to the point above named on Sixty-third street had then been obtained by purchase or condemnation and several miles of the structure erected. The company was unable to reach Van Buren street at a reasonable cost on the line selected, and made Congress street their northern terminus. From this street south the line was located between State street and Wabash avenue, occupying the alley for a part of the distance, and for the remaining part acquiring property along or near the alley as far as Fortieth street. From this point the route lay along the south side of Fortieth street as far east as the alley between Prairie and Calumet avenues, where it turned south to Sixty-third street.

The structure and stations from Congress to Fortieth street were completed early in 1892, and May 27, 1892, the road was opened to Thirty-ninth street, a distance of about 3½ miles from the northern terminus. The service was extended beyond Thirty-ninth street as the construction advanced, and within a year had reached Jackson Park, a distance of about 8½ miles from the down town terminus.

The design of the structure of this road has been illustrated in the *Railroad Gazette* of April 4 and 11, 1890, and Sept. 1, 1893. The cars were illustrated and described on June 17, 1892, and the locomotives on April 15 and October 28, 1892.

Neither of the extensions authorized by the ordinance of April 2, 1891, has yet been built, though efforts have been made to induce the company to build the Englewood branch. This would increase the traffic of the road, and as it calls for the construction of only about a mile and a half of line, it would doubtless be built were it not for the probable high cost of the right of way.

The south branch to Seventy-first street would pass through a thinly settled district; though if built near Cottage Grove avenue it would be in a position to compete with the Cottage Grove avenue line of the Chicago City Railway for passengers transferring at this point from the Calumet Electric Railway. A branch from the main line at Thirty-ninth or Fortieth streets to the Stock Yards has also been talked of, though the idea now appears to have been given up. The extension of which the line stands in greatest need, is one which will make it easier of access from the northern and western parts of the business district. With both the State street and Cottage Grove avenue lines of the Chicago City Railway reaching more than half a mile farther to the north of the Congress street terminal of the elevated road, it can hardly be expected to get its full share of the traffic. So long, however, as the road is controlled by heavy stockholders in the Chicago City Railway Company, it seems hardly probable that any of these extensions will be built. The road is now earning somewhat more than its operating expenses, although the surplus lacks considerable of being enough to meet all obligations. The minority stockholders are making a strong effort to get the road out of the conthrol of those connected with the Chicago City Railway Company and to secure a down-town loop, or an extension of the present line to such a point as will enable the company to get a reasonable share of business.

The second elevated road, and at present the only other one in operation in Chicago, is the Lake Street Elevated Railroad. This company now has about 6½ miles of road constructed and in operation, the western terminus being at West Fifty-second street, the line extending eastward on Lake street across the river to Market street and south to Madison street.

The first franchise granted was to the Lake Street Elevated Railway Company. This was passed December 28, 1888, and permitted the company to build from Canal street west to the city limits. This ordinance was amended November 24, 1890, by two ordinances, one of which permitted the company to build on Lake street from Canal street to Crawford avenue; the other, to extend the line west to the city limits from Crawford avenue and east to Market street from Canal street. These ordinances gave the company the privilege of crossing on the viaduct and the drawbridge over the river, the railroad company to make such changes as would make these structures safe. The construction of the road progressed slowly, partly on account of litigation and partly for financial reasons. On November 30, 1891, the City Council passed an ordinance authorizing the return to the company of the deposit of $100,000, required by the terms of the ordinance of November 24, 1890, and requiring the company to file in its place a bond for $200,000, guaranteeing the performance of the conditions imposed.

August 30, 1892, the name of the corporation was changed by the substitution of the word "railroad" for "railway," and the City Council, at a meeting held December 19 of the same year confirmed the change. May 15, 1893, an ordinance was passed giving the company permission to build a number of branches, one of them beginning at the corner of Market and Lake streets and extending southward on Market to Madison street. This branch has been built as an extension of the line authorized by the ordinances of November 24, 1890, and all trains run to the Madison street terminus. Of the other branches authorized, one was to leave the main line at a point between La Salle and Jefferson streets, and run northerly or northeasterly to Fullerton avenue at a point between Sheffield and Larrabee streets, and from thence in a northerly or northeasterly direction to the city limits. Another was to begin at a point on the main line within 750 feet east or west from Halstead street and run south to the city limits. Of the two other branch lines projected, one was to begin at a point on the main line between Rockwell street and California avenue, run north to Diversey and from there in a northwesterly direction to the city limits; while the other was a short line extending south from the main line to Madison street between Hamlin avenue and West Forty-first street.

Still another ordinance passed by the City Council on October 1, 1894, gave this company permission to extend their line east on Lake street from Market street to Wabash avenue.

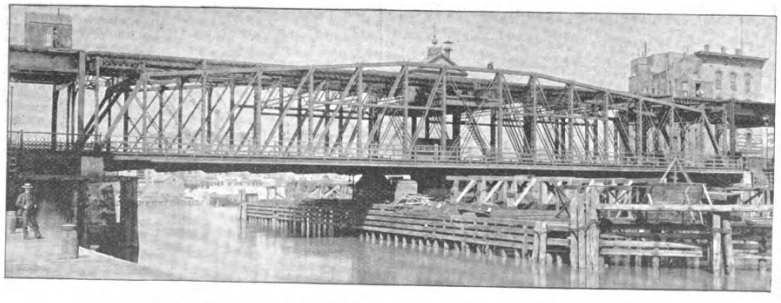
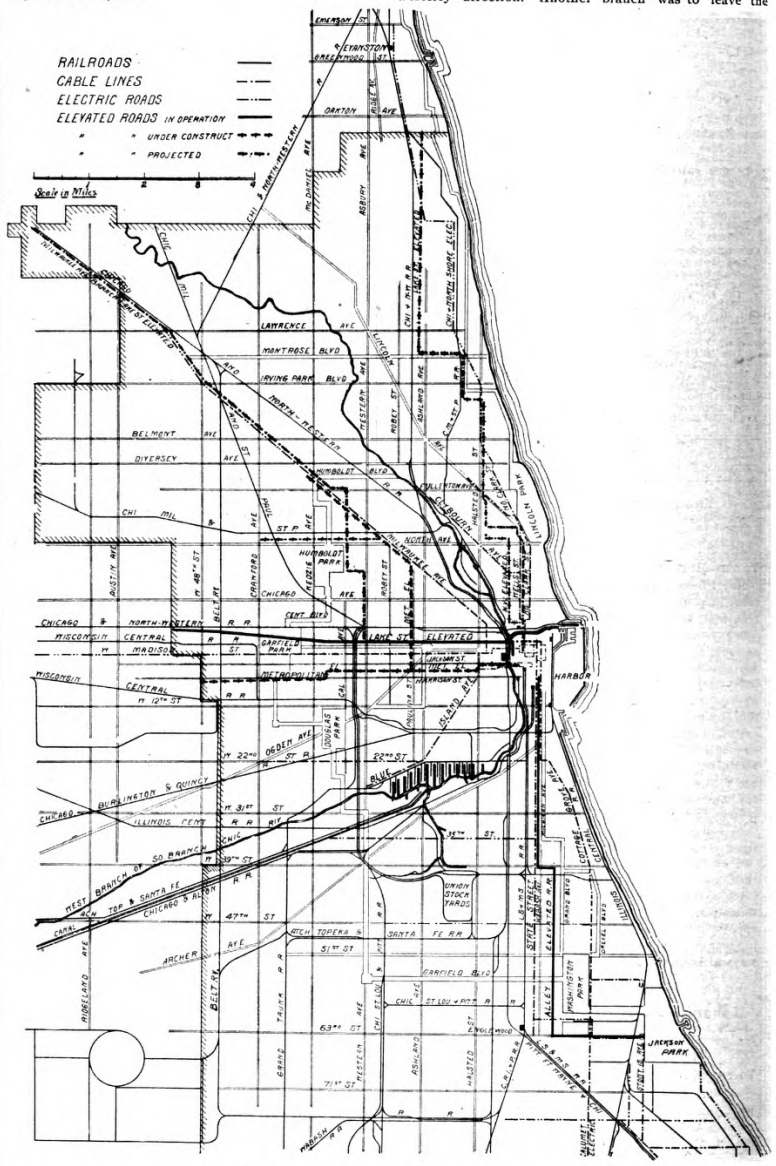


Fig. 1.—Tracks of the Lake Street Elevated Railroad Company on Lake Street Bridge.

The design of the greater part of the structure which this company has thus far erected is shown in the *Railroad Gazette*, of March 7, 1890. The locomotives used by the company were built by the Rhode Island Locomotive Works and were illustrated in the *Railroad Gazette* of August 4 and 11, 1893.



Sketch Map of Chicago Elevated Railroads.

An ordinance was passed January 8, 1894, by the City Council, giving to the Northwestern Elevated Railroad Company permission to construct an elevated line from a point on or north of Monroe street, and between Wabash avenue and Market street, north to the river at a point between Cass street and the north branch of the river, and north or northwest to the city limits. One branch named in the ordinance was to leave the main line at a point between Monroe street and the river and cross the south branch to the west, running to a point not more than 1,000 feet west of Halstead street, from which point it was to branch both in a northwesterly and a southwesterly direction. Another branch was to leave the main line at a point between North avenue and Chicago avenue, and run west to a point between Western avenue and Ashland avenue, from whence it was to extend north. A third branch was to leave the main line at a point between Diversey avenue and North avenue and extend in a northerly direction to the city limits, while the fourth branch was to leave the main line between North avenue and Belmont avenue and run west to the city limits.

Electricity was to be used as the motive power on the lines of this company. The preliminary work on the main line was conducted with such a show of vigor that the management of the North Chicago Street Railroad and the West Chicago Street Railroad Companies, apparently thinking it bettter to control the new company than to fight it, acquired a large interest in it. In order to protect their north and west side interests, provide down-town terminals for the Northwestern Elevated lines and gain control of the franchise of the Lake Street Elevated Railroad Company, which practically covers the same territory as that of the Northwestern Elevated Company, a syndicate representing the management of the surface lines above referred to recently bought enough of the stock of the Lake Street Elevated Railroad Company to give them control of it. The two elevated companies are thus practically consolidated, so far as management is concerned, with the street railroad companies of the north and west sides.

It is not an easy matter to find out from the management of the combination what it is proposed to do in the way of building over the lines covered by the ordinances granted to the elevated railroad companies. So far as

can be learned, however, it is the intention to push the construction of the extension of the Lake Street Road to Wabash avenue, and follow this with a branch to the north under the ordinance granted to one of the two companies, and a branch on the main line to the north and west under the ordinance granted to the Lake Street Elevated Railroad Company. This company filed last spring with the Commissioner of Public Works the route over which it was proposed to build these branches. The Northwestern Elevated Company has filed its proposed route only so far north as North avenue. Their franchise requires that the routes over which they propose to build shall be filed within a year of the acceptance of the ordinance, or by the first of next February.

From the map accompanying this article it will be seen that the proposed line of the Northwestern Elevated Company turns north at a point almost directly south of the proposed line of the Lake Street Elevated Road, and a short distance east of Halstead street. So far as known, no steps have been taken to acquire the necessary right of way along the line laid out by the Lake Street Company. The Northwestern Elevated Company, however, is said to be quietly buying property along the proposed right of way.

With the exception of one short line of electric road, the Metropolitan West Side Elevated Railroad Company will offer practically the only competition to the above mentioned combination in the west and northwest part of the city. This company is acting under an ordinance granted March 21, 1892, authorizing it to construct an elevated road, the main line of which should extend from Fifth avenue, between Congress and Jackson streets, west to the city limits. Three branch lines are authorized, one from a point on the main line between Ashland avenue and Wood street, south to a point between Eighteenth and Twenty-second streets, and west to the city limits; another north from the same point to Milwaukee avenue, and parallel to Milwaukee avenue, between a line 400 feet to the northeast and a line 1,000 feet to the southwest to a point near the city limits, and one from a point on the Milwaukee avenue branch between North avenue and Bloomingdale road west to the city limits.

The construction of this road has been energetically pushed ever since the franchise was granted. At present the main line is constructed, rails laid and stations practically finished, from Jefferson street west to Forty-eighth street, a distance of 5¼ miles. From Jefferson street west to Paulina street, the road is a four-track structure, and from Paulina street west a two-track structure. East of Jefferson street the work has been delayed by litigation over property between that street and Canal street. From the east line of Canal street to the west bank of the Chicago River, a viaduct of two spans will carry the four tracks of this road. The viaduct is now under construction and will soon be completed. The bridge over the river will be of the bascule type, as shown in the *Railroad Gazette*, of October 20, 1893. The construction of the west bridge pier is now practically completed, and work will soon begin on the east pier. Fig. 2, gives an idea of the appearance of the west pier and the short span adjoining. The buildings on the right of way east of the river are being rapidly removed to make way for the structure, which it is proposed to erect as soon as the bridge is completed. It is expected that the litigation over property on the short section between Canal and Jefferson streets will soon be adjusted and the structure erected.

At the present time construction is being pushed along the Milwaukee avenue branch of the road. The structure is already completed, except for the laying of the rails and the building of the stations up to a point near North avenue. The necessary right of way along this line has been secured and the foundations are being laid and the structure erected as fast as possible. The work is already well advanced on the stations along this line and it is probable that the branch will be ready for operation as soon as the motive power equipment is on hand and in working order. The work of construction has not yet been commenced on the branch west of North avenue.

It will be observed that this line crosses the Lake Street Elevated Road a short distance west of Paulina street. Fig. 3 shows the crossing of the two roads at this point, the structure of the Metropolitan road clearing the rails of the Lake Street Road by about 14 feet. The columns supporting the structures of this portion of the Metropolitan Road are all of a standard length for level track and are placed upon masonry piers of sufficient height to lift the structure to the required point. The elevation of the line begins shortly after leaving the main line of the road and reaches a maximum at the crossing. The columns next to the street are not supported by masonry piers, but by the construction shown in our illustration.

Fig. 4 shows a crossing of similar character of the Lake Street Elevated structure over that of the Belt Railway near West street. It will be observed from Figs. 3 and 4 that the structure of the Lake Street Elevated Road differs materially from that of the Metropolitan, and from that of the Chicago & South Side Rapid Transit Railroad Company, as shown in the *Railroad Gazette*, of April 4 and 11, 1890. This is partly due to the fact that the structure of the Lake Street Elevated Railroad is built over the street and the columns set outside of the curb lines, while the structure of the other two roads is built on alleys, or upon property owned or leased by the company.

Fig. 5 shows part of the foundation for the power house of the Metropolitan West Side Elevated. As mentioned some time ago in the *Railroad Gazette*, this company will use electricity as a motive power, employing a third rail system similar to that used on the Intramural Railway at the World's Fair. This building, when completed, will be 600 feet long, 90 feet wide and will have

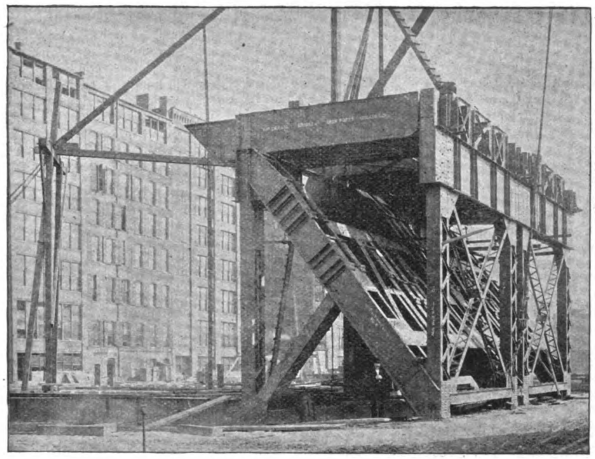


Fig. 2.—West Pier, Four Track Bridge, West Side Metropolitan Elevated, Short Span adjoining.

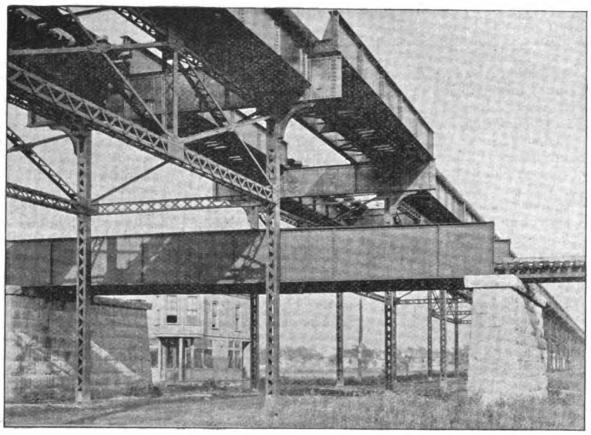


Fig. 4.—Crossing of Lake Street Elevated Railroad and Belt Railway of Chicago on West Lake Street.

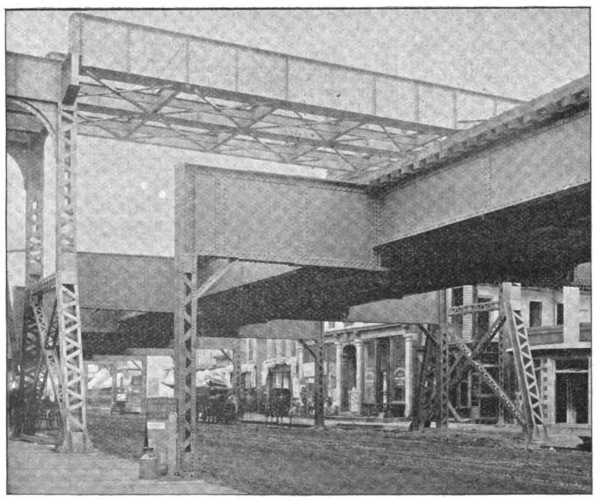


Fig. 3.—Crossing of Milwaukee Avenue branch of West Side Metropolitan Elevated over the Lake Street Elevated on Lake Street.

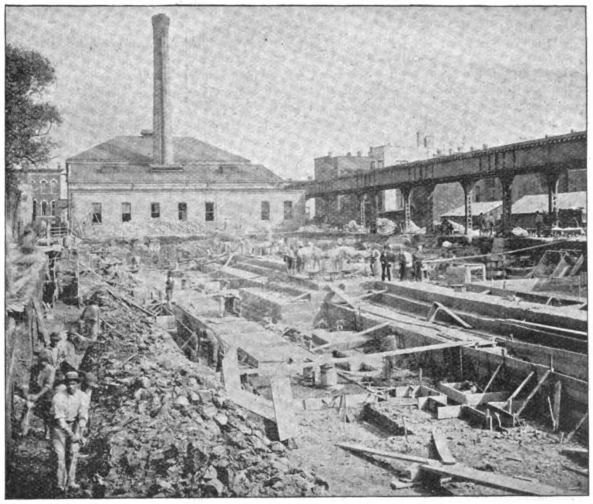


Fig. 5.—Foundations of Power House, West Side Metropolitan Elevated.

an average height of 70 feet. Only one-half of this is to be put up at present, the remainder of the structure being added as the extensions of the lines demand an increase of power. The building will be of steel construction, with red brick walls and slate roof, and will be fireproof. The engine room is to be 300 feet long and will afford space for eight engines. The boiler equipment will be in a separate house and will consist of 36 boilers of 300 horse-power each.

The station equipment consists of four engines from the E. P. Allis Company of Milwaukee, two of which are of 2,000 horse-power and the other two of 1,100 horse-power. These engines will be vertical, direct connected, cross compound condensing engines of a new design. The dynamos are to be furnished by the General Electric Company; two of them are to be of 1,500 kilowatts and two of 800 kilowatts capacity.

The power plant between Throop and Loomis streets when completed will occupy the entire space bounded by the tracks and the two streets. The building shown in the background is an electric light plant owned by the city and will shortly be torn down and removed. The illustration shows the two track structures at the south of the power house. A similar structure carrying the other two tracks will be built over the boiler house on the opposite side of the excavation for the foundations.

This road, when completed, will doubtless be the best equipped elevated road in the world. All details have been carefully and thoroughly worked out, and no expense has been spared to make the road as nearly perfect as possible.

The subject of down-town loops or terminals is one that has not yet been satisfactorily solved. A double track loop covering a large part of the down-town district would probably best accommodate the patrons of all the roads, and several plans for such a loop have been brought up, either by parties interested in some of the roads or by outsiders who propose to build the loop and make arrangements with the various roads for the handling of their trains. The plans proposed by the roads themselves or those interested have not, as a general thing, provided for the accommodation of all the roads. It is reported that the management of the Lake Street and the Northwestern Elevated roads have offered to build a loop for the accommodation of themselves and the "Alley Elevated." This would probably not be satisfactory, as it seems more probable that the Alley Elevated and the Metropolitan Roads will build a loop for joint use, unless the management of the Northwestern and Lake Street roads acquire the control of the "Alley Elevated," which it is reported, may be done. The management of the Metropolitan Road have given out none of their plans for getting farther into the business district, but appear to be concentrating all their energies upn the completion of their main line and branches and the early operation of the road.

A call has been issued for a special meeting of the stockholders of this company on Nov. 9, to pass upon a plan for further encroachments upon the territory of the Lake Street and Northwestern roads, it being proposed to run a branch northward parallel to the lines projected by the other two companies, and one south from the main line parallel to Halstead street along which the Lake Street company filed a route last January. Other branches and feeders are also proposed. This action of the officials of the Metropolitan has been variously interpreted, some professing to believe that it is an attempt to force the management of the Lake Street & Northwestern roads to unite with the Metropolitan in a downtown loop, while others claim that the announcement results from efforts on the part of those interested in the Lake Street and Northwestern roads to gain control of the Metropolitan road through the purchase of the stock of the West Side Construction Company, the company organized to build the road. The officials of the Metropolitan deny that there have been negotiations for the sale of any of its property, and claim that the announcement merely means that it is proposed to protect the lines now under construction and nearly completed by the construction of branches and feeders, and make the property a paying investment. There seems to be a general feeling, however, that no one need be greatly surprised, if within two or three years, all of the elevated lines named, together with the surface lines of the North Chicago and West Chicago street railroad companies, are under one management, thus leaving the Chicago City Railway Co. as the only independent transportation company in the city.

This question of down-town terminals is probably the most important one with which the roads have to deal at present. Later on, the construction of branch lines will probably be taken up. It would appear that the present lines, when provided with proper down-town terminals, will be able, with the help of branch lines, to serve the territory about Chicago in a very effectual manner. A number of steam surface roads are now doing a good suburban business, which will probably increase. Among the more important of these are the Illinois Central, Chicago & North Western and the Chicago, Burlington & Quincy. The Chicago & Eastern Illinois, the Lake Shore & Michigan Southern, the Chicago Rock Island & Pacific, the Pittsburg, Ft. Wayne & Chicago, and the Chicago Milwaukee & St. Paul are also doing some suburban business, with prospects of a considerable increase as the population of the towns along their lines increases. The surface roads, however, do not affect the elevated roads so much as might be expected from the number of passengers carried, as the greater part of their traffic is from points beyond those to which the elevated roads are likely to extend.

The elevated roads will, when provided with branches and suitable terminals, perhaps reduce the earnings of the horsecar and cable lines, as they are naturally preferable for long hauls. The street railroad companies are, however, equipping the greater part of their horse car lines with electricity, and are making a strong effort to hold their own against the elevated lines.

The section of the city which is most in need of better transportation facilities is that into which the Milwaukee avenue and North avenue lines of the Metropolitan Company will extend. The territory is very thickly settled, but is dependent upon the cable lines on Milwaukee avenue and West Madison street and a few cross town lines with horsecars.

The main line of this company will probably do a good business also, though it is paralleled by the Madison street cable line and several horse car lines, as well as the main line of the Lake Street Elevated Railroad. There is a large territory along this line, which, although at present thinly settled, would be very desirable if furnished with rapid transit facilities. The same may also be said of the main line of the Lake Street Elevated Road, though it has considerable competition in the suburban service of the Galena division of the Chicago & Northwestern Railway. It has the advantage, however, in getting further down town, and in running trains oftener. The north branches proposed by the Lake Street and Northwestern Elevated Companies, though passing through much well-settled territory, will have to meet the competition of the suburban service on the Milwaukee division of the Chicago & Northewstern, and the Evanston division of the Chicago, Milwaukee & St. Paul Railroads, and divide the remaining traffic with the lines of the North Shore Electric Company and the North Chicago Street Railway Company.

The "Alley Elevated" is at a considerable disadvantage in having on one side the State street and on the other side the Cottage Grove avenue cable lines of the Chicago City Railway, and in having to compete at its lower end with the express service of the Illinois Central Railroad, on which the run up town is made in about one-third of the time required on the elevated line. Notwithstanding these disadvantages, the line could probably be made a success if conducted and operated on an independent basis. The territory through which it runs is by no means thickly populated, though quite desirable, and the road will sometime be in a position to do a paying business.

American Railway Association.

The regular fall meeting of this Association was held in New York City on Oct. 17, over 100 representatives being present. The membership of the Association is now 179 companies, operating 145,000 miles of road. Colonel H. S. Haines, the President of the Association, who has presided at every meeting since 1887, was detained at home by sickness and the chair was occupied by Mr. E. B. Thomas, First Vice-President of the Association.

The first business before the meeting was a communication from the International Railway Congress inviting the Association, which is styled a "syndicate of railway managements," to become a member of the Congress. The invitation was unanimously accepted, and, on the recommendation of the Executive Committee, a resolution was passed requesting Colonel Haines to become the representative of the Association at the meeting of the Congress to be held in London in June, 1895. The resolutions were in terms highly complimentary to Colonel Haines, and contained a paragraph instructing the Executive Committee to pay his expenses to the Congress. A telegram was at once sent to Colonel Haines notifying him of the action of the Association. Under the terms of the invitation the Association is entitled to eight delegates.

The Executive Committee presented a communication from the Master Car Builders' Association asking approval of the M. C. B. Association's adopted standards of details of car construction. The Executive Committee presented a resolution endorsing these standards, and it was adopted. The M. C. B. Association also sent a communication concerning a standard wheel and track gage. The Executive Committee was ordered to appoint a committee of three to take up this subject and to confer with the Master Car Builders' and the Roadmasters' Associations; if these conferences result in a satisfactory conclusion the Executive Committee is to take a letter ballot, with power to declare the result thereof the standard of the Association, if it shall see fit to do so.

Mr. Willard A. Smith representing a committee of the Master Mechanics' Association presented a request for assistance in the proposed co operation in locomotive tests at Purdue University. The Executive Committee, however, did not recommend action on this request at present. The sentiment of the meeting seemed to be that in the present stage of the matter it ought to be managed wholly by the Master Mechanics' Association. Several general managers who were not in favor of taking action at this meeting manifested the intention to favor the tests through their mechanical departments.

The Car Service Committee presented a report suggesting that a vote be taken as to whether the rate on interchanged freight cars ought to be 5 mills or 6 mills a mile, but after a statement of the present movement to secure uniformity as between the Eastern and Western railroads, the Association decided to take no action at present. A resolution was passed requesting the committee to consider the practicability of the adoption of straight per diem and report at the next meeting. The report of this committee presented a summary of the replies received from railroads which for the first half of this year kept both a mileage and a per diem account of foreign car movements. On 69 roads, for the six months, the mileage of borrowed cars was 575,703,865 and the number of days on which per diem would have applied was 21,478,732. At 7¼ mills a mile the mileage equalled $4,317,779, which is equal to 20.1 cents a day; or to 5 mills a mile and 6.75 cents a day. These results tend to bear out the conclusions of the committee presented in April, 1893, when it was estimated that 5 mills a mile and 6 cents a day would produce results equal to 7½ mills a mile.

The Committee on Safety Appliances gave notice of a slight change in its circular regarding the position of hand holds and grab irons on freight cars.

The Joint Committee made a report on block signaling, recommending certain alterations in its signal definitions, designed to meet the criticisms made at the spring meeting. It was again stated that the matter presented by this committee was only for information and discussion. An interesting debate followed, during which it was developed that the feeling in favor of the use of green lights instead of white for safety signals at night is rapidly growing among members of the Association. This committee also presented the following report on Colored Lights.

The committee has made some observations with colored lights other than red and green for the purpose of finding one which will answer for a caution signal where red is used for danger and green for safety. It is now generally conceded by scientists that there are but three primary colors, red, green and blue, and that all other so-called colors are produced by different combinations of these three. Two of these, viz., red and green, have already been adopted as standard signal colors, and it will probably be apparent from what follows that we cannot make use of the primary color blue, or violet, for signal purposes.

Accurately speaking, it is not the office of colored glass in a signal lamp to change the color of the light passing through it. The fact in the case is that the glass adds nothing to the light given out by the lamp. It simply absorbs a large part of the light, destroying it as far as the sense of sight is concerned, and allows to pass through it and reach the eye of an observer only such rays as correspond with the color of the glass. To illustrate: If a piece of red glass is placed before a source of light, it absorbs both the green and the blue rays, so that they are not seen, and allows the red to pass through, and in this way apparently changes the color of the light to red. It is also true that, if there were no red rays in the source of light, a red glass would allow no light to pass through it to be seen, as it would absorb the green and blue, and, there being no red rays, there could be no light transmitted by the glass. It is evident from this that the character of the light from a signal lamp has an important bearing on the subject.

The application of the foregoing to the subject in hand is made as follows: Three distinct colors are wanted for signal lights, one for danger; for which red is the accepted standard. Another for safety; for which green is available. Leaving but one primary color to use for caution, viz.: blue. This cannot be satisfactorily used for the following reasons: The light given by a kerosene lamp is composed almost entirely of red and green, the combination producing yellow. The blue rays are few. It therefore follows that, as a blue glass will absorb the red and green, allowing only the small amount of blue in the flame to reach the eye, a blue signal light produced by a kerosene lamp will be feeble and indistinct. Actual tests corroborate this conclusion. If the source of light gave a pure white, which would contain blue, as well as the other colors, it is possible that blue could be used for caution. The committee is, however, strongly impressed that it could not be used successfully, because blue, or violet, at its best, is but a feeble color, and can scarcely be seen at a distance of 1,000 ft. Amber, or yellow, is a combination of red and green. The glasses of this color give a bright signal which can be seen as plainly as either the red or green at any distance; but, when the color is deep it might easily be taken for red, and when not so deep could not be definitely distinguished from a white light.

It seems reasonably certain from the theoretical considerations presented that there will be no satisfactory colored light found for a caution signal if green is used for the clear signal, and therefore some combination of lights would have to be used for this purpose. If it is thought best not to use a white light for any signal purpose, it will necessarily follow that this combination will be red and green.

It has been found in actual practice that a caution signal of red and green in combination, placed about nine inches apart, and illuminated from one source of light, can be used successfully and be clearly seen as separate and distinct signal colors at a distance of more than 2,500 ft.

It would therefore appear to the Committee that the use of colored lights in combination is practicable for cautionary signal purposes.

For the greater part of the foregoing information the committee is indebted to Mr. C. H. Quereau, Engineer of Tests, Chicago, Burlington & Quincy.

The Committee on General Regulations for Employees, which has now been made a standing committee, presented an elaborate code of rules for employees, covering subjects not treated in the standard code. The nature of the code thus presented was explained in the *Railroad Gazette* of Oct. 12, page 704. The committee hopes to take up and discuss this code in detail and perhaps digest some or all of it sufficiently to present it in shape for action at the next meeting.

The Wabash, the Chicago, Milwaukee & St Paul and the Norfolk & Western were re-elected to the Car Service Committee. The Richmond, Fredericksburg & Potomac, the Chicago & Northwestern and the Philadelphia & Reading were re-elected to the Safety Appliances Committee. The next meeting of the Association will be held in St. Louis on April 7, 1895.