of from 3 to 4 hours. This was an exhibition of very poor judgment, or negligence, on the part of the conductor, and he has been suspended 10 days.

A freight train derailed a car two miles west of station. Conductor sent word to station at 9 a. m. that no assistance was necessary, and he thought he could clear the track in an hour. Thereupon dispatcher gave his orders accordingly. Conductor did not show up again until 12:30 p. m., at which time track was clear. This was 1½ hours after leaving time of a passenger train, it being held at the station by semaphore. Had conductor reported at 10 o'clock that he could not clear track for two hours longer, the passenger train would have been sent by another route, and would have reached its destination nearly on time. The unnecessary delay to this passenger train and the further delay to several other trains threw nearly everything off time on the division, and caused considerable trouble all round, as well as expense. The conductor of the freight train is responsible for the delays to other trains than his own. He used very poor judgment. He has been suspended 15 days.

A loose wheel derailed a car on eastbound train when taking passing track. Another train was delayed on account of pulling around the wreck through the house track. They stalled on the house track, but instead of cutting part of their train off, and putting it on other end of passing track, and then getting the rest of it, they continued to try to pull the entire train at once, delaying them 50 minutes. This was very bad judgment on the part of the conductor and engineman.

A freight conductor took a car of merchandise over the division as an empty car, and it had to be returned to point of origin. He has been suspended 10 days.

A freight brakeman found two tramps in an empty car. Though they threatened to do him bodily harm, and offered him money to let them ride, he ejected them. His conduct is approved, and this method is taken of commending him. It cancels several charges on the record book.

Track Elevation on the Milwaukee Division of the Chicago & Northwestern Railway.

The Chicago & Northwestern Railway last year completed the work of raising its tracks on the Galena Division, between Sacramento avenue and West 40th street, about two miles. This work was described in the *Railroad Gazette*, July 26, 1895, page 491. At the time the work on the Galena Division was undertaken, very little had been done by the railroads entering Chicago in track elevation; the Galena Division was so situated that the elevation of these tracks did not affect any other roads, hence the tracks on this division were the first to be raised. The methods used last year proved to be so satisfactory that the same general plan is now being followed on the Milwaukee Division.

The work laid out for this year consists in elevating the tracks of the Milwaukee Division, between Diversey avenue and Balmoral avenue, a distance of about 17,400 ft., or about 3.3 miles. This work was begun June 15. Fig. 1 is a profile of the road between the above-mentioned points and shows the old and new grade lines and the intersecting streets. All elevations as given on the profile are above the Chicago City datum line.

The new grade line joins the old at the north side of Wrightwood avenue. By commencing the track elevation at this point, all the troublesome questions which naturally arise between Wrightwood avenue and the Chicago station are left out, as the work of raising this section will involve many new difficulties. From Wrightwood avenue there will be an .8 per cent. rise for 1,219 ft., to a point south of Diversey avenue. From this point to the south side of Belmont avenue the grade will be .22 per cent. for a distance of 2,700 ft. Between Belmont avenue and the south side of Grace street, a distance of 4,000 ft., the grade will be .07 per cent. From this point the new track will be level for a distance of 10,700 ft., to a point just north of Balmoral avenue. The new line will then descend on a 5 per cent. grade to meet the old grade line at the south side of Bryn Mawr avenue, a distance of 1,250 ft. It will be noted that the track when completed will be practically level for a distance of about three miles.

This work makes necessary the construction of 20 subways at the various streets intersecting the railroad. At each of these points three tracks are to be carried over the streets through girder bridges resting on masonry abutments. The preceding table shows the amount the streets will be depressed from the present grade, the width of the subway, the vertical clearance and the amount the tracks will be elevated, at each subway, above the old grades.

At the Belmont and Lincoln avenue subways the vertical clearance will be 13.5 ft., to provide for the electric car lines crossing at these points. At all other subways the vertical clearance will be either 10 ft. or 12 ft.

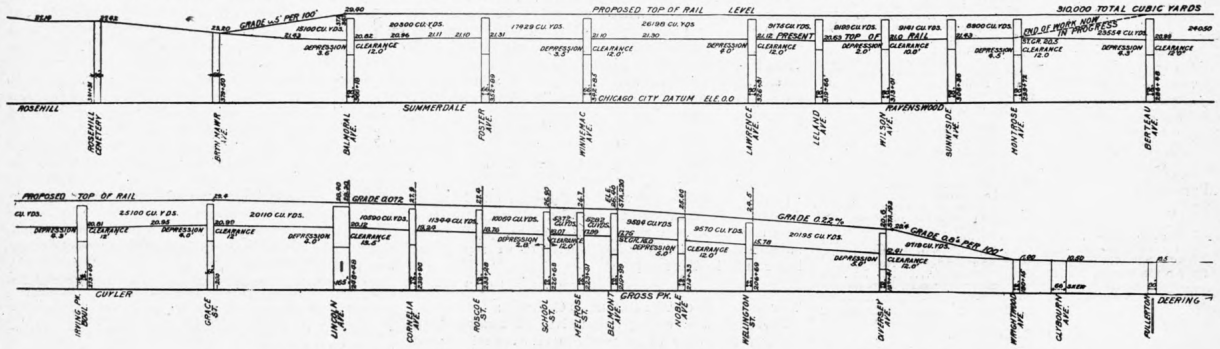

Fig. 1.—Profile of Part of Milwaukee Division, Chicago & Northwestern Railway - Showing Track Elevation.

Name of street.	Depress'on of Subway. Feet.	Width of Subway. Feet.	Clearance. Feet.	Elevation of tracks. Feet.
Diversey ave....	5.0	66	12.0	8.19
Wellington st...	5.0	66	12.0	8 72
Noble ave.....	5 0	66	12.0	8.68
Belmont ave....	4 5	66	13.5	8.65
Melrose ave.....	0.7	66	10 0	8.81
School st.....	2.8	66	12.0	8.83
Roscoe st.....	2.5	66	12 0	8.64
Cornelia st.....	3.0	66	12.0	8 66
Lincoln ave. and Addison st...	4.0	165	13.5	8.28
Grace st.....	4.0	66	12.0	8.41
Irving Park Boulevard..	4.3	100	12.0	8.59
Berteau ave.....	4.3	66	12.0	8.41
Montrose ave...	4.5	80	12.0	7.77
Sunnyside ave..	2.5	80	10.0	7.97
Wilson ave.....	2.0	80	10 0	8.40
Leland ave.....	1.5	80	10.0	8.77
Lawrence ave...	4.0	80	12.0	8.28
Winnemac ave. (or Webster ave.)	3.5	66	12.0	8.30
Foster ave. (N. 59th st.).... ...	4.1	66	12.0	8.09
Balmoral ave...	3 6	66	12.0	8.58

Total, 20 bridges.

The work has been begun at Montrose avenue and it is the intention to work south, completing the elevation of the tracks to Diversey avenue. If there is sufficient time remaining, the balance of the work north of Montrose avenue will be finished this year; if not, it will be carried over until next summer.

Fig. 2 shows a plan of part of the territory covered, and with the profile gives a very good idea of the district through which the work is being carried on. It will be seen from Fig. 2 that there are no sidings which will be materially affected by this change.

Material.—The material used for filling is white sand brought from Dune Park, Ind., via the Lake Shore & Michigan Southern and the Chicago Belt Railway. To carry out the whole plan will require 310,000 cu. yds of sand or about 12,000 car loads. This is being furnished by the Knickerbocker Ice Company, of Chicago. The total iron work for the 20 bridges will weigh about 6,400,000 lbs. There will be 49,000 sq. yds. of street paving under the subways and 19,000 sq. yds of sidewalk. The stone used is brought from a quarry belonging to the railroad company at Duck Creek, near Green Bay, Wis.

The railroad company is doing the work of making the embankment. The Lassig Bridge & Iron Company furnishes all the iron work, and does both the shop and field riveting. The masonry work and paving is let to contractors who do the excavating at subways. About 300 men and 35 teams are employed at present on this work.

Methods.—The methods used in placing the bridges and carrying them up along with the change of elevation in the roadbed is illustrated by the accompanying engravings made from photographs taken while the work was in various stages of progress.

Owing to the length of the girders and the sharp curves in the tracks leading from the yards of the Las-

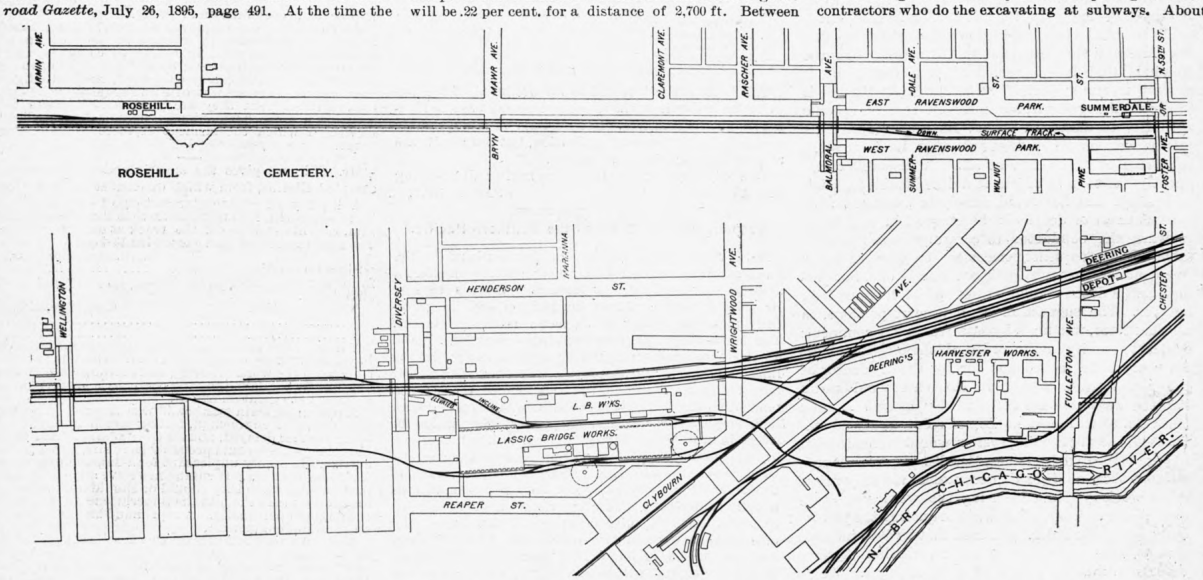

Fig. 2.—Plan of Part of the Milwaukee Division, Chicago & Northwestern Railway—Showing North and South Ends of Track Elevation.

sig Bridge Works (shown in Fig. 2), the bridges were shipped to the Chicago & Northwestern Division shops in pieces and were there assembled. For this purpose a crane was built in the yards at the railroad company's shops with a traveler overhead for lifting the various parts.

Fig. 3 shows the crane and the work of assembling the girders at the shops, showing a set of girders blocked up and ready to have the cars run under them. When the bridge leaves the shop the riveting is completed; the floor system is in place with the track laid, ready for the passage of trains.

Fig. 4 shows how the approaches are brought up so that trains can pass as soon as the bridge is in place. The girders rest directly on I-beams at either end, which are bolted to the girders, the girders and I-beams being raised together.

As soon as the bridge is off the cars the work of excavating for the subway is begun, and the masonry abutments are laid up as fast as possible. To facilitate the masonry work the stone is unloaded each night and placed within easy reach of the masons. For this work the large derrick car, belonging to the railroad company, is used, the stone being swung over the side of the bridge. Fig. 5 shows the work on the abutments, the track being clear for traffic.

After the bridge is placed the roadbed is brought up by sections following the plan outlined in the *Railroad Gazette* of July 25, 1895. The bridges are raised 12 in. at a time, 12 in. × 12 in. cribbing being used, and the abutments are carried up correspondingly. The roadbed is raised to suit the bridges.

On the Milwaukee Division, where there are three tracks over the various bridges, two sets of girders are used and an intermediate floor is put in for the middle track after the girders are in place in the field. Fig. 6 shows this work in progress, a temporary traveling crane having been erected by cross timbers resting on the tops of the inside girders.

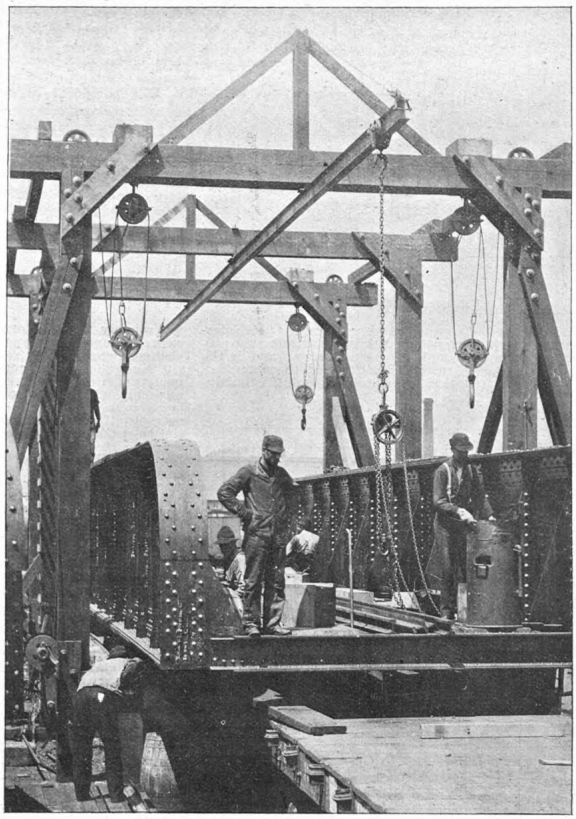

Fig. 3.

Fig. 7 is a view with the masonry nearly completed, lacking only bridge seats and shows the method of cribbing up under the bridge.

Fig. 8 is taken from the tracks and shows the ample clearance between the structure and the locomotive standing on the bridge.

It will be noted that when the two outer tracks are blocked while the bridges are being unloaded, the middle track is clear for trains, and when the middle track is out of service, while the floor system is being put in the two outer tracks can be used. With this method one or more tracks are always open for traffic.

[TO BE CONTINUED.]

The English Railroad Clearing House.*

Mr. Chapman got his information from Mr. Smart, Secretary of the Clearing House, and he opens with a sketch of the history of the institution. The historical facts are mostly from the writings of Mr. Kenneth Morison, one of the early auditors of the London & Birmingham. The need of a joint establishment for dealing with accounts became evident as far back as 1838, when the three companies making up the line from London to Liverpool found themselves doing a large through business. The settlement of accounts was accompanied by long delays leading to much angry correspondence, and even in those early and innocent (?) days some of the companies ran the freight cars of other roads without paying mileage upon them. The clearing house was originated by Mr. Morison and Mr. Robert Stephenson, and it was first put into operation on Jan. 2, 1842, only a few railroads being included. At first the number of clerks was 4; by 1861 this was increased to 400, and in 1892 there were no less than 2,100, including 450 car-record clerks scattered around at junctions throughout the country.

In 1850 the regulations of the clearing house were embodied in an act of Parliament called the Railway Clearing Act, and since then practically all the important by-laws under which the committee and Secretary act have the force of statute law. Mr. Chapman epitomizes some of the clauses of these laws. Seven per cent. interest is charged upon balances if not paid within certain periods; on mileage of freight cars, 5 days; passenger cars, 7 days; demurrage of freight cars and ordinary merchandise traffic, 23 days. The committee has extensive powers, being authorized, for instance, to decide the correctness of distances in doubtful cases. A uniform freight classification is used, the same being adopted by each company party to the clearing house. A road failing to report a loss or damage case within 24 hours must itself assume the whole liability. The errors made by station agents and clerks in their reports are carefully noted and tabulated monthly, as also all cases of delay in sending in abstracts.

Mr. Chapman thinks that a clearing house could readily be established in the United States. The most prominent objection, long distances, is not serious. There could be branch clearing houses and these could report to a single central office. Traffic from Queenstown to Dublin, Ireland, is cleared locally in the Irish clearing house, while that from Queenstown to London is settled in the English office. Even the English clearing house has long distances to deal with, as, for instance, the fish traffic from the Orkney Islands to the south of England. Letters about that traffic frequently take five or six days in transit.

The advantages of a clearing house, the reduction in the number of ledger accounts, etc., are well understood and obvious. Being in possession of information from both ends, the clearing house is frequently able to clear discrepancies at sight; and the English establishment in many cases has power to decide which information is correct. The clearing house being an impartial body and equally representing all companies interested, it is not necessary to check the returns sent in by them for three or more companies' traffic—at any rate so the great railroads in England have decided—thus saving a considerable amount of labor. The clearing house receiving division sheets signed by all concerned, no disputes can afterward arise as to erroneous proportions, and where a mileage basis applies the clearing house decides which is the correct distance in case of doubt.

All returns have to be sent in by the middle of the month and passenger returns generally within six days. Errors tend to diminish, as the manager very soon sees if a certain road's clerks fall below the average in accuracy. Mr. Chapman gives the following comparative statistics from the Board of Trade returns and Poor's Manual for 1894. The figures for Britain include only those of companies parties to the clearing house.

	U. K.	U. S.
Miles of line	19,936	175,444
Passengers carried, millions	884.6	583.2
Passenger earnings, millions	£30.5	$276.0
Freight carried, millions tons	315.9	675.1
Freight earnings, millions	£43.0	$700.5
Parcels earnings, millions	£5.6	.....

The writer assumes that in England a larger proportion of the traffic is interline than in the United States. There would be very much less work for the same traffic

*From a paper by Mr. S. Chapman, General Auditor of the Interoceanic Railroad of Mexico, read before the Association of American Railway Accounting Officers, New York City, May, 1896.

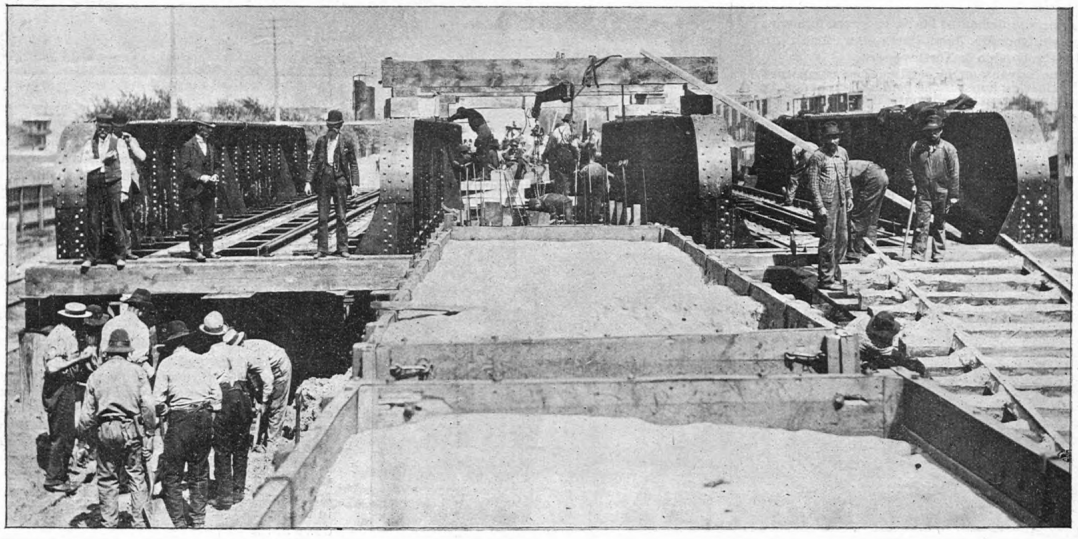

Fig. 6.