

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 1 1/2 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

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

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.

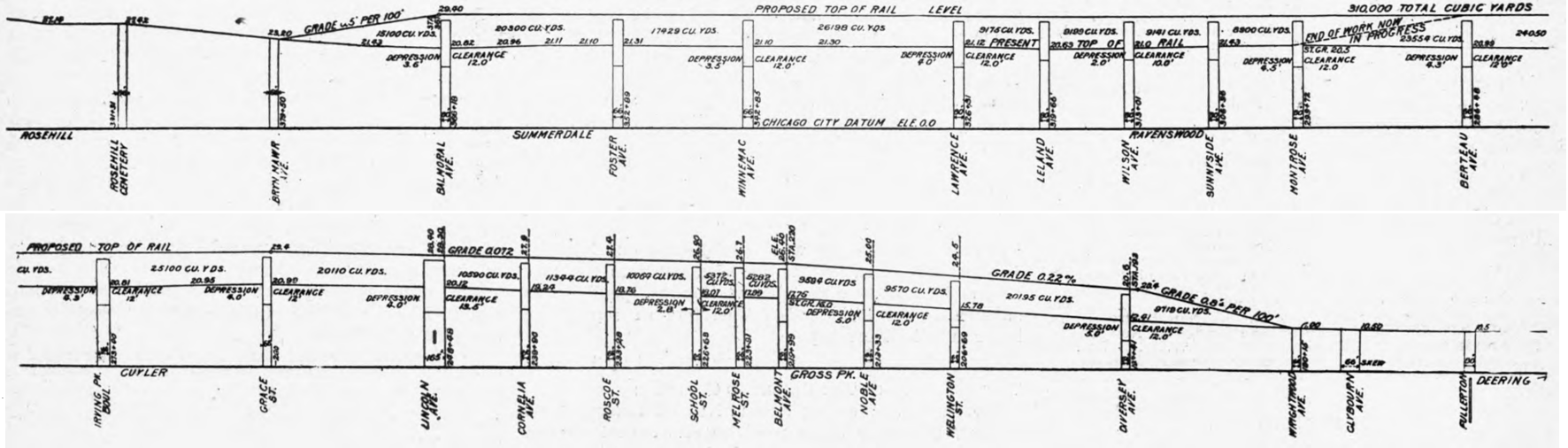


Fig. 1.—Profile of Part of Milwaukee Division, Chicago & Northwestern Railway - Showing Track Elevation.

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.

Wrightwood avenue there will be an .8 per cent. rise for 1,219 ft., to a point south of Diversey avenue. From

Name of street.	Depression 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.

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

this point to the south side of Belmont avenue the grade will be .22 per cent. for a distance of 2,700 ft. Between

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

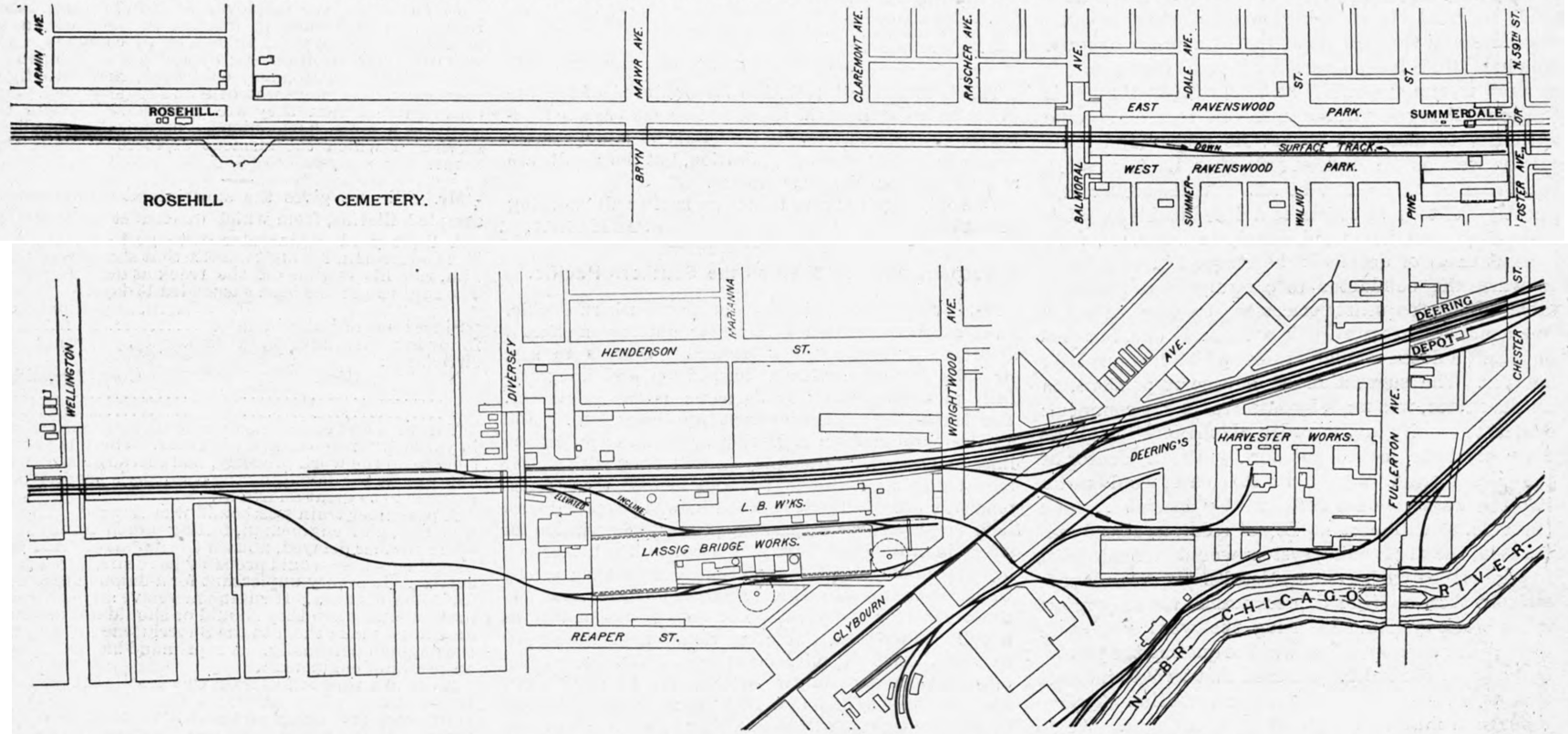


Fig. 2.—Plan of Part of the Milwaukee Division, Chicago & Northwestern Railway—Showing North and South Ends of Track Elevation.

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

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.

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-

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. x 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.

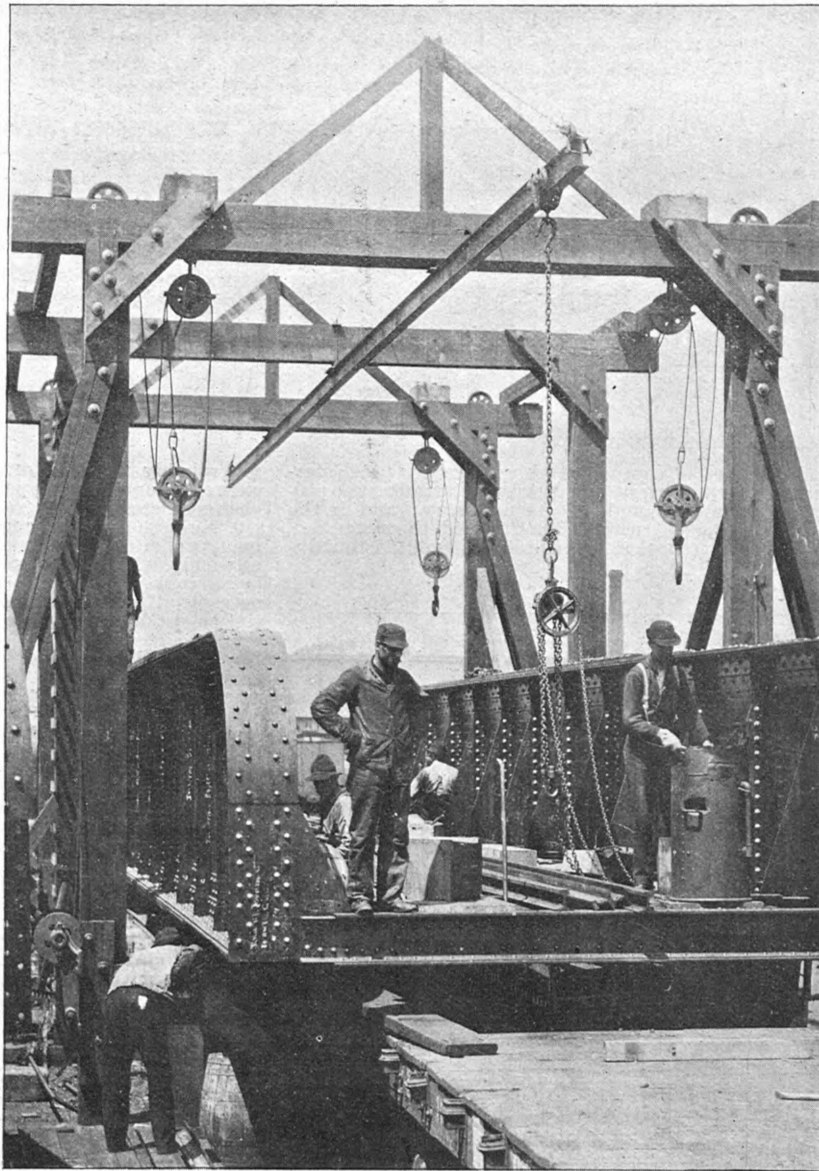


Fig. 3.

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

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

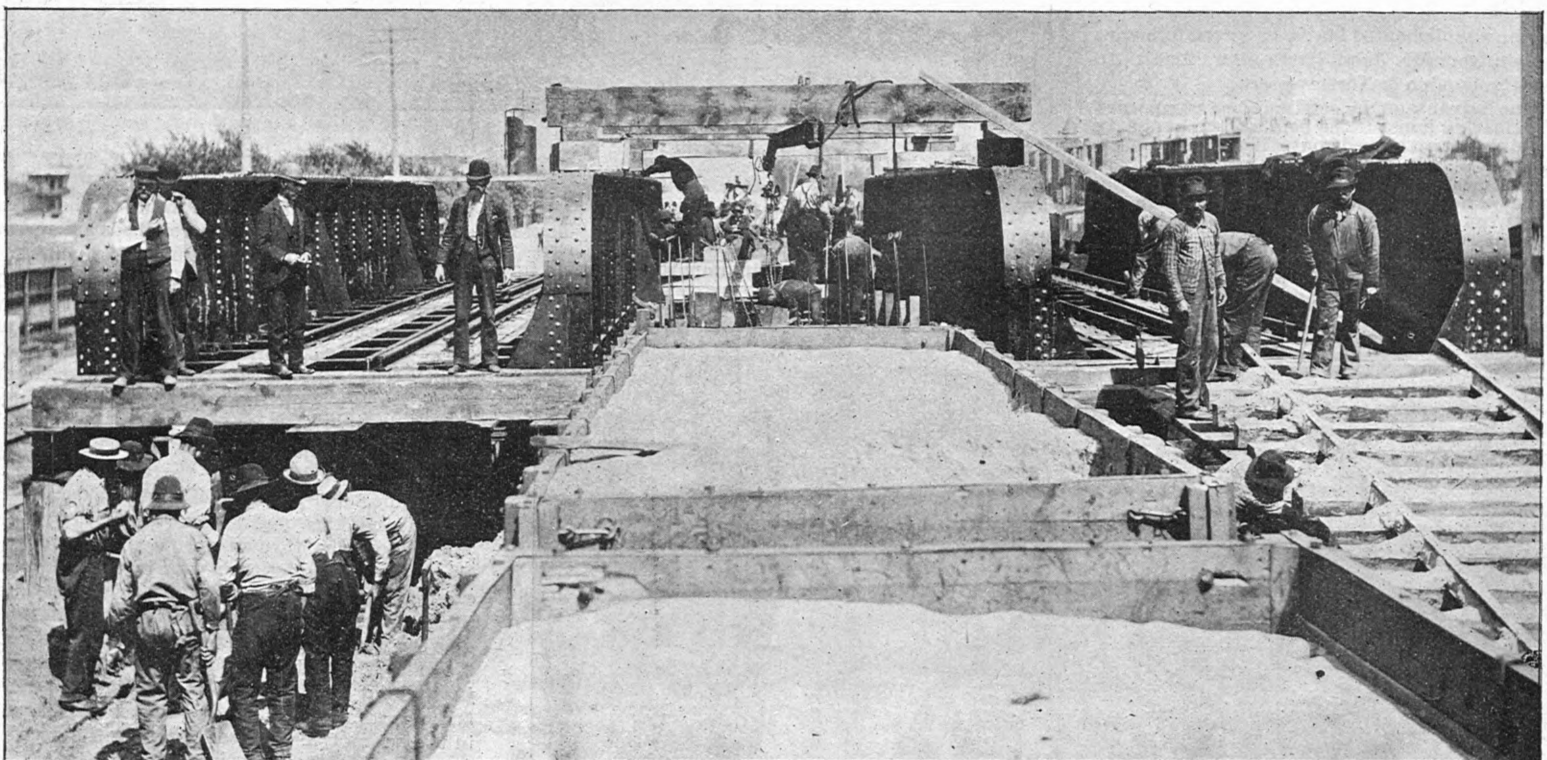


Fig. 6.

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

ham. 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

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

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.....	230.5	\$276.0
Freight carried, millions tons.....	315.9	675.1
Freight earnings, millions.....	243.0	\$700.5
Parcels earnings, millions.....	25.6

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

in this country, because most of the freight in England is collected and delivered, and many clerks are required to keep the collection and delivery accounts alone. Moreover, the English establishment keeps the statistics of parcel express business, amounting to \$27,000,000 a year. Also, there is much less joint use of passenger cars in this country. On the whole, Mr. Chapman thinks that 3,000 men could probably do the work of an American clearing house. The apportionment of the 2,100 clerks in the English establishment is as follows:

Merchandise traffic about.....	700
Coaching (including parcels, etc., traffic).....	500
Mileage and demurrage (indoor and outdoor staff).....	800
Lost luggage.....	20
Not defined.....	80
	2,100

About 12 years ago the amount of money cleared was as 18,000,000 sterling per year, or about 27 per cent. of the total earnings of the roads.* The number of settlements made was 8,000,000, for merchandise alone, covering some 3,000,000 pairs of stations. It would thus appear that the average shipment passed over 2½ railroads. In 1884 there were 45,545 passenger cars in the United Kingdom and 467,181 freight cars. Taking 73 per cent. as engaged in "local" traffic, we have 138,436 engaged in interline work. The clearing

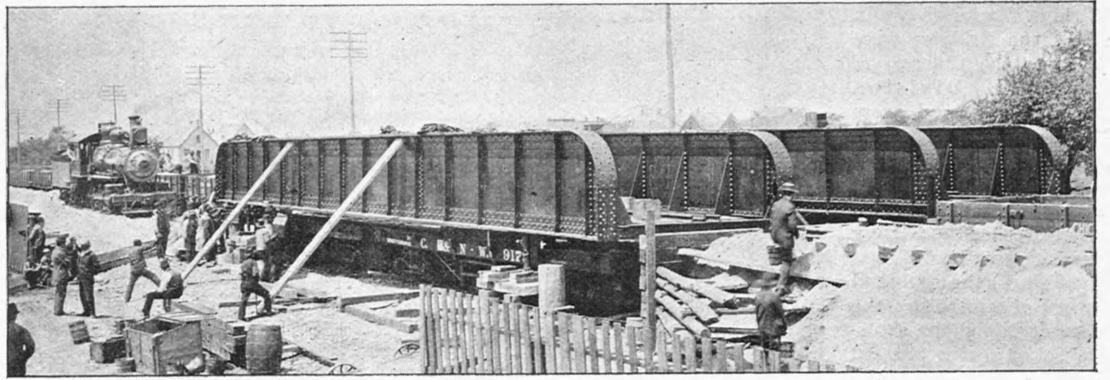


Fig. 4.

5. In the case of companies whose lines are used intermediately for the passage of "through" traffic, the protection of the clearing-house is necessary; and in the event of streams of traffic being diverted, the advantage of the wagon records in determining the route is invaluable.

is probably the best organized and most efficient in existence for adjusting payments arising from the interchange of stock.

9. Nevertheless, the concentration of so many settlements under one roof makes the establishment somewhat unwieldy, which leads to complication and to methods being applied to ensure accuracy which would be unnecessary if the house were of smaller proportions; the settlement of all two companies' traffic privately would tend to correct this.

10. Beyond its original design the clearing-house has provided the collective companies with neutral ground where administrative and parliamentary measures are discussed at regular intervals, and arranged by the representatives of the whole of the railways of the United Kingdom much more conveniently than if desultory or chance meetings were held at uncertain places and convoked at the instance of a particular company.

11. Again, in dealings with the legislature and the public, the varying interests of the separate companies are thus more easily consolidated and concerted action more promptly agreed upon, which, in many cases, is not only desirable but absolutely necessary.

12. The expensive process of dividing traffic when it reaches 20 shillings a month between a pair of stations by mileage after deducting terminals, is no doubt antiquated, and in lieu thereof only very large traffics should be so dealt with, the residue being allotted to the companies interested in fixing proportions subject to revision from time to time. This would effect a great saving.

Disastrous Crossing Collision at Atlantic City.

By a collision of passenger trains at the crossing of the West Jersey & Sea-Shore and the Atlantic City railroads, two miles from Atlantic City, N. J., on the evening of July 30, at about 6:50 o'clock, 42 persons were killed outright and over 50 very badly injured, five of

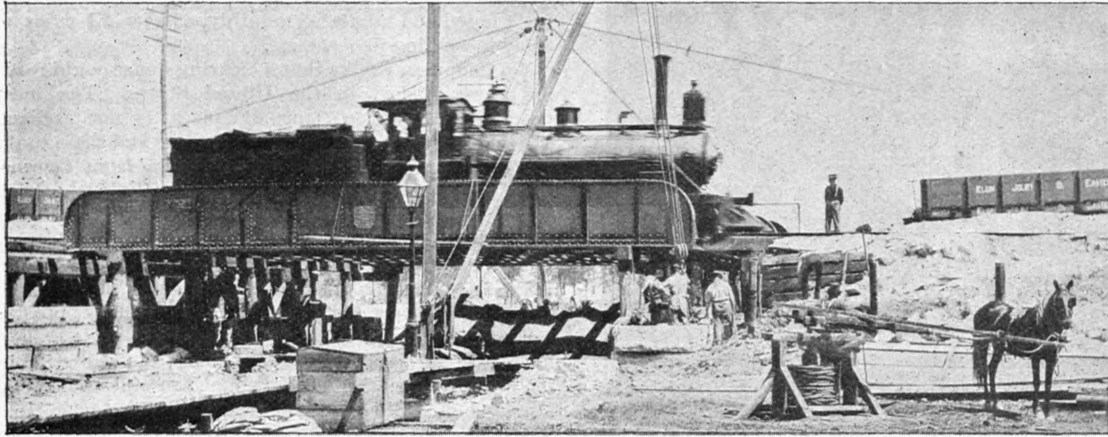


Fig. 5.

house charged mileage amounting to about 4,000 miles per vehicle and in addition about three and one-half days' demurrage. These charges involved some 34,000,000 entries.

In a preliminary paper such as this it is impossible to cover the ground thoroughly, but I hope that my notes may lead to a general consideration of the scheme. If we can learn the proportion of interline traffic in relation to total, and the number of clerks engaged on such work and who could be dispensed with if a clearing system were inaugurated, the English Clearing House will tell us the volume of business cleared by them; the estimated number of clerks that could be dispensed with if traffic were only station to station; and the number of clerks engaged on parcels, etc. With such data a more or less intelligent idea could be formed as to probable saving consequent upon the introduction of a clearing system.

Mr. Chapman supplemented his paper by the following communication from Mr. John Partington, Audit Accountant for the London & Northwestern.

1. There is no advantage in settling two companies' traffic in the clearing house if the point of exchange be not open to doubt, or an agreed route list be in operation; the L. & N. W. with Caledonian Group is of this nature.

2. It is more economical to settle privately where the traffic is between two stations of one company and passes intermediately over another company's line.

3. Further, it is because two companies' passenger traffic can be cleared more cheaply without the inter-

6. The receipt of settlements of traffic in one uniform shape, size and manner is a great convenience to the companies; many companies would find it somewhat difficult to train their staff to the making of private settlements.

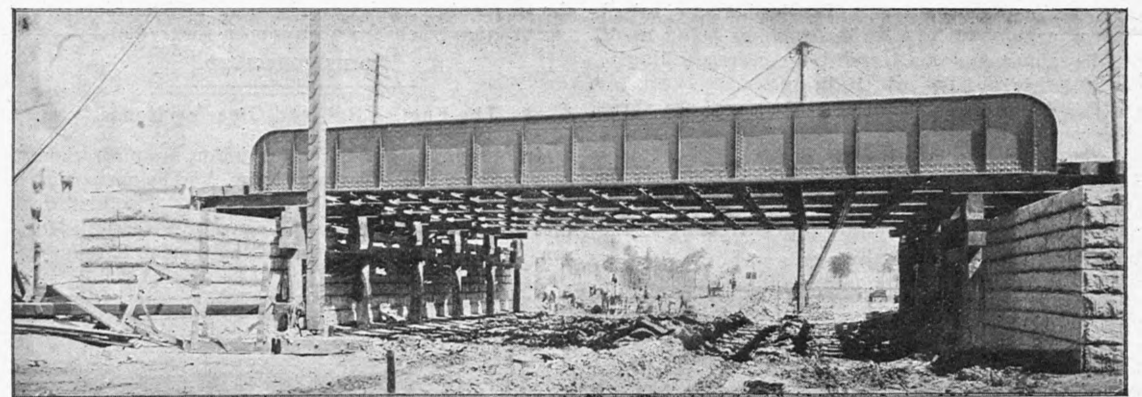


Fig. 7.

7. There are, however, larger considerations which influence the companies in upholding the clearing-house, among which are:

(a) The maintenance of an impartial tribunal for

whom have since died. The scene of the collision is on the "Meadows," where the roadbeds are surrounded by low ground and mostly surrounded by water. Running westward from Atlantic City, the West Jersey road (a Pennsylvania line) is north of the Atlantic City road (a Philadelphia & Reading line) and nearly parallel to it for most of the two miles, and the crossing is at an acute angle. The trains in collision were an excursion of the West Jersey, bound from Atlantic City to Bridgeton and the regular express train of the Atlantic City road, leaving Philadelphia at 5:40 p. m. The latter train ran into the former, striking the second and third cars from the engine. The Reading engine was derailed and overturned and the engineman was killed; the fireman jumped, or was thrown out, and was not badly hurt. No passengers on this train were injured. Two cars of the excursion train were completely demolished and the injuries to the occupants were frightful in the extreme. One car was filled with steam from the broken locomotive and the uninjured passengers, fearing scalding, jumped out of the windows. Another car was partially submerged in water. The wreck took fire from the coals in the locomotive and, to many of the victims pinned down in the wreck, this was an additional terror; but the flames were extinguished before doing appreciable damage.

The crossing is equipped with interlocked semaphore signals, home and distant, but has no derailing switches. The home signal that was overrun is 117 ft. from the crossing, and the distant is about 947 ft. away. The points where approaching trains ring annunciators are about 1 mile from the crossing. The Reading is also equipped with Hall automatic block signals operated by a track circuit, and at this point the Hall disks are on the same posts with the semaphores, the automatic signal being controlled, however, by the track circuit alone.

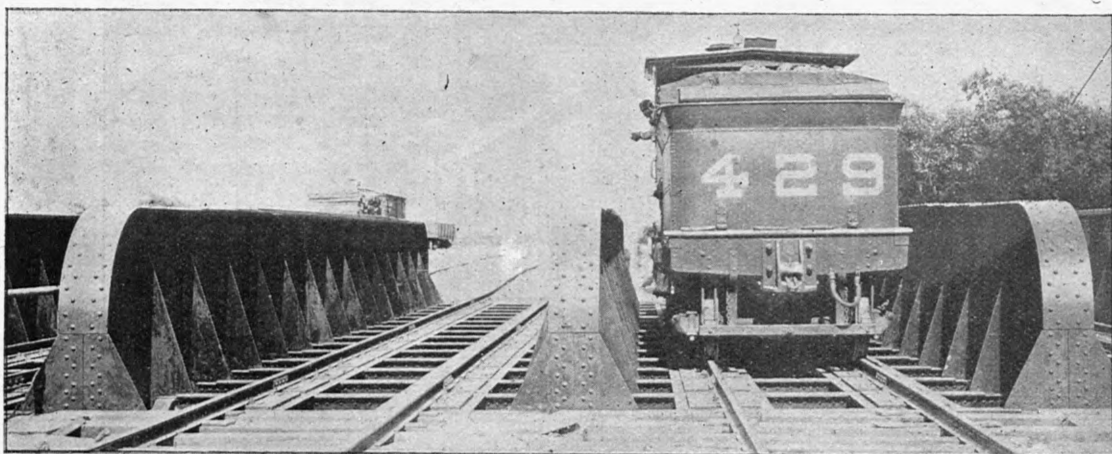


Fig. 8.—Track Elevation of the Milwaukee Division, Chicago & Northwestern Railway.

(For description see page 549.)

ference of the clearing house that the companies practically arrange these settlements direct.

4. In 1862 a committee of experts, who inquired into the advantages of the clearing-house constitution, recommended that in the case of two companies' traffic it was desirable that more extensive settlements between the companies should obtain.

*For 1894 Dr. Taussig, in his paper given in the *Railroad Gazette*, May 22 and 29, gives the clearings as 37 per cent. of the total mileage.

the settlement of the constant disputes arising in regard to invoices or divisions of traffic.

(b) The assurance of punctuality in the payment of balances.

8. So long as the existing basis of charging for the use and detention of rolling stock prevails, the mileage department cannot possibly be dispensed with. The work could not be done in a fragmentary manner by individual companies with anything like the success which is at present attained, and that branch of the clearing-house