Reconstruction of the Railway Bridge over the Rhine at Düsseldorf. PLATT.

(Centralblatt der Bauverwaltung, 1898, pp. 351 *et seq.*)

The bridge has a total length of 815·33 metres (2,674 feet), including four stream spans of 103·57 metres (340 feet), and carries a double track of railway. The river spans are crossed by girders, while the approaches are carried on brick arches 18·83 metres (61·8 feet) span. In 1895–96 it was decided to reconstruct the deck of the river bridge and to renew the covering and filling in of the arches, which had become leaky and sodden.

About seventy-three passenger and goods trains pass the bridge daily, and the plan adopted for reconstruction necessitated working the length over the bridge as a single line. The Author gives the regulations enforced for the safety of the traffic, and a diagram of the special signalling arrangements, &c.

On the arched part of the bridge the old filling in and asphalt was removed, and new asphalt laid down and covered with 5 centimetres (2 inches) of clean sand. Three small drain-pipes were laid longitudinally along the centre of the bridge embedded in the sand. A layer of bricks on the flat with open joints was placed on the sand, over this dry stone packing, and finally a depth of 40 centimetres (1·3 foot) of ballast.

While the bed of one pair of rails was relaid, that of the pair in use was supported by short timber struts from the side walls, which are very solidly constructed.

Prices in some detail are given, also five illustrations.

W. B.

The Kornhaus Bridge at Berne. P. SIMONS.

(Schweizerische Bauzeitung, 1898, p. 92. 12 Figs.)

Allusion was made to this bridge in the Minutes of Proceedings, vol. cxxxiv., and in the present Paper full details are given of the difficulties overcome. Considerable trouble was experienced with the foundations of the pier on the right bank of the river. Before the contract was let a series of bore-holes was made at about equal distances along the centre line of the proposed bridge. One of the bore-holes was in the centre of the site of the proposed pier on the right bank and a bed of clay was found at a depth of 37 feet. It was decided to make this the foundation and provide an air-pressure of 75 lbs. per square inch. As troubles with ground-water were expected, a sum of £800 was put aside to provide for pumping. In July, 1895, the work was begun, and instead of pumping it was decided to use sheet piling of steel of I section. This method was

employed quite satisfactorily on the left bank of the river, the points of the piles being driven 9·85 feet below the bottom of the foundation. As soon as work was begun and the slope of the Altenberg was cut into, it was found that the site was very different from what was anticipated. It was found that the bed of clay had a sharp dip across the axis of the bridge; water was also encountered, and it was found that an underground lake of considerable extent had been tapped; the water was eventually led off by two siphons. The quality of the ground was found to be so bad that the pier could not be built as originally intended, and other bore-holes, carried 85 feet below the proposed foundation-level, showed even worse results. Experts were called in, who decided that it was necessary to increase the area of the foundation 9·85 feet in each direction, and the site was to be surrounded with sheet piling and the whole area filled with pitch-pine piles, 40 feet to 50 feet long, which were to be driven by a steam pile-driver weighing 1,760 lbs. to 2,200 lbs. The Author gives details of the manner in which the work was carried out. The I-piling previously put in was removed with dynamite. The pitch-pine piles were from 12·6 inches to 15 inches square, and these were driven until a series of 10 blows with a ram weighing 2,200 lbs. drove the pile only 2 inches. Laying of the concrete foundation could only be begun on the 18th February, 1897; the concrete consisted of 440 lbs. of cement to 8 cubic feet of sand and 20·5 cubic feet of stone. This pier after completion only sank 0·39 inch.

E. R. D.

Arch Bridge over Schuylkill River, Fairmount Park, Philadelphia.

(Engineering News, New York, 4 August, 1898, p. 67.)

There are four arch spans of 208 feet, and some smaller girder-spans on each side, making a total length of 1,097 feet. Three arches, side by side, 28 feet apart support the platform, 79 feet wide, of which a concrete footway occupies 12 feet, a concrete carriage-way 40 feet, and a double electric railway 27 feet. The arches are constructed on three hinges, with vertical posts and diagonals between arch and horizontal top member. Posts, diagonals and top members are made of two channel irons braced together, but as the channels are turned outward, the bracing stops at the assembling plates. Transverse bracing is placed between the arch members and the vertical posts. All connections are riveted. The bridge was designed and erected by the Phœnix Bridge Company. The article is fully illustrated.

M. A. E.
