THE CZERNOWITZ BRIDGE.

PLATES XIII. AND XIV.

On a hill near the right bank of the River Pruth, and about 140 miles south-east of Lemberg, is the town of Czernowitz, the capital of the district of Rukowina, which forms the easternmost portion of the Austrian dominions. It is bounded on different sides by Galicia (Austrian Poland), Roumania, Russia, and is separated from Hungary by the Carpathian Mountains. The Pruth is a river something like our own Trent, but much wider, and is subject to very heavy and sudden floods from the melting snows. The cold in the winter in these parts is very extreme, the temperature often falling as low as 4° below zero, Fahrenheit, and at the breaking up of the frost, enormous masses of ice come floating down against the bridges. Up to quite recently the whole of the traffic into Czernowitz, from a wide stretch of country around, had to cross the Pruth by an old and fragile wooden bridge. The inconvenience experienced, combined with the temporary character of the bridge, at length caused the Austrian Government to take some active steps towards the construction of a new bridge. They resolved to have a permanent iron structure, and accordingly asked for designs and tenders from six manufacturers in Austria, Prussia, France, and England. Messrs. Andrew Handy-side and Co., of the Britannia Foundry, Derby, were the English firm applied to, and they consulted Mr. R. M. Ordish on the subject, and with his advice and assistance they prepared a design and an estimate, which were sent in and accepted. The bridge, which has been constructed from these designs, is illustrated in Plates XIII. and XIV. A perspective view, showing the structure and the surrounding country, and which has been engraved from a photograph, is given in Plate XIII. In the distance is seen the bridge which carries the Lemberg-Czernowitz Railway across the Pruth, whilst in the foreground is a temporary timber bridge, which was erected to carry the traffic over the river during the construction of the new iron structure, which replaces the old bridge to which we have before alluded.

Besides the perspective view, illustrations of the details of the bridge are given in Plate XIV. Referring to these engravings, Fig. 1 is a general elevation, and Fig. 2 a plan of the bridge; Fig. 3 is a cross section, half of which is taken over the centre of the pier, the other half being taken through the middle of the girder, the roadway also being shown in section; Fig. 4 is a longitudinal section through the centre of the platform in the first span; Fig. 5 is a longitudinal section through the centre of the flange at the centre of the bridge; Fig. 6 is an elevation of the end of the bridge; Fig. 7 is a section of top flange of main girder; Figs. 8 and 9 are sections of two of the diagonals, whilst Figs. 10 and 11 show details of the connexion in the end span, in front view and section; Fig. 12 is an end view and part transverse section of the roller bearing; Fig. 13 shows the bearing in half front elevation and half vertical section; and Fig. 14 is a section of the bearing at the centre of the bridge. The bridge carries a roadway and two side footpaths, and measures 762 ft. 6 in. in length, and 25 ft. in width from centre to centre of girders. It has six openings over the river, each 126 ft., centre to centre of piers; the five piers and two abutments are of masonry, resting on concrete foundations. The main girders are continuous, of the single lattice type, and are 11 ft. 10 in. deep. The flanges are boxes composed of two large channel irons and a flange plate which connects them. The diagonals are placed at an angle of 45°, and consist of a pair of flat bars, which form the ties, and a pair of channel irons braced together, which form the struts. Except at the piers the main girders have no verticals, nor are they anywhere braced across the top flanges. The method adopted in order to prevent the top flanges from collapsing, has been to carry them at every pier in two strong W-shaped frames, placed 5 ft. 6 in. apart, centre to centre, which keep the top flanges steady at this point, whilst the stiffness of the flanges between the piers is secured by their great width. The horizontal member of each of these W frames consists of an ordinary plate girder 18 in. deep, the two vertical members, each consisting of two channel irons 10 in. × 9½ in., braced together by strong T-iron bracing, and connected with the bottom member by a triangular gusset. The cross girders are of wrought iron; they are 1 ft. 6 in. deep in the centre, and are placed 5 ft. 6 in. apart throughout the bridge. The parapet railing is also of wrought iron, bolted at intervals to the main girders, and finished with a wooden hand-rail.