MODERN EXAMPLES OF ROAD AND RAILWAY BRIDGES.

It will thus be seen that while we have refrained from adopting, with few exceptions, this method of construction, French engineers have hastened to recognize its value, and to employ it largely for a variety of work, having tested its reliability by a series of exhaustive trials. An exception to which we may refer is the concrete bridge constructed by Mr. Fowler across the Metropolitan Railway at Kensington, but even that experiment was scarcely analogous, for the material employed was simply concrete, mixed with cement it is true, but mixed in the ordinary way, and thrown into the mould instead of being carefully set in layers and well combined, as in the Coignet process. But signs are not wanting to show that the extensive adoption of concrete structures in France will probably be followed by an equally extended adoption of the system in this country.

THE WIDENING OF THE METROPOLITAN RAILWAY.

PLATES XXV. TO XXX.

The widening and duplication of the Metropolitan Railway between King's Cross and Farringdon-street Stations, with the deviations of the branches to the Great Northern Railway, was commenced in 1865, and was completed in the beginning of 1868.

A constantly increasing traffic rendered these extension works necessary, the new lines being intended for the service of the Great Western, Great Northern, and the Midland trains (the former line being turned into the widening by a cross-over road, the points of which are at the east end of the King's Cross Station platform), so that the Metropolitan Railway proper was relieved of the extra traffic which was at first imposed upon its limited rail accommodation.

The widening commences in the King's Cross Station, Metropolitan Railway, and for some distance it runs parallel with the old line towards Farringdon-street; then dipping, it crosses beneath the Metropolitan, and rising on the other side, again runs parallel with it, the rails of the new work being laid with such a gradient as to overtake those of the Metropolitan at a point a little westward of the station of Farringdon-street.

Under the same contract as this work was included the erection of the substructure, and the extensive system of sidings, platforms, and hoists for the new Smithfield Dead-meat Market. The construction of the widening presented unusual difficulties, in consequence of the necessary deviation of the two existing branches to the Great Northern Railway (through one of which the uninterrupted traffic was maintained), the extent of driven tunnel work, and the tedious process of underpinning a portion of the Metropolitan Railway retaining walls, as well as the foundations of Vine-street and Ray-street bridges; indeed, but for the excellent quality of the old brickwork, a different and more costly plan of construction, involving a stoppage in the traffic, would have been necessary, especially in those places where the sides of the tunnel were cut away at the bell-mouthed junctions. In all these cases the new work was carried out in short lengths, with the greatest care, and with the best materials, brickwork set in cement being used throughout.

The plan on Plate XXV. shows the general arrangement of the new works at King's Cross, the lines representing the Metropolitan Railway and the Great Northern branches as they were originally constructed, and the centre lines of the deviations and new works. From A to B, a length of 1 furlong 5 chains, is that branch of the widening to the St. Pancras Station of the Midland Railway; the length, C D, is the diversion of the Great Northern and Metropolitan Junction Railway (single line), known as the Hotel Curve; from E to F is the diversion of the eastern curve, or up line, from the Great Northern to King's Cross (also a single line).

Fig. 1, Plate XXVI., is a sectional plan from the bell-mouth, formed by the junction of the Hotel Curve with the widening, to the bell-mouthed tunnel, where the Midland branch diverges toward St. Pancras Station. Fig. 2 is a transverse section of the Hotel Curve taken on the line A B; and Fig. 3, a section on C D. At this place the tunnel of the original line of this curve intersected the side walls of the Metropolitan main line, thus