to be set in mortar, and not laid dry, and afterwards grouted. Facework must have no stone containing less than one-quarter of a cubic foot. The work shall be grouted every foot in height; archwork shall be of brick, set in cement mortar; but where flat-bedded stone exists, approved by the Engineer, the Contractor may use it for arches, but he must in that case increase the thickness of the arches 25 per cent. beyond that shown on drawings. All wingwalls, parapets, and abutments shall be finished with a coping of brick on edge, one brick wide, set in cement. The coping is not generally shown on drawings. The whole of the masonry is to be neatly pointed.

A layer of puddle, 9 inches thick, to be put over the arches of culverts.

All timber shall be of kauri or totara, or other timber specially approved; it shall be heart-wood, except as shown on Drawing No. 36, and shall be straight and sound, free from shakes, large knots, and other imperfections.

The whole of the straps and bolts shall be made of B.B. Crown iron, or other iron of equal quality, of the dimensions shown; the whole to be finished and fixed in a workmanlike manner.

Bolts shown or specified shall have a square head, of which the thickness shall be equal to the diameter of the bolt, and the width twice the diameter of the bolt. They are to be tapped with a good clean thread, and shall have a nut equal in size to the head of the bolt, and shall be provided with one or more washers 3 inches in diameter.

Bridges and Timber Openings.

12. Bridges, as per detail drawings, shall be erected where shown on longitudinal section.

All joints, shoulders, and sides of tenons and scarfs to be worked perfectly true, and to fit accurately, and to be covered with red lead before being put together. Tenons generally to be 5 inches long, and to be draw-bored to receive trenails of hard wood made with hollow auger or trenailing machine. All trenails to be well seasoned and kept dry, and to be one-sixteenth of an inch more in diameter than the hole bored for them, and to be covered with red lead before being driven. All capsills and mudsills to be mortised on to posts or piles. All string pieces to be accurately notched down to capsills or floor-beams by notching $\frac{3}{4}$ inch from each, to be scribed and accurately fitted. Diagonal braces, where placed inside the panel, are to be notched together as described for string-pieces.

All piles are to be rung before driving with a 3-inch by $\frac{3}{4}$-inch round hoop. The piles are to be shod with a substantial iron shoe weighing not less than 30 lb., securely fixed; the point of the pile to be cut true, and to be squared off at the end to 3 inches square, and to have true bearing against the shoe. No pile-driving is to be commenced at any bridge, opening, or other work, without giving six days' notice previously to the Engineer in charge of the works.

The Contractor shall provide all proper rods and gauges for setting out and testing the dimensions of bridges and timber openings that the Engineer may require.

Culverts and Drains.

13. Timber culverts shall be erected where shown on longitudinal section.

The frames shall be accurately mortised and tenoned, and pinned; the planking to be securely spiked on to the frames, the whole of the timber to be heart of totara or matai; the outer side of the planking need not be reduced to the dimensions given, but there must in every case be the full thickness specified of heart timber; the edges of the planking must fit truly for the whole thickness, and the planks must extend over at least two panels, and break joints as much as possible.

Masonry culverts shall be erected where shown on longitudinal section. They shall be of rubble masonry, set in cement mortar, with coping of brick on edge.

Sufficient catchwater and outfall drains are to be dug at culverts, and all stumps and roots occurring in the line of ditch to be taken out.

Ballasting and Permanent-way.

14. The ballast is to consist of shingle, scoria, broken stones, or sand previously approved of, and is to be disposed as shown in Drawing No. 34. In all cases the embankments and cuttings are to be cleared from mud, and brought to an uniform formation level before the ballast is laid on.

The permanent-way is to consist of a single line of rails laid to a gauge of 3 feet 6 inches, and sidings provided and laid where directed, amounting in all to three miles of sidings.

The Contractor is to provide and have upon the ground at all points when the work is proceeding a sufficient supply of all such templates, tools, gauges, and other implements as are necessary and are usually required in the laying of permanent-way, or as may be required by the Engineer.

About three thirty-seconds of an inch of space is to be left between the ends of the rails when fixed in place, or such other space as the Engineer may direct, according to the season.

For the curves the rails will require bending. This, as well as the straightening of all bent rails, must be effected by a press, or by striking with wooden hand-beetles on wooden blocks. In all cases, whether of straightening of bent rails or of bending rails to the necessary curves, the rails must be set permanently to the form required before being laid, and no temporary bending, springing, or straightening, either by dragging with a lever and hook, or by any other means of a like character, will on any account be permitted.

Great care must be taken to lay all the sleepers square to the rails on straights, and as near as may be on curves. Where the line is straight the rails will be level across the line; but where the line is curved the rails will be canted, the difference of level between the two rails being such as the Engineer shall order.

When suitable material for ballast is not found immediately on the line, the sleepers may be laid on formation, being carefully tamped with dry earth. The Contractor will be permitted to run ballast and material trains over the line thus laid at a speed not exceeding ten miles an hour, but the ballasting and lifting must be proceeded with with all possible despatch.

The changes of gradients shall be made by a gradual curve.