

remaining, is taken up by the flying buttresses. As a matter of fact, these flyers were a later addition to the design and are not shown in the original eighth inch scale drawing, so they are there partly for external appearance.

The piers are slender, but well proportioned and moulded, and with an attached half shaft on 3 faces, the over-all sizes being approximately 2 ft. 6 ins. x 2 ft. 6 ins. Being joined together at triforium floor level, they should be specially rigid. The triforium, though not very high (7 ft. down to 5 ft.) is high enough to accommodate a number of people on special occasions, and although the view from there will be limited, owing to the closeness of the mullions forming the arcade, it will be decidedly interesting. It is floored in concrete, the surface being brought to a fine finish, and left thus. Access to the triforium is obtained by means of two spiral stairs, placed in the two west end turrets; these stairs are continued up, opening on to the nave gutters, and finally to the top of the turrets, from whence a splendid view should be obtainable. The height from nave floor to triforium floor is 26 ft., to apex of nave vaulting 59 ft. 6 ins., and to top of ridge 78 ft. 9 in. From these figures it will be seen that the building will be fairly lofty, especially after adding on the 14 or 15 ft. from ground level to nave floor. With regard to the materials, the whole of the interior is lined with stone, each alternate course being allowed to be 2½ in. thick. This method is most economical, and enables a great deal of the cuttings to be used up. Gay's stone is being used throughout, the warm colour of which should be most pleasing. It was intended to use T.T. for the interior lining, but as this entailed wasting the thin slabs obtained from the cuttings it was found much cheaper to stick to the one stone.

A great deal of Gay's stone has veins of dark yellow, following the natural bed, and this, while giving beauty and variety to the work, has also checked the possibility of the stone being laid off its natural bed. The piers and arches are all of Gay's "hard" stone, which consists of the top 2 or 3 lifts in the quarry. The difference in crushing strength between these top lifts and the lower ones is very great. The former on being tested, failed at 115.4 tons per sq. ft., the latter at only 36. There is a load of approximately 85 tons on each pier, which works out at about 16½ tons per sq. ft. of area in the pier, thus giving a factor of safety of about 9½. As Oamaru stone hardens and becomes denser with age, it was felt that this would be well on the safe side. The sheeting of the vaulting is kept as light as possible, being only 3" thick, and is built of T.T. stone, with Gay's every five courses, for the sake of variety. To show the difference in hardness between the hard and soft Gay's it may be of interest to mention that the large circular saw used for cutting up the blocks, had to be sharpened every 5 or 6 days while working at the hard, and only once in six weeks while at the soft. A great deal of hard quality came in the first few months of the job, considerably adding to the cost of working—a little item not appreciated by the contractor. The least thickness of stone on the exterior is 8", and the

core between the inner and outer stone facing is concrete—6 shingle to 1 cement with "Trus-con" waterproofing paste in same, in the proportion of 5 lbs. paste to each cubic yard of concrete. The mixture seems to make a good dense concrete, and if the statement of the agents is any guarantee, there should be no trouble with damp penetrating the walls. The turrets, save for the exterior stone facing, are carried up in solid concrete, although it was open to the contractor to use rubble. This necessitated a great deal of rather costly boxing, especially as the turret stone steps were not built-in simultaneously with the walls. Recesses were formed in the walls by fixing little projecting boxes on the outside of the circular timber drum to take the ends of the steps. The stone steps will thus have to be lifted and lowered from the top by the cranes.

The nave floor is in reinforced concrete and, as originally designed, was to be 8-in. thick, with 6-in. x 3-in. R.S.J. at 2-ft. 6-in. centres embedded in same. The weight is taken up alternately by girders formed of pairs of R.S.J.—16-in. x 6-in., and by solid brick walls, at 15-ft. centres. However, when the 6-in. x 3-in. came to be ordered, it was found impossible, owing to war conditions, to get such a large number, so the design was changed to round rod reinforcement. The system adopted was the "beam and slab," consisting of 9-in. x 12-in. beams at 6-ft. centres, spanning the 15-ft. above mentioned, with a 4-in. slab covering the whole. The spacing of the rods varied according to the diameter used, and also as to whether British mild steel or Burnside w. iron was employed. As it was a case of using what one could get, there was considerable variation in this respect. I might mention that a saving of £78 was affected by this change, and I consider a much better job was the result, as the cohesion between the concrete and a 6-in. x 3-in. joint would not be very secure, especially on the under side. The effect from below is much improved by the use of beams, as the flat ceilings are thus broken up in a perfectly natural manner. A design was also made for a floor with a flat soffit, but it would have had to be 10-in. thick, and even then would not have been as solid a job. The main floor is specified to be paved with wood blocks under the seating, and with Malmsbury stone slabs in the alley ways. It is most likely that Italian marble "tiles" will be substituted for the stone slabs if the value is about equal. The dimensions of the floor of the present portion are 90 ft. long by 66 ft. wide, but the appearance of undue width will be greatly lessened by the row of twin piers on each side, which will leave the Nave 30 ft. wide in the clear.

Taking the basement next, the first point of interest is the staircase. This is constructed of concrete, reinforced with expanded metal in the soffit, and ½-in. rods in the steps, and will be faced with stone or marble. The stairs lead direct into the choir vestry (a room 48 ft. x 30 ft.) access to which is also obtained from the exterior on the "S.W." side, off this are also the priest's and bishop's vestries. All these rooms are paved with wood blocks on concrete, reinforced with wire netting. Besides these rooms