for bedrooms or other purposes are provided. It is steeply pitched at an angle (55°) which gives a very satisfactory appearance, and is especially suitable if the covering is plain tiles (see D and Fig. 41); little difficulty is experienced in obtaining the necessary height of rooms when the roof has such a pitch. It consists of spars, supported by two sets of purlins, and lower or principal collars. The spars and these collars are spaced at 15-in centres. There is, in addition, a second set of collars supporting the upper pair of purlins; these collars are provided at every third, fourth or fifth pair of spars, to which they are securely nailed and preferably dovetail halved jointed (see p. 73, Vol. I). The portion of roof between the collars is triangulated by braces or struts, birdsmouthed to the purlins, and a central runner nailed to the ceiling joists and placed immediately over a stout stoothed partition (see Fig. 11). Hangers and runners are provided as intermediate supports to the ceiling (see p. 72, Vol. I), the former being spiked to the purlins and runners. Alternatively, the hangers may be placed with their edges adjacent to and notched over the purlins and runners, and nailed to the spars, etc. It will be noted that, like the upper collars, the braces and hangers are spaced at every third, fourth or fifth spar apart.

To ensure complete rigidity, it is advisable to provide an adequate support for the partition in the form of double floor joists, as shown at A, or a single joist of sufficient thickness.

The sketch at F shows more clearly much of the construction described above.

The section at A shows two alternative methods of treating the sides of the room. The shape of such a room is improved if, as illustrated on the right, a studded partition is fixed along the side below the purlin. The space between the outer wall, roof and partition may be utilized for storage. The door is detailed at E. *Ashlaring* is the term applied when studding is used for this purpose, especially when the floor is at the level of the eaves. A dormer window [1] is shown in broken outline on the left. If required, studding may also be employed here below the lower purlin, returned studded ends being provided at the window; the plastered face of the side studding would then be as indicated by the partly broken line at G.

It is explained in Vol. I that it is usual to limit the unsupported length of purlins to 16-ft. and that roof trusses are provided when this span is exceeded. Whilst this conforms to the general practice, it is possible to dispense with roof trusses, provided some suitable alternative construction is adopted. The double roof shown at A, Fig. 16, is an example of a structure of moderate span in which roof trusses are not employed, although the distance between the cross walls is assumed to be 28-ft. This shows two alternative means of support for the purlins, *i.e.*, a *trussed purlin* at C and a mild steel beam with a partition at D.

As shown at A, the central portion of the roof is so constructed as to provide bedroom, etc., accommodation which is lit by means of windows in the gable walls. Collars are placed at a sufficient height to give adequate headroom, and the partitions and ceiling are either lathed and plastered or covered with wall board (as shown), match-boarding, plywood, etc. If this space is only to be used for storage, the collars may be lowered to the position shown by broken lines at Y.

An elevation of a little more than half of the trussed purlin is shown at B. This is of lattice construction consisting of two longitudinal members called *booms*, compression members or braces or struts, and tension members in the form of steel or wrought iron rods. The top boom is, in effect, a purlin, placed vertically, which supports the spars birdsmouthed to it. The lower boom supports the ceiling, floor joists and partition (see V). In addition, the trussed purlin supports part of the load from the lower purlin, which is transmitted to it by bearers placed at approximately 7-ft. 2-in. centres (see B, C, Q and U). These bearers are nailed to the spars at one end (see U) and to the braces at the other (see Q). The structure is triangulated hereabouts by 4-in. by 2-in. struts nailed to the spars (see U) and oblique mortised and tenoned to the lower boom (see V).

The studs provided at the trussed purlin are indicated at B by broken lines in order not to confuse the detail; these are fixed as explained on pp. 42 and 43.

Details of the trussed purlin are shown at P, Q, R, S, T, U, V and X. Some of them are very similar to those described in connection with trussed partitions (pp. 43 and 45), the centre-line principle being observed in setting out the members.

The detail at P shows the structure to be supported on a pad stone at each end, and the foot of the brace is bridle jointed and well spiked (or bolted) to the lower boom. The detail at Q shows the bearer supported by a cleat notched to receive it and nailed to the side of the brace and purlin; a triangular block, nailed to the back of the brace and to the bearer, assists in making a rigid connection. The opposite end of the bearer is spiked to the side of the spar (see U); a dovetail halved joint (see Z, Fig. 36, Vol. I) may be used. The upper end of each end brace is tenoned to the purlin (see R), and a block, well spiked to the purlin, increases the abutment. Details at the ends of the middle braces are shown at S and T. Details at the ends of the rods are shown at R, S, T and X; the rods are provided with nuts and washers at their lower ends (see S and X), and details at R and T show the heads and washers. The rods are finally tightened after the trussed purlin has been erected and the roof covering fixed. The detail at V shows the ends of the floor joists dovetail housed (see M, Fig. 34, Vol. I) to the lower boom, and the ceiling joists are notched over a fillet well spiked to the boom.

The alternative support for the purlins is shown at D and detailed at W. The latter shows a section of a mild steel beam, which has a bearing at each end on a pad stone built into the cross wall, and to which the 4-in. by 3-in. sill of the stud partition is secured by $\frac{1}{2}$-in. diameter bolts staggered at 2 to 3-ft. centres. Cradling (see pp. 34 and 36) is fixed for the plasterers' laths. The ends of the floor and ceiling joists have a 4-in. bearing on the sill to which the lower ends of the 4-in. by 2-in. struts are birdsmouthed. The top ends of the struts are secured to the spars, as are also the 4-in. by 2-in. bearers; the construction is

[1] Dormer windows are detailed in Vol. IV.