and this makes it possible for each course of slates in the adjacent roof surfaces to be uninterrupted at the valley, as the slates are continued round to form a series of curved or swept courses. The slates forming the valley are cut and packed underneath as required. As swept valleys are more often formed on roofs which are covered with plain tiles, a full description of this finish is given on pp. 109 and 110, Vol. III.

VERGES.—One of several methods of finishing at verges is shown at A and N, Fig. 69. For the reason stated on p. 136, a slate and a half should be used at each alternate course. The slates project as shown, and in order to direct the water from the edge and prevent it from running down the face of the gable wall, the outer slates of each course are slightly tilted upwards. This tilt is formed by bedding a course of butt-jointed slates (called an *undercloak*) on the wall in cement mortar, and the ends of the battens are laid on this course. After the slating has been completed, the open edge is well filled in with cement mortar and neatly pointed, as shown. The undercloak may consist of a double layer of slates.

PREPARATION OF ROOFS FOR SLATING.—The groundwork may consist of either (*a*) horizontal slating battens only, (*b*) boarding and felting, (*c*) boarding, felt and slating battens or (*d*) boarding, felt, counter-battens and slating battens.

(a) *Horizontal Slating or Cross Battens* (see D, Fig. 38, D and E, Fig. 69, and Fig. 70).—This is the most common method as it is the cheapest. It is quite satisfactory and a drop-dry roof is assured provided either felt or torching (as described on p. 136) is applied to prevent the access of rain, snow, wind and dust.

(b) *Boarding and Felting* (see W and X, Fig. 36, and J, Fig. 69).—The boarding (described on p. 136) is nailed to the spars and then covered with felt (see p. 136). This provides a drop-dry and draught proof roof, although dampness has been caused through the penetration of water through the nail holes. Heat is less readily transmitted through this roof than that described at (*a*) and therefore rooms which are partly in such a roof are relatively warmer in winter and cooler in summer.

(c) *Boarding, Felt and Slating Battens* (see L, Fig. 69).—The boarding is fixed, felt is nailed to it, and the cross-battens are then fixed to the required gauge to receive the slates. Although expensive it is not a satisfactory method, as any rain or snow blown up between the slates lodges on the upper edges of the cross battens causing, in some cases, a rapid decay of the battens.

(d) *Boarding, Felt, Counter-battens and Slating Battens.*—This is undoubtedly the best method and is adopted in first-class work (see H, F and K, Fig. 69). After the boarding and felt have been fixed, 2-in. by $\frac{3}{4}$-in. counter-battens are nailed running from eaves to ridge at the same distance apart as the spars; the slating battens are nailed to them at the gauge apart and the slates are secured to them. Any driven rain and melted snow gaining access pass down between the counter-battens to the free outlet at the eaves. Besides providing a perfectly drop-dry roof, heat losses are reduced to a minimum and this construction is therefore very suitable for open roofs such as are required for churches, public halls, etc., in addition to domestic buildings where the expense is not prohibitive.

Certain of the details in Fig. 69 not already referred to are described below.

CENTRE-NAILED SLATING.—This is illustrated at D, E and L.

Detail D.—See p. 76 for the construction of the eaves and this page for the groundwork. The top batten at the ridge is thicker ($1\frac{1}{2}$-in.) than the slating battens (1-in.) so as to tilt the ridge course, otherwise the tails of the short slates comprising the ridge course would ride on the course below; see the two alternatives at the ridge detail. *Note that there are* THREE *thicknesses of slates at each lap* (see the enlarged sketch at E). *Students in examinations frequently make the mistake of showing only two thicknesses at the lap with one thickness between laps*; this of course affords no protection at the edge joints. The double eaves course projects $1\frac{1}{2}$ to 2-in. and the felt overlaps the edge of the gutter.

Detail L.—The sprocketed eaves has been referred to on p. 76 and the groundwork on this page. The distance between the slates at the junction between the sprocket and spar is rather excessive; this would be reduced if smaller slates (say 16-in. by 8-in.) were used as the sweep would then be more gradual.

HEAD-NAILED SLATING.—Examples are shown at H and J, Fig. 69.

Detail H.—The sprocketed eaves is similar to that described on p. 76, except that the inclination of the spars and sprockets are 50° and 30° respectively and the projection is only 9-in.; the groundwork is described on this page. The space between the slates over the intersection of the spars and sprockets, whilst excessive, is not so serious as the defect purposely shown at L (already referred to), as the slates, being head-nailed, are not so liable to be damaged whilst being nailed; this space would be reduced if the sprockets were given a steeper pitch, and attention is drawn to the gradual sweep of the portion of the roof shown at K, Fig. 37, which is produced when the ideal and traditional pitch of the spars and sprockets of 55° and 35° respectively is adopted.

Detail J.—The projecting ends of the spars are cut as shown and a wood gutter is screwed to them. This gutter is shaped out of 6-in. by 4-in. redwood which should be well seasoned and of best quality, otherwise the lengths of gutter will cast and leaks at the joints will develop.

Any joints of the gutter are half lapped some 3 or 4-in. and, before assembly, the adjacent parts of the joints should be well bedded in red or white lead oil mastic; they are then well screwed together. The joint is rendered watertight by paring a slight $1\frac{1}{2}$-in. wide housing all round on both sides of the joint, mastic is spread over the housing and a 3-in. wide piece of lead is bedded in it and finally secured with copper nails. The inside of the gutter should be given at least three good coats of creosote and the outside is painted. Sometimes the whole of the gutter is lined with 5-lb. lead.

Wood eaves gutters are now rarely employed except for cheap work, where the above precautions (which are costly) are not taken to make the joints watertight.

The close boarding and felt have been previously described.