

which is the upper surface when laid. In slates which are nailed at the centre, the lap is the distance by which the tail of one slate overlaps the head of the second one beneath it. The gauge is in all cases the basis for the setting out of the slating.

Rendering consists in covering the under side of the slate with hair mortar. This is an operation often adopted when the slates are laid on battens, and it is sometimes employed when the roof is boarded, by laying the slates on the mortar, which has first been applied directly to the boards. Rendering prevents the wind from blowing rain or snow through the crevices when felt is not used over the boards. It is not so effective when slates are laid on battens, as they are likely to settle and crack the rendering. The great objection to rendering is that it is liable to shrink slightly and leave a joint between it and the slate, through which moisture will be drawn by capillary attraction. This moisture, when reaching the timber or boarding, is liable to set up dry rot.

Shouldering is the application to the head of each slate, to a depth of 2 inches, of a thin bed of hair mortar or slater's cement. Shouldering is resorted to only in very exposed situations.

Torcing is the pointing of the joints between the heads and tails of the slates from the under side with hair mortar or slater's cement, and is done after the slates are laid; it is of little value, as it soon falls out, leaving the joints open. Both torcing and shouldering are resorted to only when slates are laid on battens, to prevent wind, wet, and dust from blowing through.

Methods of Nailing.—There are two methods of nailing slates: *Head-nailing* and *centre-nailing*.

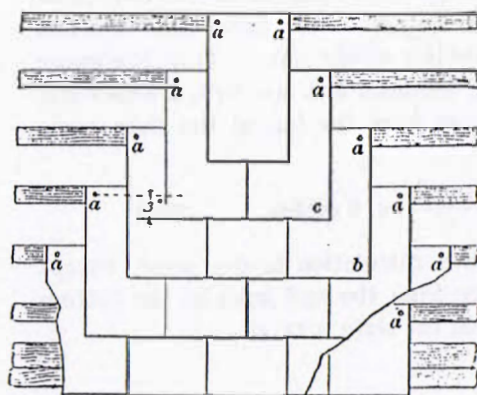


FIG. 7

In head-nailing the nail holes are punched about 1 inch from the top, as at *a*, Fig. 7, and the tails of the next two courses, as *b* and *c*, lap over the nail holes. Should the first-covering slate *b* be broken, the nails are still protected from the weather by the lap of the second-covering slate *c*. The objection

to this method is the leverage exerted by the wind. In the

case of large slates, the wind, if it gets under the slates, acts with such a leverage as to threaten the security of the covering. Head-nailing was at one time almost universally adopted, but is now in less general favour.

As regards centre-nailing, holes are punched at a distance from the tail of the slate equal to a little more than the gauge plus the lap, as at *a*, Fig. 8. Although by this method there is only the protection afforded by one slate over each nail hole, the greater security of fixing is considered to be a more than counterbalancing advantage.

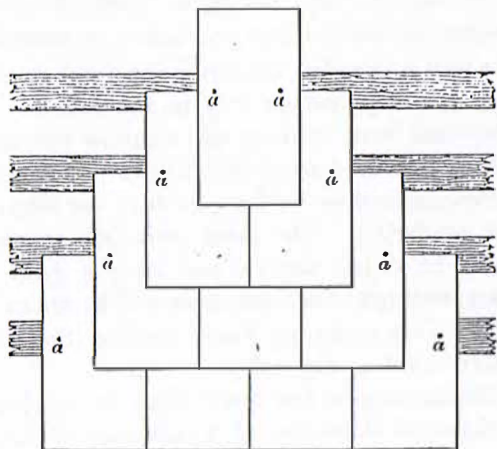


FIG. 8

Lap and Gauge of Slates.—The lap of slates is usually not less than 3 inches, except in the case of small slates employed on roofs of steep pitch, where a lap of $2\frac{1}{2}$ inches is sometimes adopted, but the lap of random-sized slates should not in any case be less than 3 inches. The size and lap of the slates being given, the gauge must be ascertained by calculation. In the case of head-nailed slates, the gauge is equal to half the remainder obtained by subtracting the lap from the distance of the line of the nail holes from the bottom of the slate. Thus, the gauge of $16'' \times 8''$ slates nailed at the head and laid with a 3-inch lap, the distance of the nail holes from the top of the slate being 1 inch, is

$$\frac{(16 - 1) - 3}{2} = 6 \text{ inches}$$

For centre-nailed slates, the calculation is the same, except that in place of the distance from the nail holes to the bottom of the slate, the full length of the slate is taken.

The gauge of 20'' × 10'' slates nailed at the centre and laid with a 3-inch lap is

$$\frac{20 - 3}{2} = 8\frac{1}{2} \text{ inches}$$

Cut Slates.—The tail-ends of slates are sometimes cut on the corners so as to give, when laid, a semi-octagonal or triangular margin, and when so treated are termed cut slates. This method is sometimes adopted in the case of a band of slates of a colour different from the rest of the roof, provided to relieve the otherwise even colouring.

Cut slates also tend to shed the water more rapidly than square-end slates, as their form acts as a guide, carrying the water to a point it readily leaves, thereby clearing the roof quickly; while, with square slates, the water lodges in the joints, accumulates on the lower edge, and drips off so slowly that the joints are wet when the rest of the roof is dry. In a hard winter, the alternate freezing and thawing are likely to loosen the slates and cause the edges to crumble. A roof covered with cut slates is, however, not so strong as one covered with square slates, on account of the material which is cut away.

Sorting and Piling Slates.—Sorting and piling slates preparatory to laying is a most important detail of the slater's work. The slates should be piled with their edges up, the pile in no case being more than 3 feet 6 inches in height; the ends of the tiers may be held up by laying a pile of slates on the flat, while the top of the pile should be covered with slates laid flat to keep out moisture. The slates should be sorted or selected by grades of thickness, the thinner being piled first and the thicker next. Thick slates should be laid on the lower part of the roof, and the thinner at the top.

Random-Sized Slates.—Where Westmoreland or other similar random-sized slates are used, they are sorted in respect of both thickness and size, and are laid from eaves to ridge in courses diminishing in size. Slates of this kind are particularly suited for covering conical and other forms of pointed roofs, where, if standard-sized slates were used, it would be necessary to break

joints, an undesirable procedure which can be avoided when the slates are of different widths.

Holing Slates.—In holing slates for the nails, it is found that machine-punched slates are preferable to hand-punched.

In Fig. 9 (a) is shown a section through a machine-punched slate; the hole is clean cut and gives the very best result; while in Fig. 9 (b) is shown a hand-punched slate whose edge is ragged and flaked, the slate consequently being weakened. In Fig. 9 (c) is shown another machine-punched slate, but with the nails driven too tightly. The result is as indicated. The slate has sprung to its natural position, pulling

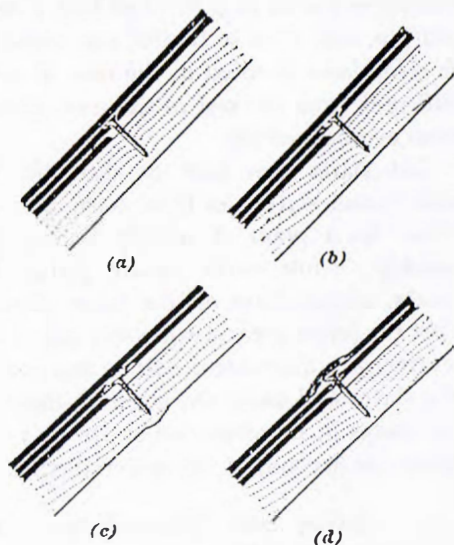


FIG. 9

the head of the nail through, as shown, thus rendering it of little value for holding the slate. In Fig. 9 (d) is shown a machine-punched slate with the nail insufficiently driven; the nail head may then be forced through the upper slate by pressure from above.

The slates in the illustration are shown of an exaggerated thickness, and it will be observed that they are quite parallel, which they would not be when laid in position, the tiling fillet at the eaves lifting the tails of the slates in the eaves course. In the other courses the tails will rest on the slates beneath and the heads on the roof boarding.

Trimming Centre-Nailed Slates.—When the slates are centre-nailed, the slater usually trims the top portion about $\frac{3}{8}$ inch on the right-hand side, as shown at *a* in Fig. 10. This gives him a little freedom to move the slate either way, so that the tails of the slates may keep a perfectly true line when laid.

Methods of Slating.—Slates may be laid in any of the following alternative manners: (a) On wooden battens ; (b) on boarding ;

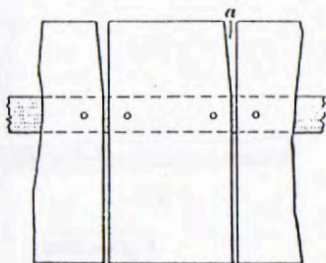


FIG. 10

(c) on boarding covered with felt ; (d) on boarding and felt with battens laid on top of the felt ; and (e) on boarding and felt with two rows of battens, one laid transversely on the other, and the lower series running parallel to the rafters, up the slope of the roof.

Laying Slates on Battens.—In the method of laying slates on battens, wooden battens from 2 to 2½ inches by $\frac{3}{4}$ to 1 inch are laid across the rafters and fixed apart at a distance equal to the gauge of the slates. These battens are securely nailed to the rafters and the slates are nailed to the battens. This method is adopted only where the chief consideration is cheapness, as there is no protection under the slates to prevent snow, rain, and dust from blowing in the building by passing between the slates.

Laying Slates on Boarding.—The method of laying slates on boarding is an improvement on that just described. The boarding often consists of plain butt-jointed boards, but sometimes of grooved-and-tongued boarding about 6 inches wide by 1 inch or 1½ inches thick. The objection to wider boards is that they are likely to shrink, curl on the edges, and lift some of the slates, thereby giving the roof a rough, uneven appearance. If wide boards are used, however, they must be well nailed at both edges. More care in this respect is needed when the boarding is applied to curved roofs or round towers, in which cases the boarding must be perfectly solid and smooth. When it is not solid, the driving of a nail is almost sure to loosen the slate that has previously been nailed, and a uniformly tight job is impossible.

Tools Used by Slater.—Besides the mallets, saws, chisels, etc., used by a stonemason, the slater has a few special tools employed only in the work of slating a roof. These are shown in Fig. 12 (a), (b), and (c), in which (a) is the slater's axe, or zax as it is sometimes called, used for trimming the edges of slates. A slate is cut by resting it on what is called a dog, which is simply an iron straightedge with a spike at each end by means

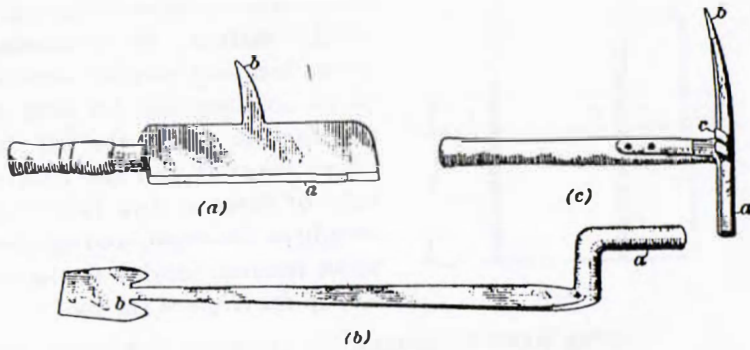


FIG. 12

of which it can be fastened to a board or wooden log. The axe is then taken in hand, and by means of the cutting edge *a* the slate is trimmed off along the iron straightedge at any point desired. The pick *b* at the back of the axe is used for holing slates for nails, when this is done by hand.

In (b) is shown the ripper, a thin steel blade about 2 feet long with a projecting handle *a*. It is used by a slater, when repairing a roof, for removing broken slates. The shaped and flattened end *b* is slipped up under the slate and by a sharp movement of the tool the nails are cut in two, thus allowing the broken slate to be drawn out preparatory to inserting a new one. The slater's hammer is shown in (c). It consists of a hammer head *a* used for driving the nails when fixing slates, a pointed end *b* for holing a slate, when this has to be done on the roof, and a claw *c* at the side to pull out broken or defective nails.

Placing the Slates.—In commencing to slate a roof, the first course is laid at the eaves, and in all good work is laid double, the lower or *undercaves* course having a length equal to the gauge plus the lap, as seen at *a*,

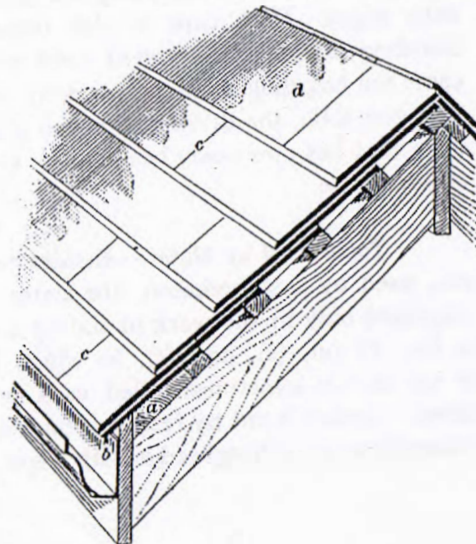


FIG. 13

Fig. 13, and should project over the eaves or gutter edge from $1\frac{1}{2}$ to 2 inches, as at *b*. All the courses must be laid so as to break joints, as shown at *c*. The last course, as at *d*, is known as a *finisher*, and is put on to receive the ridge roll.

When the edges of a slate are trimmed, the face, which is placed upon the iron straightedge, remains true and regular; while the edge of the slate on the other face is rough and uneven, and forms a ragged splay. In laying the slates, the smooth side of the slate is placed face downwards, so as to make a close fit at the tail with the slate underneath. This applies to all slates except those in the undereaves course, which, as shown in Fig. 14, are laid with the smooth face uppermost.

Slating Curved Surfaces.—In slating curved surfaces, very great care must be taken. Commencing at the lower course, with slates from 6 to 10 inches wide, the size must gradually be reduced until a slate 2 inches in width is reached. This is about the smallest size that will safely cover a nail hole and keep the weather from affecting it. Even with this width the upper courses should be well bedded in slater's cement, which is generally composed of paint skins and refuse lead, as should also all hips, ridges, and joints round chimneys, bulkheads, gables, and parapet walls.

Repairing Slated Roofs.—The broken slate is removed by means of the ripper, and a new slate is inserted; but as the new slate cannot be nailed, on account of the slates already fixed on the roof being in the way, it is secured by means of lead or copper tacks, which are narrow strips of metal about $\frac{1}{2}$ inch wide hooked over the head of the slate below, as at *a*, Fig. 19. The new slate *b* is then inserted and the lead or copper tack is turned up over its tail, as shown at *c*. There should always be two tacks to each new slate inserted.

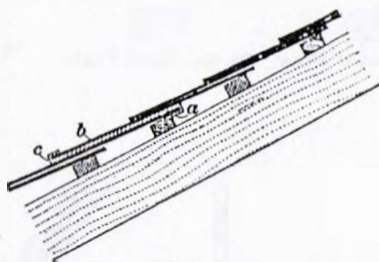


FIG. 10

REFERENCE:

Roofing, ICS Reference Library,
London, 1907.

INTERESTING FINDS

A recent acquisition of a batch of moulding planes "as is" produced some interesting finds. A very nice example of a quirked ogee by John Sym (I.SYM, 1753-1802) was noted before the purchase, but three others came to light on further examination. A 3/16" side bead by Stothert, of Bath (probably 1800-1830), a #18 round by James or John Kendall, Bristol (I. Kendall, 1765-1800), and a 1/4" side bead by John Wyllie. This last maker is mentioned in Goodman's book but there are no details, dates or examples noted. There is a reference to his association with Archibald McVicar of Perth, 1850-1870 (McVicar & Wyllie). The name order suggest Wyllie was the junior partner, though it may simply be alphabetical. The name was probably pronounced "Wiley" ("Smellie" is pronounced "Smiley" in Scotland). There are two previous owners' names; Hayball, and Ferris. The maker's name is incuse and rendered as Jn WYLLIE

Although this plane may not be as exciting a find as a Jennion, perhaps, it is still of considerable interest as an example from a maker of relative obscurity.

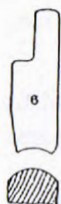


Fig. 69.—Hollow Plane.

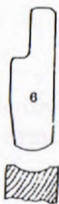


Fig. 70.—Round Plane.

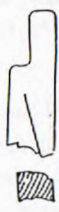


Fig. 71.—Sash Plane.



Fig. 72.—Sash Plane.



Fig. 73.—Ogee Moulding Plane.



Fig. 67.

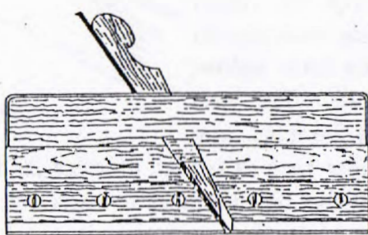


Fig. 66.



Fig. 68.

Figs. 66, 67, and 68.—Bead Plane.