

(b) Cornices, string courses and similar projecting courses should be constructed of stones which are "edge-bedded" or "joint-bedded," *i.e.*, the stones are bedded with the laminations *vertical* and at *right angles* to the face of the wall (see 2', Fig. 24), otherwise the mouldings may be defaced owing to weather action.

Thus if the natural bed were vertical and parallel to the face of the wall, portions of the stone may flake off, as at o, Fig. 26, where the portion of the cornice on the left of the broken line may become detached. Similarly, if the natural bed were horizontal any undercut mouldings and horizontal fillets (flat bands) would tend to disappear, *e.g.*, the lower portion below the broken line at P, Fig. 26.

An exception to this rule applies to quoin cornice, etc., stones which are returned, as the return faces would be face-bedded and would result in rapid loss of shape; therefore such must be carefully selected compact stones, free from obvious laminations, and bedded on the natural bed.

(c) Arches should be constructed having the natural bed of the voussoirs normal (right angles) to the face of the arch and perpendicular to the line of thrust, *i.e.*, parallel to the radial centre line of each stone (see 3', Fig. 24).

DEFECTS

The following are some of the defects in stone:—

Vents.—These are small fissures or hollows in the stone which may cause it to deteriorate rapidly, especially if exposed. Stone with vents should not be used for building purposes.

Shakes or *snailcreep* are minute cracks in the stone containing calcite (a carbonate of lime) and forming hard veins which, in course of time, project beyond the general face on account of their greater durability. It is not advisable to use stone containing them on account of the difference in texture which results.

Sand-holes are cracks which appear in the stone and which are filled with sandy matter. *Clay-holes* are vents which contain matter of a clayey nature. Both are readily decomposed when subjected to the action of weather, and the stone should be rejected.

Mottle is a defect which causes the stone to have a spotted appearance due to the presence of small chalky patches. Such stone is unfit for building purposes.

An inherent defect which occurs in Portland stone is the presence of shells (known as *shelly bars*), fossils, cavities and flints. These are often not detected until the large blocks from the quarry are being converted into smaller units, the saw-cuts revealing their presence. The affected portions must be removed and therefore waste results.

The presence of clay and oxide of iron is apt to cause disfigurement of the stone, producing brown-coloured bands which interfere with the uniformity in colour of the stone and diminish its durability.

WALLING

CLASSIFICATION.—The various classes of walling may be divided into:

1. *Rubble Work*, which consists of blocks of stone that are either undressed or comparatively roughly dressed and having wide joints, and
2. *Ashlar*, consisting of walls constructed of blocks of carefully dressed or wrought stone with narrow joints.

RUBBLE WORK

1. *Rubble Work* includes:

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|--------------------|---|------------------------------|
| (a) Random Rubble | { | (i) Uncoursed. |
| | | (ii) Built to courses. |
| (b) Squared Rubble | { | (i) Uncoursed. |
| | | (ii) Built to courses. |
| | | (iii) Regular coursed. |
| (c) Miscellaneous | { | (i) Polygonal walling. |
| | | (ii) Flint walling. |
| | | (iii) Lake District masonry. |

(a) **RANDOM RUBBLE**.—The stones are those which have been quarry-dressed (see p. 36). The principles of bonding referred to on p. 3 apply equally well to this class of work as they do to brickwork. Unlike bricks, the stones are not of uniform size and shape, and therefore greater care and ingenuity have to be exercised in arranging that the stones shall adequately distribute the pressure over the maximum area and in the avoidance of long continuous vertical joints.

The bond should be sound both transversely (across the thickness of the wall) and longitudinally (along both faces of the wall). Transverse bond is obtained by the liberal use of *headers* (or *bonders*) and *throughs*. Headers are stones which reach beyond the middle of the wall from each face to overlap in the centre (sometimes called *dog's tooth* bond). Through stones or throughs extend the full thickness of the wall (see Fig. 20). Satisfactory stability may reasonably be assured if one-quarter of the face consists of headers (approximately two per square yard), in addition to one-eighth of the face area of throughs (one per square yard).

Unless the relative impermeability of the stones is satisfactory it is not advisable to use through stones for external walls, as moisture may be conducted through them and cause dampness on the internal faces. This may be prevented by either (a) using three-quarter bonders or (b) using throughs extending to within $\frac{1}{4}$ -in. of the internal face and covering the ends with slate bedded on good mortar. The latter method is only applied if the internal faces of the walls are to be plastered.

The footings should consist of large flat-bedded stones, and, as in brickwork, the width of the bottom course should be twice the thickness of the wall.