SHEARING OF MASONRY.

The term shearing in masonry is apt to be used in a confused sense. The idea of a shear strain (vertical) is properly represented when one unsupported part of a wall ruptures vertically and drops below the level of the adjacent supported stationary parts, or, in another case, when a girder template, or a column base, by reason of an excessive unit load, cuts vertically through the brickwork wall which was intended to sustain it. The shear of this kind would usually take place in the vertical line of joints or "perpends," and hence the sheared section of brick material is, roughly, half the brickwork exerting the stress. Strictly speaking, it is the cumulative thickness of the bed-joints in the height of the brickwork less than half of the brickwork height. Tests of this kind of stress on bricks are rarely made. A strain, which is sometimss called shearing, is that which occurs when the interlaps of the ends of the bricks in the courses above and below are drawn horizontally apart in the line of the bed-joints, so that a shearing action takes place in the mortar of this joint. The utmost proportion of the bed-joints of a brick which can be sheared in this manner is half a brick in the stretcher course of chimney bond, or the intermediate stretcher courses of the flying or Yorkshire variety of English bond. In the heading courses the half-brick is in bond, though only showing a quarter-brick on face, and must, therefore, only be reckoned as equivalent to a quarter-brick bond. In other brick bonds there is only a quarter-brick lap to resist shearing of and in the line of the bed-joints. The shearing of this kind, so-called, occurs generally by excessive settlements of the end or ends of the wall, thereby pulling the walls in its upper parts apart lengthways. The rupture or fissure in such a case increases upwards in width.

Properly, however, this strain must be distinguished as a frictional shear, as its force of resistance depends upon the unit intensity of the insistent weight acting upon any particular bed-joint. It is, therefore, equal to a constant force of half the amount of the extreme force acting at the level of any bed-joint in question. It may be 75 to 80 per cent. of the insistent weight, according to the coefficient of friction of the material and of the mortar joint adhesion. In high or heavy brick walls the adhesion of ordinary lime mortar bed-joint adds little to the frictional resistance of the bricks because of its weakness or softness, liability to disintegration, and to remain soft in the interior, and thus to act as a lubricator.

ROMAN CONCRETE WALLS.

The chief objection to rubble and concrete walls is the roughness of the surface. The ancient Romans got over the objection in various ways; at first they faced them with large blocks of tufa, such as had previously been used in the time of the kings (rubble walls only came in with the Republic); afterwards, in the latter days of the Republic and in the early Empire, they faced them with small wedge-shaped blocks of tufa; the square surfaces of these small blocks were placed diamond-wise, resembling in appearance a small net, hence called net-work, or reticulated work. Afterwards they used brick or tiles of a triangular shape, with the long surface outwards, and thus these also formed a sort of wedges, but the mortar held them so tight that even if held by the point only the brick or the block of tufa will break before it can be pulled out. The smooth surfaces are then frequently plastered and painted, or covered with marble. In building such a wall the wedge-shaped blocks or tiles were placed in order and filled up with the broken stones to the depth of about a yard before the cement or hot-lime grouting was poured in. The whole was thus bound together in one solid mass, with openings left for doors and windows.

SUBTERRANEAN QUARRIES.

The labyrinth of the Petersberg, near Maastricht, in Dutch Limburg, is a very interesting curiosity. Geologically the formation belongs to the Senonian chalk, and the Maastricht tuft, as it is called, consists of coarse grained, yellow marls, which resemble sandstone in appearance —the people talk of sand hen which are lined with rows of large always lying on their flat side. The forms a fair building material, wh very easily quarried. The quarries back to the most remote ages, thou is not certain that what is to-day poi out as a Roman or a Celtic quarry deserve such a denomination. Of re years the use of the marl has decli Everybody had, in the middle age right to quarry on his ground wit having to pay any royalties. That is of the reasons why the hill is so stran honeycombed with passages that one m wander for days, it is said, without tou ing the same point. The marl is use quarried in blocks 21 in. by 21 in. b in. A furrow is made, a wedge inse and the rest is done with the help steel saw. Houses built of these blo have a neat appearance. After about years the mauve yellow turns green grey; they can then be scraped and tidy again. The walls are firm, but not be knocked about. Yet ruins c castles prove that the stones can sta good deal.