battens are fixed horizontally along both faces of the wall with their top edges usually ½-in. above the top of the course of the wall which is to receive the asphalt. The heated material is placed on the wall between the battens and finished off by means of hand floats to the top of the battens. The asphalt is kept slightly back from the external face of the wall so that it may be pointed with cement mortar after the wall has been completed; this covers the dark line of the asphalt and assists in preventing the asphalt from being squeezed out and discolouring the brickwork, especially if it is subjected to intense action of the sun. Asphalt forms an excellent damp proof course, it being impervious and indestructible; in addition it does not fracture, if, on account of unequal settlement, cracks are caused in the brickwork.

Fibrous Asphalt Felt.—There are many varieties of this damp proof course, one of which consists of a base of tough hessian (woven jute cloth) or felt which is impregnated with and covered by a layer of hot natural bitumen, and sanded on the surface or covered with talc to prevent the layers from adhering to each other. It is obtained in rolls, 24-yds. long and in various widths from 4½ to 36-in. In laying it in position, a thin layer of mortar is spread on the brickwork and the damp proof course is bedded on it. It should be lapped 3-in. where joints occur and lapped full width at all crossings and angles. It should be pointed in cement mortar.

This type of damp proof course is extensively used, it being easily handled and, provided it is adequately impregnated with bitumen and obtained from a reputable manufacturer, it forms a thoroughly reliable damp-resisting material. Some of the cheaper varieties are practically worthless; they are comparatively thin and both the bases and the bitumen are of inferior quality; such should be avoided. It is not suitable for certain classes of stone walling, *i.e.*, Lake District Masonry (described on p. 44), as the weight of the ragged undressed stones cut it and produce defects through which moisture may pass to cause dampness.

Another variety of this class of damp proof course consists of a continuous core of light lead (weighing only 4-*oz.* per sq. ft.) covered both sides with bitumen which is surfaced with talc to prevent sticking of the folds. It is made in two or three grades of varying widths and in rolls which are in 8-yd. lengths. It is an excellent damp proof course, especially for damp sites, and whilst it is more expensive than the above, it is more durable.

Slates.—Such a damp proof course consists of two layers of sound slates embedded in cement mortar composed of 1 part Portland cement and 3 parts sand. A layer of mortar is spread over the brickwork, upon which the first layer of slates is bedded with butt joints; more mortar is spread over these slates and the second layer of slates is laid in position so as to form a half lap bond with the first course of slates (when the slates are said to "break joint"); the next course of brickwork is then bedded in cement mortar on the top layer of slates. The slates must extend the full thickness of the wall, be at least 9-in. long, and be neatly pointed in cement mortar. It is a very efficient damp proof course and has been used on important buildings.[1] It is used in connection with Lake District walling and similar construction as it is not damaged by the sharp edges of the rough stones. This damp proof course is liable to be broken if unequal settlement occurs, and thus water may be absorbed through the cracks.

Lead.—This is a costly but very effective damp proof course. It consists of a layer of sheet lead (see Chapter Six) which weighs from 4 to 8-lb. per sq. ft., embedded in *lime* mortar.[2] It is either lapped as described for fibrous asphalt felt or the joints may be welted (see p. 145). The mortar does not adhere to it readily unless the lead is well scored (scratched).

Copper.—This is another excellent damp proof course. The copper should weigh at least 1-lb. per sq. ft., lapped or jointed as described for lead, and embedded in lime or cement mortar.

Blue Staffordshire Bricks and Vitrified Stoneware Blocks.—These provide effective damp proof courses, although the latter especially is not now so extensively used as formerly. The former is built in two to four courses in cement mortar; the colour of the bricks renders them unacceptable for general application. The glazed stoneware blocks vary from 2 to 3-in. in thickness. They are sometimes perforated in the direction of their width, and thereby serve a dual purpose of resisting dampness and of providing a current of air under wood floors. Further reference to the necessity of providing adequate ventilation to wood floors is made on p. 61.

The second cause of dampness stated on p. 17 (*i.e.*, rain passing down from the tops of walls) may be prevented by the provision of a horizontal damp proof course either immediately below the top course of brickwork or some little distance below it. Thus, in the case of boundary walls, the damp proof course may be placed immediately under the coping (see Figs. 17 and 27), and parapet walls may be protected by continuing the cover flashing (see p. 143) the full thickness of the wall.

Vertical damp proof courses which are necessary to exclude dampness in basement, etc., walls are described in Chapter One, Vol. II.

SURFACE OR SITE CONCRETE

The area of a building below wood floors must be covered with an impervious material in order to exclude dampness.[3] The material used may

[1] Horizontal slate damp proof courses are being used in both the Anglican and Roman Catholic cathedrals at Liverpool. In addition, lead and blue Staffordshire bricks are being used in connection with the latter building.

[2] Certain mortars, especially cement mortars, act upon lead and ultimately destroy it; such should therefore not be used as a bedding material for lead damp proof courses.

[3] Vegetable soil or turf covering a site should be removed as a preliminary building operation; the excavated soil may be spread over that portion of the site set apart for the garden, etc., and the turf may be stacked (as rotted turf is a valuable manure) or used subsequently for making lawns. The depth of soil removed varies from 6 to 9 in. and the site concrete is laid on the exposed surface.