As implied, this material is composed of asbestos and cement. The latter is ordinary Portland cement. Asbestos is a silky fibrous mineral existing in veins in metamorphized volcanic rocks. It is found chiefly in South Africa, Rhodesia, Canada, United States of America, Russia and Cyprus. There are several varieties, but white asbestos, which is a compound of magnesia and silica, is that principally used.

The first stage in the manufacture of asbestos-cement is the separating of the fibres of asbestos. This is accomplished after the quarried rock has been broken into smaller pieces, dried, crushed and passed through a vibrating screen. The fibres are mixed with water and cement, in the approximate proportions of 1 part asbestos to 7 parts cement. This takes place in a machine having a revolving drum with blades attached, and the operation is continued until the asbestos is closely blended with the cement and the fibres are arranged in a uniform direction.

The mixture is now transferred to another machine which has a revolving cylinder of fine sieve wire. The excess water drains through the sieve, leaving on the cylinder a thin film of the mixture, which is then transferred to an endless moving blanket. The film is conveyed by the blanket to a large forming cylinder, where a sheet of asbestos is gradually built up, layer by layer, until the required thickness is obtained. As the mixture passes over the blanket and forming cylinder, the asbestos fibres are uniformly distributed and drawn lengthwise in the direction of the movement to form a tough-woven fabric.

An operative slits the sheet, which is then removed to a platen where it is allowed to mature in the form of a flat sheet, or the sheets are stacked ready for further processing. Partly matured sheets required for slates, tiles and corrugated sheets are submitted to a high degree of pressure in a powerful hydraulic press.

Roof coverings made of this material are tough, durable, fire-resisting and light in weight. The average weight of asbestos-cement covering is only 3½-lb. per sq. ft. (compared with 10 and 14½-lb. for slates and clay tiles respectively) and therefore an economy in timber results when it is applied to wood roofs, as the spars to which the battens are fixed may be spaced up to 2-ft. 6-in. centres. The larger units, such as corrugated sheets and tiles, are especially suited for large spanned buildings of the factory type, where steel trusses are employed, as the covering is fixed direct to the purlins. Here, again, because of their lightness in weight, the employment of asbestos-cement sheets, etc., results in an economy in the sizes of the members of the trusses. Compared with hand-made clay tiles, the chief demerits of asbestos-cement slates and plain tiles are the lack of texture and their true mechanical appearance.

The sizes and methods of fixing some of these asbestos-cement coverings are included in the following description.

Asbestos-cement Slates.—These are made in the following shapes: (*a*) rectangular, (*b*) diamond and (*c*) honeycomb.

(a) *Rectangular Slates*.—There are four standard sizes, namely, 24-in. by 12-in., 20-in. by 10-in., 15¾-in. by 7⅞-in. and 11¾-in. by 5⅞-in.[1] The thickness varies slightly with the size and is expressed in millimetres; the approximate maximum thickness is 3/16-in. They are obtainable in several colours, including natural grey, green, green-brown and russet-brown. They are laid to give a bonded appearance, and the principle is similar to that described for ordinary slating in Chapter Five, Vol. I. The same terms also apply. Thus, as shown here at A, Fig. 47, each slate is centre-nailed with two nails. The lap is usually 3-in. and occasionally 4-in. The gauge is found in the usual manner, and, as indicated at A, equals $\frac{\text{length of slate} - \text{lap}}{2} = \frac{20 - 3\text{-in.}}{2} = 8\frac{1}{2}$-in. The nails should be of copper or composition and be 1¼-in. long. In addition to being twice nailed, each slate (excepting those of the smallest size) is secured at its tail by means of a copper *disc rivet* (see enlarged sketch B). As shown at A, the discs are placed on the course of slates next but one below that of the slates to be riveted with the upturned rivets between the side joints of the slates immediately below. The rivet is passed through the hole formed near the tail of the slate to be fixed and bent over it, after which the slate is nailed.

A further difference between asbestos-cement and ordinary slating occurs at the eaves. Whereas the latter is provided with a double eaves course, an asbestos-cement slated roof has three thicknesses at the eaves. As shown at A, there are two short courses below the top course of full size slates. Two of these under-eaves slates are obtained from one of full size by means of a saw, the cut being made at the gauge distance from one end. Thus, in the example, the length of the two pieces will be 8½ and 11½-in. (20 − 8½-in.). The shorter slates are centre-nailed and form the first under-eaves course, and the longer pieces are used for the second under-eaves course; the latter are nailed in the centre near the tail, in addition to being twice head-nailed (see A).

The preferred minimum pitch is 30°, although this is sometimes reduced to 25° and the lap increased from 3 to 4-in.

The groundwork for these slates is that described for ordinary slating, but, as already stated, on account of their extreme lightness the spars may be spaced at a greater distance apart up to a maximum of 2-ft. 6-in. centres.

A half-round ridge capping of asbestos-cement is used for this slating. These caps are in 2-ft. lengths, tapering from 8½ to 7⅞-in., ¼-in. thick, laid with 2-in. laps and secured by 3-in. screws at each lap and in the centre of each length. Washers are used in conjunction with these screws (see p. 124). Hips are also formed with these caps.

Some of the merits of asbestos-cement have been stated in the preceding column. In addition, such slates are much cheaper than good quality natural slates. The appearance of these artificial slates, chiefly because of their mechanical neatness, is generally considered to be their least satisfactory feature.

(b) *Diamond or Diagonal Slates*.—These are square shaped, of 15¾ and 11¾-in.

[1] These are specified in the B.S.S. for "Asbestos-Cement Slates and Unreinforced Flat Sheets and Corrugated Sheets, No. 690—1936."