

sac bulges to a greater or less extent into the interior of the cavity, so as to increase the area of the wall, and along which the internal longitudinal bars are present in greater number, and are therefore more closely placed than in other parts of the sac (Pl. VIII. fig. 3). In an average size of fold there are ten internal longitudinal bars, counting both sides of the fold, while, in the plain space between two folds, there are only four internal longitudinal bars. Yet that open space is nearly as wide as the fold would be if spread out, that is to say, it is nearly twice as wide as the fold in its normal doubled-up condition. In fact, on an average, the internal longitudinal bars are about twice as closely placed on the folds as they are elsewhere. They are not, however, placed at regular intervals, but become more and more closely placed as they approach the projecting edge or crest of the fold; while the first bar of the fold shows but little difference from the arrangement between the folds, the fourth, fifth, and sixth are so closely placed that the meshes are reduced in places to mere chinks, and are in some cases obliterated (Pl. VIII. fig. 3, *br. f.*).

A conspicuous feature in this branchial sac is the presence of spicules in the interior of the vessels (Pl. VIII. fig. 3, *sp.*). They lie in the inner part of the wall of the vessel, and are present in greatest number in the internal longitudinal bars, and especially near their points of intersection with the larger transverse vessels into which the spicules sometimes extend. I have never seen them in the smaller transverse vessels.

These spicules are composed of carbonate of lime, and are often of very considerable size, up to .5 mm. in their greatest extent. There seems to be no prevalent form or plan of growth for them, though they have a characteristic appearance, as they are generally slender and branching, and the outline is formed of gentle curves, there being no sharp points or angles. The smallest and simplest forms noticed were minute fusiform spicula; these, when a little larger, began to have their outlines somewhat wavy, and frequently one of the ends was forked, or a slight branch had made its appearance near the middle. From this all stages of complication may be found up to the largest forms which are often considerably branched.

On examining these spicules closely with a high power, one notices that they are invariably marked by a series of delicate lines, of which the outer ones run exactly parallel to the outline of the spicule, following all its curves, while the more internally placed lines do so to a less degree, and finally the series ends near the centre of the spicule in a few concentric curves, the whole having the closest possible resemblance to a system of contour lines on a map (Pl. VIII. fig. 6). These markings no doubt represent stages in the deposition of the carbonate of lime. In some of the spicules, if not in all of them, there exists a central cavity, which may be prolonged along the branches to a considerable extent as fine canals, along which air and staining fluids were observed to pass in some of the broken spicula.

The wall of the vessels of the branchial sac is composed externally of a layer of thin