If a thin section is soaked for from six to twenty-four hours in water saturated with carbon dioxide, it is found that the spicules are either entirely dissolved out or only partially so, according to the length of the treatment. Their remains when visible are always found inside the large spherical or polygonal vacuoles, the boundaries of which stain readily with eosine or aniline blue, and more faintly with picrocarmine. In a few cases after the treatment with carbon dioxide the vacuole was distinctly stellate in form, and not very far outside the rays of the partially dissolved spicule.

The chief difference between the sections decalcified by means of carbon dioxide and those treated with hydrochloric acid was that in the former, in nearly all cases, the more or less stellate membrane which had apparently been attached to the spicule, and was set free by its dissolution, lay distinctly inside the margin of the vacuole (see Pl. XXXV. fig. 6, where 1 shows the margin of the vacuole, and 2 the stellate membrane inside which the spicule lay).

These results seem to indicate that the calcareous spicule is formed by a group of modified test cells, which constitute, when the spicule has attained a fair size, its membranous investment.[1] Possibly the angular thickenings, which stain more deeply than the rest (see Pl. XXXV. fig. 5), may be the nuclei or the protoplasmic remains of the constituent cells. This membrane is apparently in the natural condition in close contact with the test matrix externally, and with the spicule internally, with the exception of occasional small chinks at the bases of the rays in some specimens (Pl. XXXV. figs. 8, 9). Slow decalcification with carbon dioxide sets it free from both test matrix and spicule (Pl. XXXV. fig. 6), while the more rapid action of hydrochloric acid causes the membrane to assume a polygonal or spherical form, and seems to press it outwards against the bounding test matrix (Pl. XXXV. figs. 5, 7, 10), probably as a result of the evolution of carbon dioxide. It is not, however, evident to me why, after treatment with water saturated with carbon dioxide, the vacuole in the test matrix should assume a more or less spherical form (Pl. XXXV. fig. 6), as in this case no gas is evolved.

The branchial sphincter and the muscular system generally are well developed. The invaginated test lining the branchial siphon is distinctly visible in the vertical sections (see Pl. XXXV. fig. 2, *br.*) and contains a number of calcareous spicules. A few longitudinal muscle bands start from the posterior end of the branchial sphincter and radiate outwards over the anterior part of the body.

The stigmata in the branchial sac are notable for their considerable length. The ciliated cells are distinct, and are pointed at the free ends. The tentacles are very distinctly of two sizes (Pl. XXXV. fig. 2, *tn.* and *tn'.*), which as a general rule are placed alternately.

[1] The observations which were made on the test and the discoid spicules of the genus *Cystodytes* point to a similar process of formation (see p. 139).