2. *Aulocystis zittelii* (Marshall) (Pl. CIV. figs. 1–6).

Two specimens of this remarkable Mæandrospongid were included in the rich collection of Hexactinellids trawled by the Challenger at Station 192, Little Ki Island, from a depth of 140 fathoms and a blue mud ground. They are fairly well preserved in spirit, have an oval form, and are about as large as a little man's fist. A smaller third specimen, dead but intact in form, was trawled off Banda Islands (Station 194A, lat. 4° 31′ S., long. 129° 57′ 20″ E.), from a depth of 360 fathoms and a volcanic mud ground. In form and size it resembles a hen's egg (Pl. CIV. fig. 2). The better preserved of the two other specimens is figured on Pl. CIV. fig. 1, in its natural size. It forms an oval, somewhat bulbous mass, 11 cm. in length, and 6·5 in greatest breadth. The outer surface consists of a thin, smooth, soft covering plate. In certain regions this plate exhibits irregular stellate clefts, while at others thin, translucent, and fine sieve-like perforated regions are seen, with an interjacent connected network of narrow, not translucent zones. Since not all the portions of this covering are preserved, it cannot be determined whether a round oscular aperture, which is suggested on the other specimens, is here really absent. Nor is it possible to discover the mode by which the sponge was fixed to its solid substratum, or its original position.

Traversing the entire internal space of this capsule is a well-preserved framework of irregular round tubes, a finger's breath in diameter, with firm walls 1 to 2 mm. in thickness, and exhibiting on both surfaces numerous small groove-like depressions of variable depth and breadth. From a median central space or short main passage, tubes which sometimes anastomose pass out radially to the external capsular plate, on which they are directly inserted transversely. These zones of insertion correspond to the non-translucent zones of the capsular covering plate, while the lumina of the tubes usually correspond to one of the round regions bearing a stellate cleft. Between this connected system of tubes there is a system of similarly anastomosing intercanals, which are covered over externally by the thin finely-perforated regions of the covering capsular plate (Pl. CIV. fig. 1). Through the latter the water passes from the exterior into the intercanalicular system, and through the tube-walls into the lumen of the anastomosing system of canal tubes, whence it regains the exterior through the clefts of the covering plate or through the oscular opening.

The connected dictyonal framework which supports the wall of the anastomosing tubes, is characterised by the great regularity of the lattice of beams which surrounds the strictly square meshes and corresponding cubical spaces. The simple nodes of intersection are furnished with twelve beams representing the edges of a regular octahedron. These beams extend as oblique buttresses between each two adjacent beams of the framework, at an angle of 45°, and at equal distances from the node of intersection. Both these buttresses and the freely projecting portions of the beams of the general framework