

ON CAMARAPHYSEMA, A NEW TYPE OF SPONGE.

By JOHN A. RYDER.

A singular organism, which I will name *Camaraphysema obscura*, was first observed by me on living oysters from Chesapeake Bay, attached to hydroids growing on those mollusks. The single specimen which I obtained measured less than half an inch in length, and consisted of a larger and smaller individual (person), united basally to a common attachment, constituting a corm or colony. The color was yellowish, or dirty white; the form of the branches was cylindrical, club-shaped, covered by a tough skin (ectoderm?), which was perforated at intervals, giving rise to tubular, funnel-shaped, oscular openings of exceedingly variable form, according to their condition of expansion. The margin of the funnels was entire and exceedingly thin and tough; this portion was capable of being thrown into longitudinal folds and withdrawn or inverted inwards into the basal portion. These funnels communicated at their bases with chambers, lined, apparently, with a single layer of cells (endoderm?). No mesodermal structures were observed, unless the single egg which I noticed in the first cleavage stage, from its apparent position, is to be regarded as a product of this layer.

The chambers were lined throughout the entire organism with a similar layer of nucleated, columnar cells, as was shown by a series of cross-sections, but no evidence of a collar or flagellum could certainly be detected as forming the inner extremities of the cells. The embryos observed were nearly all in the blastula or morula stage of development, and appeared to lie superimposed upon the living cellular pavement of the chambers, except the one observed in the stage of first cleavage, which seemed to lie in contact with the membranous wall of its chamber. The whole organism was composed of very irregular chambers, separated from each other by an apparently almost structureless membrane, probably of an ectodermal nature. The only evidence of structure here was the presence of faint, delicate striations when the edges of the walls were transversely cut across and viewed with high powers. No spicules were to be found in any situations; no fibers, as in the genus *Spongia*; but the whole supporting structure consisted, as stated before, of the structureless ectodermal membrane, which was perforated and produced at intervals into the funnel-shaped oscular organs.

The chambers in the center or axis of the cylindrical body of the organism could not certainly be made out to communicate with those next to the membranous, funnel-bearing body-wall; but these axial chambers appeared to differ in no way from the outer ones in structure. They were lined like the external chambers with cells, and, like them, contained ova in different stages of development, together with brown material, apparently dirt or remains of ingested food, which would appear to show that there was some sort of communication with the oscular funnels. Only once did I find what I believed to be an intercameral

demi-canal, paved in the same way with cells as the chambers themselves.

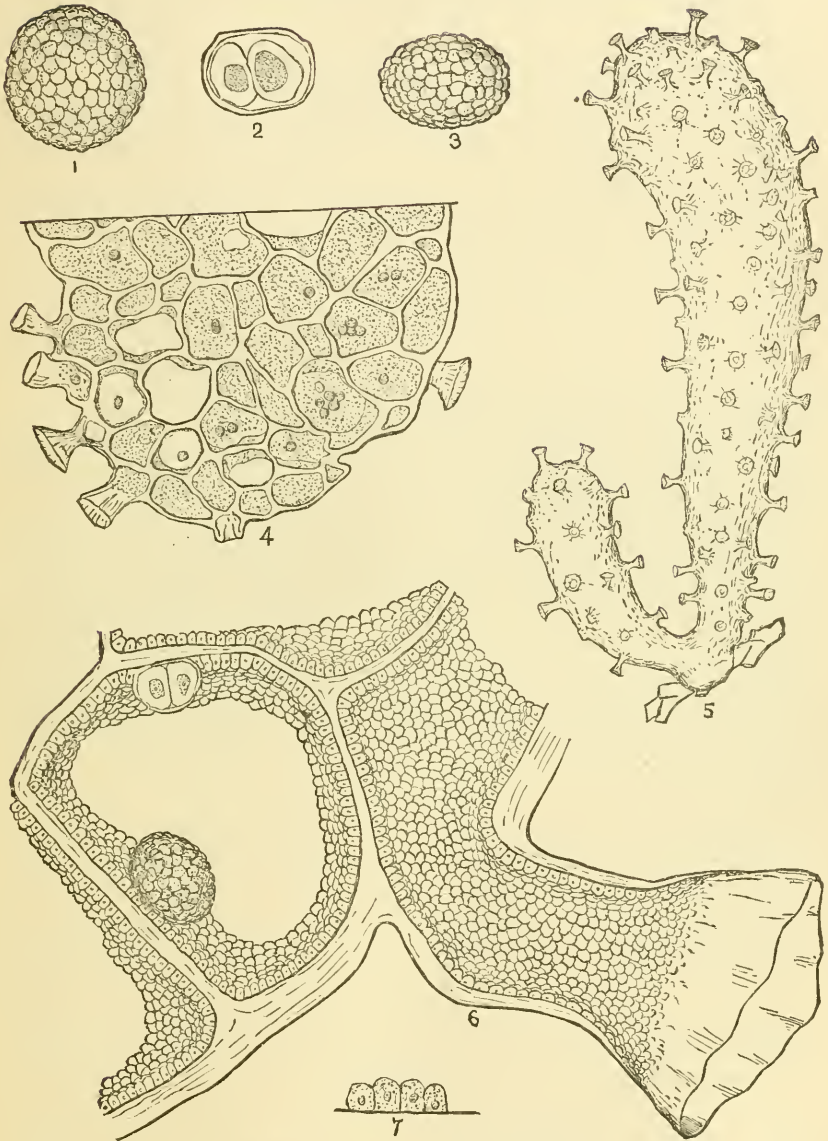
Not seeing the sponge in an absolutely fresh condition, I could not observe the action of the funnels in life; but once while the whole sponge was still in a comparatively fresh condition, and under observation in a zoophyte trough, I saw one of the inverted funnels suddenly everted and expanded to apparently its fullest extent. I was also unable to detect the slightest evidence of any other kinds of openings besides the funnels into the organism, and these were of about the same size throughout. This fact, together with others which I have stated, removes all doubt as to the sponge nature of the organism.

There is no form known to me in literature which corresponds to this in structure. *Halisarea* does not have a tough membranous ectoderm, while the *Physemaria* have an ecto-skeleton, composed of the shells of *Foraminifera*. But as the existence of the *Physemaria* has been apparently doubted by some zoologists, the position of *Camaraphysema* becomes an interesting question. At any rate it may be safely placed close to the fleshy sponges, and may possibly constitute a distinct family.

The account now offered, while it is not as complete as might be desired, rests upon sufficient evidence to make it desirable that the fullest possible description of the organism should be put upon record for the benefit of those who may have the opportunity of extending or confirming my interpretation of its anatomical and embryological features. While I could hardly convince myself at first that I did not have before me some one of those curious compound Ascidians of the suborder *Synascidiae*, the absence, however, of a common cloacal cavity and any indications of a branchial apparatus or a digestive canal satisfied me that I was not dealing with a tunicate, but that I should have to look among the very lowest of the sponges for its nearest affines.

I have stated that no collar or flagellum could be detected as forming the inner extremities of the cells lining the cavities. This fact does not, however, render it improbable that such structures exist in the living animal, as it must be borne in mind that both Bowerbank and Carter have called attention to the circumstance that the flagellate cells of sponges withdraw their collars and flagella after death. The extreme irritability of sponges is notorious, and to one who sees it for the first time would be considered remarkable, and it is not unlikely that *Camaraphysema* partakes of this characteristic, known to be well-nigh common to all the members of the group.

The exact locality from whence this species was derived could not be ascertained; all that the writer could learn was that the lot of oysters from whence he had obtained his specimen had certainly been brought from the waters of the Chesapeake. It is to be hoped that more specimens will be brought to light, as the writer in investigating his unique specimen was obliged to sacrifice it in order to make his study as complete as possible by slicing it up into sections.



CAMARAPHYSEMA OBSCURA, Ryder.

EXPLANATION OF THE FIGURE ON PRECEDING PAGE.

- FIG. 1.—Embryo in the mulberry stage of development, enlarged 250 times.
- FIG. 2.—Embryo in the condition of the first cleavage, showing the nuclei and nucleoli of its cells distinctly and an egg membrane, 250 diameters.
- FIG. 3.—Embryo in mulberry stage of more frequent ovoid form, 250 diameters.
- FIG. 4.—Part of a cross-section of the larger branch of the animal, showing the chambered character of the organism, the membranous septa, the oscular funnels in various conditions of extension, and the eggs and embryos in place; 25 diameters.
- FIG. 5.—The whole animal of *Camaraphysema obscura*, enlarged 7 times.
- FIG. 6.—A small portion of a cross-section similar to Fig. 4, showing the single layer of cells which pave the walls of the chambers, with the embryos in position in one of the latter. The stria on the cut edges of the walls of the chambers and the peculiar conformation of the oscular funnels are indicated. Enlarged 200 times.
- FIG. 7.—Four of the pavement cells lining the chambers, magnified 900 times, showing their nuclei distinctly.