137. *A Striking Case of Mimetism in Simple Ascidians.*

By Asajiro OKA, M.I.A.

Zoological Institute, Higher Normal School, Tokyo.

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Among the collection of Tunicata, made by the steamer "Albatross" in the Northwestern Pacific, in 1906, I have found three specimens of Simple Ascidians, which were almost exactly alike in external appearance, but which, on dissection, turned out to be members of three different families. As no such case seems to have been recorded hitherto, I have thought it well to give a short account of these interesting little animals.

The specimens in question were all collected at the same locality, and on the same day—Station 4903 (32°31'10" N, 128°33'20" E; depth 139 fathoms), Aug. 10, 1906—and were obviously regarded by the naturalists on board, who put them together in a small bottle, as belonging to one and the same species. I, too, at first had no doubt as to their specific identity, and, taking one of them at random, dissected it in order to examine the internal organisation. This specimen happened to be a new species of *Molgula*, and I have reported upon it in my paper on Japanese Molgulidae¹⁾, in 1914, under the name of *Molgula hartmeyeri*. Some time afterwards, desiring to ascertain the range of variation of certain internal organs, I opened one of the remaining specimens, when I discovered, to my great astonishment, that it was not a *Molgula*, but a representative of the genus *Cynthia*. This naturally induced me to dissect also the only specimen left intact, which, to my still greater astonishment, proved to be a species of the widely distributed genus *Ascidia*. As both the *Cynthia* and *Ascidia* seemed new to science, I have named them *C. snaboja* and *A. dolosa* respectively.

All the three species agree in the following points. They are subglobular in shape, slightly elongated dorso-ventrally, and somewhat

1) OKA, A. Notizen über japanische Ascidien, II. Annot. Zool. Japon. Vol. VIII. 1914.

compressed laterally, being 21 mm—18 mm in length, 18 mm—15 mm in height, and 15 mm—12 mm in thickness. The entire surface is covered with a close coating of sand and shell-fragments, so that at no point the test is visible externally. The siphons, when contracted, are either quite flat and invisible or only very slightly elevated. As is well known, the latter characters are common to many species of *Molgula*, but are quite exceptional among the families Cynthiidae and Ascidiidae, whose members are as a rule naked.

In *Molgula hartmeyeri* OKA, the test is thin and membranous, but is provided all over with long hair-like processes, to which sand-grains and shell fragments are attached. They form a compact layer, 1.2 mm—1.5 mm thick, which lies immediately upon the outer surface of the test, and form together with the latter a sort of solid shell, which does not collapse even when the animal is opened. The processes are very fine and branching, and somewhat protrude beyond the outer surface of the sandy coat; the longest measure about 3 mm.

In *Cynthia snaboja*, a species closely allied to *C. lanka* HERDMAN¹⁾, the test is also thin and membranous, but sufficiently tough. It is likewise provided all over with long hair-like processes which bear sand-grains and shell-fragments. In comparison with *Molgula hartmeyeri*, these processes are somewhat thicker and flattened and more richly branched, and the layer of sand grains, which is at least 2 mm thick, is separated from the test by a narrow empty space, about 1 mm wide, traversed only by the basal portions of the filaments. The test itself bears, between the bases of these hair-like processes, a single layer of very fine sand grains. Thus, the thickness of the outer covering of the body is considerable, so that the animal taken out of the test is comparatively very small. The filaments are specially well developed on the lower side of the body, where they apparently serve as roots, some attaining a length of 12 mm.

In *Ascidia dolosa*, lastly, which seems to come nearest to *A. granosa* SLUITER²⁾, but differs from it chiefly in the extreme delicacy of the mantle, the test is very thin, transparent, and soft, so that, when the body-wall is cut open, it is not strong enough to keep the original shape. Here the sand grains and shell fragments adhere, not to hair-like processes of the test, but directly to the test itself, being partly

1) HERDMAN, W.A. On the Tunicata. Ceylon Pearl Oyster Fisheries, Pt. V. 1906.

2) SLUITER, C.P. Die Tunicaten der Siboga-Expedition, I. Abt. Siboga-Exped. LVI, b. 1909.

imbedded in the latter. As the mantle is extremely thin and transparent, except the narrow muscle bands near the tip of the siphons, the body-wall appears almost to consist of a layer of sand and shell fragments alone. The thickness of this layer does not exceed 1 mm.

It is interesting to note that the species of *Cynthia* and *Ascidia* inhabiting the same locality, have acquired the same *Molgula*-like appearance by different means, one by the development of hair-like filaments to which sand and shell fragments are attached, and the other by cementing foreign matters directly to the outer surface of the test, both of which are rare exceptions among the members of the respective families.