

HOLOTHURIA HAWAIIENSIS, new species.

Plate LXVIII, figs. 4, 4a-g.

Size small; general form subcylindrical but flattened ventrally, well arched dorsally. Mouth directed somewhat ventrally; anus terminal. Tentacles 30, crowded, not very large. No evident circumtentacular collar. Ventral surface with not numerous, rather large pedicels more or less evidently arranged in three series. Dorsal surface with scattered papillæ, less numerous than the pedicels but of about the same size. Body wall rather thin, minutely roughened. Deposits: Tables and rather irregular buttons, with well developed and numerous supporting rods in the ambulacral appendages. Tables of two or three kinds: (1) Disk with a smooth undulating or irregular margin, with a large central hole and with eight to ten slightly smaller peripheral ones; spire made up of four rods and two or three crossbeams, the crown ending in twelve to sixteen teeth, sometimes irregular, with less. (2) Much smaller tables with usually an annular disk with a large central hole, and one at base of each spire support; sometimes with more; spire with only one crossbeam, the crown either truncate or pointed, irregular, ending in numerous teeth. Buttons accumulated in small rings or circles, or circular groups, and in larger rings about the base of ambulacral appendages; more or less irregular or sometimes slightly twisted, or one-sided, frequently fairly regular; holes vary from four to sixteen, average eight to fourteen; incomplete buttons are common. Color, ground tint light olive brown more or

less marbled on back with raw sienna (yellowish); dark brown about base of papillæ, tip of latter light. Whole body closely dotted with white (the groups of buttons). A specimen from Necker (?) has the ground color Vandyke brown and the marbling is in the form of light yellowish-brown areas about the papillæ. Some papillæ of the type have a light circle about the base instead of one of brown. Length, 45 mm.; width, about 12 mm.

Localities.—Type (Cat. No. 21212, U.S.N.M.) from Station 3876, Auau Channel, between Maui and Lanai Islands, 28 to 43 fathoms; sand, gravel (6 specimens); 3872, same locality, 43 to 32 fathoms, yellow sand, pebbles, coral (2 specimens); Necker Island (probably), (2 specimens).

The tentacles in the dredged specimens seem quite constantly 30 in number, but in a specimen from Necker there appear to be only 25. Inasmuch as they are very retracted, it is entirely possible some have escaped notice or been lost. The form of the tentacle possesses nothing unusual. The pedicels are not always obviously arranged in three rows unless fully expanded. When fully expanded, the dorsal papillæ are pointed, the terminal plate being very rudimentary.

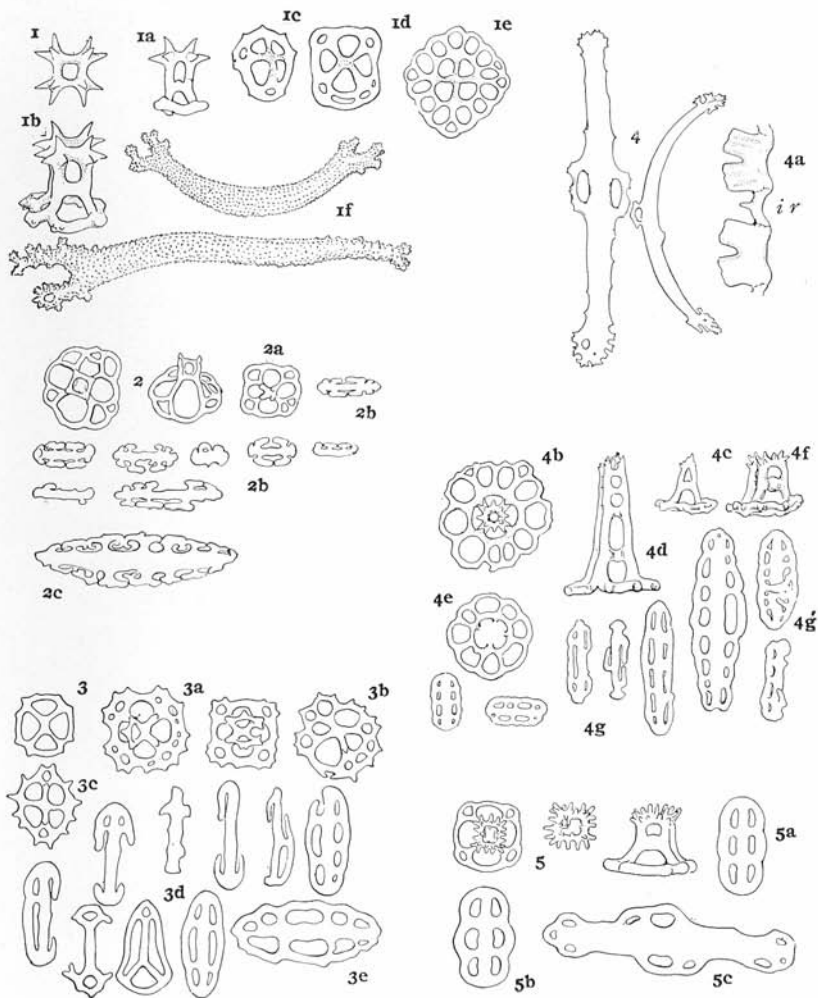
The radial pieces of the calcareous ring are more than twice as large as the interradial, but both elements are of the usual shape. Polian vesicle single, large. Madreporic canal single, free, on right side of mesentery. The gonad is well developed, showing that the specimens are adult. It consists of a thick tuft of simple strands, which are long. Cuvierian organs well developed, forming a tuft at the junction of the two branches of the respiratory tree. Left respiratory tree in connection with the retentabile of the intestine.

The tables with a tall spire are numerous. There are also many intermediates, between forms *c* and *d* (fig. 4, Plate LXVIII), individuals with two crossbeams to the spire being more common than those with three. The disks of the large tables vary in size, as may be seen by comparing *b* and *d*, 0.073 and 0.063 mm. in diameter, respectively. The tall spires commonly terminate in a small crown of as many as sixteen teeth, frequently less regular than *b*. The small tables either have a pyramidal form (*e*) or are more truncate (*f*). In either case the disk hardly ever reaches 0.06 mm. in diameter, 0.055 being the average. The pyramidal form is commonest, and the crown has eight to twelve short teeth irregularly placed. Occasionally the rim of the tables has a few very short teeth on the margin. This form occurs in the same individual on which the smooth rims are prevalent. On the whole the tables are rather variable, but the average is summed up in the diagnosis. The most characteristic feature of the buttons is their accumulation in circular groups, or fairly large rings surrounding the base of pedicels and papillæ, recalling *H. pardalis*. The buttons vary greatly in size, the ordinary extremes of length being 0.034 to about 0.12 mm., the number of holes ranging from four to sixteen, or

even more. Generally speaking, the large buttons are found about the base of the pedicels and papillæ, being usually the innermost of the group, while the small ones are found in the small intermediate groups and around the outer edge of the ambulacral rings. The majority of the buttons are of the smaller sizes, and are frequently very irregular or even incomplete, the majority having about eight perforations. In a specimen from Necker the buttons average a trifle more regular than in the Auau Channel examples, and have about eight holes, but here, too, there are a great many incomplete, contorted, and generally irregular forms. A rather prevalent variation is shown in 4g', where a loop is formed over the central shaft of the button, and odd processes grow out toward the center from the edge. The supporting rods of the pedicels and papillæ are numerous, curved, expanded slightly at the tips and in the middle, where there are one or two perforations on either side. The expanded tips are often perforated and the edge of the rods is thorny. Forms intermediate with the large buttons are sometimes present. They have a number of perforations along either side of the central shaft. In the papillæ the rods frequently are more elaborate and have branches at the middle which may or may not unite. When they do, a fenestrated plate, which, however, retains its rod-like character, is formed. In the papillæ also are many of the large tables. The end plate of the papillæ is very much reduced, but that of the pedicels is as usual well developed.

This species is characterized especially by having 30 tentacles, dorsal papillæ and ventral pedicels, two or three kinds of tables, one of which has two or three crossbeams, irregular buttons disposed in circular groups and rings. The number of tentacles and general character of the deposits, as well as the ambulacral appendages, ally this form to *H. discrepans* Semper, *H. immobilis* Semper, and *H. samoana* Ludwig. From *discrepans*, *hawaiiensis* differs in having two distinct kinds of tables, neither of which greatly resemble the figures given by Semper;^a in having the buttons not only about the ambulacral appendages, but likewise in numerous intermediate groups, and in having the buttons very variable in size and frequently irregular and large; in having differently shaped supporting rods; and, finally, in color. The calcareous ring is very characteristic and may furnish an additional difference. Neither *immobilis* nor *samoana* are any more nearly related to *hawaiiensis* than is *discrepans*.

^aHolothurien, 1868, pl. XL, fig. 7.



HOLOTHURIA.

FOR EXPLANATION OF PLATE SEE PAGE 741.

EXPLANATION OF PLATES.

(All figures were drawn by the writer.)

PLATE LXVI.

Fig. 1. *Opheodesoma spectabilis*. From a colored sketch of a medium-sized living animal. About four-fifths natural size. The present illustration does not truly reproduce the shades. The excrescences, and often a narrow transverse band between them, are much darker than the interspaces; the former are brown, the latter orange, except posteriorly on the ventral surface, which is grayish barred with darker gray, often almost black.

PLATE LXVII.

- Fig. 1. *Actinopyga mauritiana*. Rods and grains from ventral perisome, $\times 200$.
 1a-d. Rods from dorsal perisome, $\times 400$.
 2. *Actinopyga parvula*. Table viewed from above, showing crown and disk. 2a. Slightly larger table from side. 2b. Disk of table. 2c-e. Buttons. 2f. Plate and rod from dorsal papilla, $\times 200$. 2g. Calcareous ring, medio-dorsal piece without anterior tooth, $\times 3$.
 3. *Actinopyga obesa*. Rods from perisome, $\times 400$.
 4. *Holothuria paradoxa*. Several rods from dorsal perisome, $\times 200$. 4a. Same, $\times 400$. 4b. Rods from dorsal pedicels, $\times 200$. (See also Plate LXIX, fig. 5.)
 5. Same. Various forms of rods from ventral perisome, $\times 200$.

PLATE LXVIII.

- Fig. 1. *Holothuria cinerascens*. Crown of table. 1a. Smaller table from side. 1b. Larger table. 1c-1e. Various forms of disks of tables. 1f. Rough rods from general perisome. All $\times 200$.
 2. *Holothuria perricax*. Two views of table. 2a. Tables with rudimentary spire. 2b. Various forms of rods from general perisome. 2c. Larger rod intermediate between supporting rods and the small button-like rods of general perisome, $\times 200$.
 3. *Holothuria fuscorubra*. Reduced disk of table. 3a-c. Various forms of tables. 3d. Various forms of buttons. 3e. Button from near tip of pedicel, $\times 200$.
 4. *Holothuria hawaiiensis*. Supporting rods of pedicels and papillæ, $\times 200$. 4a. Two radial and 1 interradian (*ir*) piece of calcareous ring, $\times 4$. 4b. Large table from above, showing disk and crown. 4c. One type of small table. 4d. A large table from side. 4e. Disk of smaller table. 4f. Another type of small table. 4g. Various forms of buttons, some of them incomplete, $\times 200$.
 5. *Holothuria arenicola*. Table from above, the crown, and side. 5a-5b. Two forms of buttons. 5c. Supporting rod, dorsal pedicel, $\times 200$.

PLATE LXIX.

- Fig. 1. *Holothuria pardalis*. 1, 1a-d. Various forms of tables; 1b crown; 1, 1a disk from beneath. 1e. Supporting rod from pedicel. 1f. Various forms of buttons. 1g. Supporting rod from dorsal pedicel, $\times 200$.
 2. *Holothuria anatifera*. Disk of table and crown, from above. 2a. Table from side. 2b. Table from wall of papilla, viewed from one side; this type rather uncommon. 2c. A rare form of complete button. 2d. Usual form of incomplete knobbed buttons and knobbed rods, $\times 200$.