ON ECTEINASCIDIA BOMBAYENSIS N. SP.
(A NEW ASCIDIAN FROM BOMBAY.)

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1. Introduction.

The present contribution is the first of a series in which the author desires to add to the existing knowledge of the ascidian fauna of the Indian coasts. Except for Herdman's work in 1906, which deals with the fauna of the Gulf of Manaar, little systematic work on ascidians has been done in India. Ascidians are animals difficult to obtain and yet more difficult to preserve in an extended condition. The external form, shape and colouration of
preserved specimens are often misleading. The author has, therefore, laid more stress on internal characters as criteria for specific distinction.

The material was received in a preserved condition from the Royal Institute of Science, Bombay. The labels show that it was collected at Okha Port (Bombay) in 1926; but nothing is mentioned about the time of collection and the zone from which the material was collected. Three colonies of *Ecteinascidia* were received, one of which was quite well preserved, the other two being very much shrunk and ill-preserved.

My acknowledgements are due to Prof. P. R. Awati of Bombay for sending me the material, and to Prof. N. J. Berrill of Montreal for sending me his paper on *Ecteinascidia*. To Prof. K. N. Bahl of Lucknow I am indebted for giving me the necessary facilities for work and for kindly reading through the manuscript.

2. *External Characters.*

The colony consists of ten to twelve individuals, each being attached by a short thin peduncle (Plate XV) to a basal stolon network. The stolon is not constricted but forms an anastomosed pattern (Fig. 3). Each individual is cylindrical, wider at the free end than at the middle or the fixed end (Figs. 1 and 2). The size varies slightly from one individual to another. The maximum size measured was 23 mm. and the minimum 18 mm., while the maximum thickness of an individual was 7 mm. The colour of the preserved specimens is dirty white, but this is certainly due to

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**Fig. 1.—Mature individual of *Ecteinascidia bombayensis* from the left side (*× 4*).**

**Fig. 2.—Mature individual, from the right side (*× 4*).**

**Fig. 3.—Stolon (*× 4*).**
On Ecteinascidia bombayensis N. Sp.

the effect of the preservative. There is no differentiation of the body into thorax and abdomen. The branchial and atrial siphons are of moderate size, the branchial being a little larger than the atrial. The apertures are comparatively far apart, each being bounded by five lobes of the test.

3. The Test.

The test is thin and almost transparent allowing almost all the internal organs to be seen through it. There are no blood-vessels in the test but quite a large number of large bladder-cells are present.

4. Internal Organs.

(a) Mantle.—The mantle is thin and translucent and covers all the organs in the body. There are a large number of transverse anastomosing muscle-fibres arranged transversely in annular bands around the body. These muscles are present throughout the body but are weak at the posterior end of the animal and are totally absent over the intestine and the endostyle.

(b) Branchial Sac.—The branchial sac occupies nearly the whole length of the individual except the stalk through which the "epicardiac tube" passes. The transverse vessels are narrow and are all alike. The internal longitudinal bars are much narrower than the transverse vessels and are supported by wide cylindrical connecting ducts at the place of their junction with the transverse vessels (Figs. 7 and 8). There are no papillae, unless

![Diagram](image)

Fig. 4.—Side view of stomach and part of intestine (× 20).
Fig. 5.—Tentacles (× 40).

the projections beyond the internal longitudinal bars are considered as such. The stigmata are longitudinal in axis and regularly arranged, 3—4 to a mesh. There are about 40 stigmata in a single row.

(c) Tentacles.—The tentacles are all simple and are in three alternating sizes (Fig. 5). They are about 64 in number, the ventral ones being the longest. The tips of the tentacles are slightly swollen and appear transparent even when stained.

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(d) *Dorsal Lamina.*—The dorsal lamina is in the form of a thin flap with wavy ridges on it and is provided with short triangular languets connected at their bases by a narrow membrane (Fig. 6). Two or three of the posteriormost languets are free and elongated.

(e) *Dorsal Tubercle.*—A small and simple rounded opening with raised walls represents the dorsal tubercle.

(f) *Alimentary Canal.*—The viscera project slightly beyond the pharynx at the posterior end of the animal. The stomach, placed almost at the posterior end of the animal, is a pear-shaped sac. It has slight longitudinal folds (Fig. 4) on its walls. The intestine is narrow and there is a moderate constriction between the stomach and the intestine. The intestinal loop is formed on the left side of the branchial sac. The rectal aperture is bounded by two large thick lips.

(g) *Heart.*—The heart is a thin-walled tube of sufficiently large diameter, bent like a crescent and situated on the right side of the body (Fig. 2).

(h) *Gonads.*—The gonads are present in the loop of the intestine, the testis-lobes being arranged in the form of a crescent around the centrally placed ovary. The testis-lobes consist as usual of a large number of testicular follicles (Fig. 9). The ovary is comparatively small consisting of ova
of different ages. The vas deferens is formed by the junction of four or five spermatic tubes. It runs for some distance alongside the comparatively short and thick oviduct and opens alongside the rectum into the atrial cavity.

5. Development.

Development is internal and takes place first in the oviduct and then in the atrial cavity which acts as a brood-pouch. Segmentation of the egg begins in the oviduct and when discharged into the atrial cavity it is already highly segmented. As development proceeds further the embryo passes towards the atrial aperture and more embryos take its place. Thus, a progressive series of developing embryos may be seen lying between the oviducal aperture and the base of the atrial siphon (Fig. 2), where the embryo is in the tadpole stage. Eight to ten embryos may be observed at a time in the same individual.


Body elongated with a short peduncle, but not divided into thorax and abdomen; Test thin and membranous, containing no blood-vessels; Mantle thin, musculature consisting of transverse bands; Branchial sac with internal longitudinal bars but no papillae; Dorsal lamina represented by a series of tentacular languets, some being connected at their bases by a narrow membrane. Tentacles simple; Viscera on the left side of the branchial sac; Gonads placed in the intestinal loop the spermatic vesicles forming a crescentic curve around the centrally situated ovary.

7. Specific Characters.

The individuals are large and their number in one colony is about twelve. Both the branchial and atrial apertures are five-lobed; the tentacles are in three lengths and number about 64; the languets in the posterior region of the dorsal lamina are conical long and free, while in the anterior region they are short and triangular and joined by a membrane. There are about 40 stigmata in a row and the internal longitudinal bars are supported by cylindrical ducts that connect them with the transverse vessels. There is a swelling on the top of each junction of the internal longitudinal bars with the transverse vessels, and this on first sight appears to be a papilla (Fig. 8). True papillae are, however, absent. The stomach, which is usually plain in Ecteinascidia, has light longitudinal folds in the present species.

8. Remarks.

The genus Ecteinascidia was established by Herdman in 1880. In 1891 Herdman himself described four species of the genus, viz., E. diaphanis, E. moorei, E. turbinata and E. thurstoni. To this list nine more species have been added, viz., E. garstangi, E. euphues, E. psammodes, E. nexa, E. multicalathara,
E. sluiteri, E. diligens, E. solida and E. conklini. The present species E. bombayensis n. sp. resembles E. solida in its size and in its connecting ducts of the internal longitudinal bars; while its thin and transparent test, and slight folds on the wall of the stomach, brings the species close to E. sluiteri. It has 3 to 4 stigmata and about 60 tentacles in common with E. thurstoni.

Ecteinascidia appears to be a tropical type of ascidian structure, occurring so far as we know at present, only between Bermuda to the north and the north coast of Australia to the south; and having its main development in the eastern seas. Out of the fourteen known species ten occur in the Indian Ocean and Malayan seas. Of these again E. sluiteri, E. thurstoni and E. solida are known from Ceylon; while E. bombayensis, procured from Bombay, should be common on the West Coast of India.


The author describes a new species of Ecteinascidia (fam. Clavelinidae) collected from Bombay. The present species can be distinguished from other existing species by the following characters: the siphonal apertures are 5-lobed; tentacles are of three lengths and about 64 in number; the posterior dorsal languets are long conical and distinct; the transverse muscles completely encircle the pharynx; the internal longitudinal bars have projections comparable to papillae; the stomach has folds in its walls.

Ten to twelve individuals form a colony, each individual being attached by a peduncle to a basal stolon network. Development is internal, the atrial cavity acting as a brood-pouch, and the young are discharged into the sea as fully developed tadpoles.

LETTERING OF ILLUSTRATIONS.

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LITERATURE CITED.
