ON A COLLECTION OF ECHIUROIDS OF THE GENUS *THALASSEMA* LAMARCK IN THE INDIAN MUSEUM, CALCUTTA.

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(Plate I)

Within recent years the Indian Museum has received very valuable collections from the Sandheads, off the mouth of the River Hooghly, made by the members of the Bengal Pilot Service from time to time. In two of these collections were included three specimens of a very interesting species of the genus *Thalassema* Lamarck. This species, though allied in the development of gills on the proboscis to the peculiarly modified group of estuarine species [1] of the genus found in eastern waters, is new to science, and is described in this paper under the name *Thalassema arkati*,[2] sp. nov. A specimen received some years back from Dr. H. H. Marshall from the estuarine waters of the Irrawady, from off Rangoon, cannot also be assigned to any of the previously known species, and is described under the name *Thalassema marshalli*, sp. nov.

The opportunity has also been taken to report on a large series of specimens of the genus collected round the Andamans and Nicobars by the Surgeon-Naturalists to the Marine Survey of India during the years 1921-26, and a few specimens collected by Dr. S. W. Kemp at Port Blair in 1921.

Thalassema caudex Lampert.

1883. *Thalassema caudex*, Lampert, *Zeitschr. Wiss. Zool.* XXXIX, p. 340.
1898. *Thalassema caudex*, Shipley, *Proc. Zool. Soc. London*, p. 472, pl. xxxvii, fig. 11.
1899. *Thalassema caudex* Shipley, *Willey's Zool. Results*, p. 346.
1913. *Thalassema caudex*, Wharton, *Philippine Journ. Sci.* VIII, pp. 262, 263.

The description of *T. caudex* was based on specimens from the Red Sea in the Wurzburg Museum; Lampert also referred some specimens from the Indian Ocean in the Berlin Museum to this species. Shipley identified as *T. caudex* specimens collected by Professor J. Stanley Gardiner at Rotuma.

The species is represented in the collection before me from the following localities:

1. Reef on Aberdeen, north of Jetty at South Point, Port Blair, Andamans. S. W. Kemp. 18.ii.21 — 1 specimen.
2. East Coast of Camorta Island, Nicobars (St. 616). R. B. S. Sewell. 2.x.22 — 1 specimen.

[1] For a detailed account of the species reference may be made to Prashad, B., *Mem. Asiat. Soc. Bengal*, VI, pp. 323-338, pl. xi (1919); also see *id.*, *Rec. Ind. Mus.*, XVI, pp. 399-402 (1919).

[2] For the derivation of the specific name *arkati*, see Kemp, S., *Rec. Ind. Mus.* XXV, p. 405 (1923).

3. Camorta Island, west of Jetty, Nicobars (St. 619). R. B. S. Sewell. 13.xii.21 — 1 specimen.
4. Macpherson Straits, Andamans (St. 657). R. B. S. Sewell. 29.i.24 — 2 specimens.
5. East Bay, Kachal, Nicobars (St. 673). R. B. S. Sewell. 9.iii.25 — 3 specimens.
6. Nankauri Harbour, Nicobars (St. 710). R. W. G. Hingston. 11.ii.26 — 1 specimen.

I give below a detailed description of the three well preserved specimens from the reef on Aberdeen, Port Blair. They were found under a stone close to the highwater mark, and in the Station Book their colour is described by Dr. Kemp as follows: "Proboscis pale yellow, finely mottled with bright apple green which becomes most intense on the lateral margins. Anterior two-thirds or more of body pale grey, broadly striped longitudinally with deep red. Tubercles at distal end of body white, showing when this portion of the animal is expanded as white spots on a dull red ground." Preserved in spirit the animals appear pale yellow with the regions of the muscle bands slightly darker.

Measurements (in millimetres).

Total length	73	59	48
Maximum width	19	18·5	16·5
Length of proboscis	18·5	19	18

Seen with the naked eye the surface shows small, rounded papillae on the anterior third or a little more of the body, and prominent, rounded to ovoid papillae on the posterior third. Under a binocular microscope the papillae are found to be present all over the surface, but they are more minute in the middle region of the body. There are 18-19 longitudinal muscle bands separated by narrow intervals, more marked in the middle region of the body. Three pairs of segmental organs with the lateral margins of their funnels produced into long, spirally coiled lobes were found in all the three specimens; the anteriormost of the three pairs lies in front of the setae. The anal vesicles vary in length, but generally do not exceed half the length of the animal; they are provided with brownish funnels.

The specimens from the other localities agree in general with the Port Blair specimens described above, and I have no doubt that they are all *T caudex* Lampert. The proportion of the length of the proboscis to the entire length, which Wharton describes as $\frac{1}{3}$, is variable, differing according to the state of preservation of the material. The two ventral margins of the proboscis form near its base a short, closed tube, but are quite separate from one another throughout the remainder of its length.

In general appearance *T caudex* resembles *T kempi* Prashad,[1] but the latter species, as I have confirmed by a re-examination of the type and the specimen recorded below, has *four* and not *three* pairs of segmental organs. My description of this species, however, needs correction in that the anterior two pairs of segmental organs are situated in front of the setae.

[1] Prashad, B., *Mem. Asiat. Soc. Bengal*, VI, pp. 336, 337 (1919).

Thalassema kempi Prashad.

1919. *Thalassema kempi*, Prashad, *Mem. Asiat. Soc. Bengal*, VI, p. 336, fig. 2.

A single specimen of this interesting species was collected by Lt.-Col. R. B. S. Sewell in the east end of Macpherson Straits, Andamans (St. 657) on 29th January, 1924.

This specimen has a total length of 60 mm. with a maximum width of 20 mm.; the proboscis is 19 mm. long. The specimen preserved in spirit is of a dirty yellowish colour, and 20 longitudinal muscle bands can be easily distinguished. On dissection it was found that this specimen like the type of *T kempi* has four pairs of elongate segmental organs.

Thalassema diaphanes Sluiter.

1888. *Thalassema diaphanes*, Sluiter, *Natuurk. Tidschr. Nederl. Ind.* XLVIII, p. 244, pl. iii, figs. 1-7.
1899. *Thalassema diaphanes*, Shipley, *Willey's Zool. Results*, p. 366.
1902. *Thalassema diaphanes*, Shipley, *Faun. Geog. Maldive & Laccadive Archipel.* I, p. 128, pl. vi, fig. 2.
1913. *Thalassema diaphanes*, Wharton, *Philippine Journ. Sci.* VIII, pp. 262, 263.

T diaphanes has previously been recorded from the Bay of Batavia; Pigion Island, New Britain; Hulule, Maldives; and Minikoi, Laccadive Islands.

The single specimen from a small bay on the north side of the east end of Macpherson Straits—near Chiryatapu; Andamans (St. 657), collected by Lt.-Col. R. B. S. Sewell on 20th January, 1924, from a sandy and rocky bed, undoubtedly belongs to this species.

The specimen is 48 mm. long, while the proboscis is 38 mm. long. The proboscis forms a closed tube near its junction with the body on the ventral surface, the closed part being less than $\frac{1}{4}$ of a millimetre long. In the description of the species Sluiter remarked "Der Russel ist an der basis röhrenförmig geschlossen"; this is not shown clearly either in Sluiter's figure or in that of the living animal by Dr. C. Forster Cooper from the Maldives. The skin is very thin and diaphanous. The skin papillae, though minute in the anterior third of the animal, can be readily distinguished even under a low magnification; round the anal opening they are comparatively large and more rounded. There is only a single pair of segmental organs, which are short and without the spirally coiled lobes of the lateral margins of the funnels. The anal vesicles are short, and closely resemble those figured by Sluiter.

Thalassema arkati, sp. nov.

The body, as shown in Pl. I, fig. 1, is elongate-ovoid with the anterior third narrower and almost cylindrical. The anal opening is surrounded by a number of elongate papillae, which form a sort of fringe round it (Pl. I, fig. 4). About a quarter of an inch distant from the anus is a ring-shaped thickening of the integument, which seems to serve as an anchoring device for the animal. The proboscis (Pl. I, fig. 2) is short and stumpy, about $\frac{1}{3}$-$\frac{1}{4}$ of the total length; its ventral margins are free to the base, and the free margins to a little behind the

tip are cut up or produced into short, variously branched gill-like processes (Pl. I, fig. 4). The colour of the animals in spirit is creamy to yellowish. The surface of the body, including the proboscis, is covered by minute, rounded to ovoidal papillae; in the middle region of the body the papillae are very minute or even absent, while in the posterior region next to the annular thickening mentioned above, the papillae are transversely elongated, ovoid; no papillae can be distinguished in the region below the annular thickening. Two golden yellow or darkish hook-like setae are present in the usual situation on the ventral side. The longitudinal musculature consists of 8 distinct bundles separated by broad interspaces. There are two segmental organs on either side opening behind the level of the setae. The segmental organs are very long, tubular structures, being only slightly shorter in length than the body of the animal, and the lateral margins of their funnels are produced into spirally coiled lobes. The anal vesicles are of a light yellowish colour, very thin and about $\frac{1}{3}$ the length of the animal.

Measurements (in millimetres).

	Holotype.	Paratypes.	
Total length	47	44	28
Maximum width	21	18	12
Length of proboscis	11	11	8

Holotype No. W. $\frac{3168}{1}$ in the collection of the Zoological Survey of India (Indian Museum), Calcutta; *Paratypes* No. W. $\frac{3176}{1}$.

Distribution. Two specimens were collected by Captain C. Park of the Bengal Pilot Service at Sandheads in June, July, 1927, while one specimen was collected by the officers of the S. P. V. "Lady Fraser" in January 1934.

Remarks. The species differs from all marine species of the genus in bearing gill-like prolongations along the free ventral margins of the proboscis and an annular thickening round the anus. From the group of estuarine species of the genus which have gills on the proboscis, it is easily distinguished by its longitudinal musculature, which is broken up into distinct bundles.

Thalassema marshalli, sp. nov.

T. marshalli is a species of small size, rounded anteriorly and narrowing down to almost a point posteriorly (Pl. I, fig. 5); its total length being 25 mm. and the maximum width 8 mm. The proboscis is 5·8 mm. long and its free ventral margins provided with greatly branched gill-like structures (Pl. I, figs. 6, 7). The colour of the single, rather badly preserved specimen in spirit is bluish yellow. The surface of the body is covered over by minute, rounded papillae; these are very minute or absent in the middle region of the body, and are more prominent in the posterior third. The longitudinal musculature is continuous. On dissection only two pairs of minute, finger-shaped segmental organs were seen behind the level of the prominent, hook-like ventral

setae. The alimentary canal in the unique holotype was badly damaged, while the body cavity was full of a bluish mud, and it is, therefore, not possible to describe the form of the anal vesicles.

Holotype No. W. $\frac{3166}{1}$ in the collection of the Zoological Survey of India (Indian Museum), Calcutta.

Distribution. The unique holotype was collected by Dr. H. H. Marshall in the estuarine waters of the Irrawady, near Rangoon, Burma.

Remarks. The species is allied to *T. branchiorhynchus* Annandale & Kemp[1], but the form of the body and the proboscis are distinctive, while the gill-structure is quite different in the two species.

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[1] Annandale, N. & Kemp, S., *Mem. Ind. Mus.* V, p. 61, fig. 2 (1915).