

NOTES ON THE BIONOMICS OF *TROCHUS NILOTICUS* LINN.

I.—ON A NEW SPECIES OF *SPIROGLYPHUS* (VERMETIDAE) FROM THE ANDAMANS.

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(Plate X.)

In the course of detailed investigations by one of us (H. S. R.) on the biology of *Trochus niloticus* Linn. in the Andaman waters a large number of shells of a Vermetid was found embedded in calcareous algal growths covering the apical and middle regions of the shells of *Trochus niloticus* Linn. and *Trochus pyramis* Born. On a casual examination, the Vermetid colonies resemble those of a Serpulid worm (Pl. X, fig. 1). They are of a yellowish to a purplish brown colour, and project, in some cases, above the surface of the white calcareous deposits. The shells are often deeply embedded in the periostracal layer of the *Trochus* (Pl. X, fig. 3). We have succeeded in isolating a few of the adult as well as the young shells of this Vermetid, and have studied the external features of the animal and the radula. The species undoubtedly belongs to the sub-genus *Spiroglyphus*, but does not agree with the description of any known species. It is, therefore, described here as *Vermetus (Spiroglyphus) andamanicus*, sp. nov.

As previous authors such as Tryon¹ and Schepman² have remarked, the Vermetidae are "the most disagreeable amongst Gastropods to deal with; the extreme variability in the majority of the species and the often vague descriptions, render it impossible in many cases to make safe identifications" Mörch's descriptions of the species which are quoted in the monographs of Tryon (*op. cit.*) and Clessin³ are too brief to be of any value, and as most of the species are not illustrated it is difficult to identify them with certainty from the descriptions alone.

The exact limits of the generic and subgeneric divisions of the family are still very confused, and as we have not the requisite material for a revision of the group we have followed Thiele's⁴ recent summary in his valuable "Handbuch"

Genus *Vermetus* Daudin.

In view of Adanson's work being pre-Linnaean we have adopted Daudin, who was the first to employ the generic name *Vermetus* in a true binomial sense, as the author of the genus.

¹ Tryon, G. W.—*Man. Conch.*, VIII, p. 164 (1886).

² Schepman, M. M.—"Siboga" *Expedite*, XLIX. The Prosobranchia, Pulmonata and Opisthobranchia Tectibranchia, p. 183 (1909).

³ Clessin, S.—Vermetidae in *Martini-Chemnitz, Conch. Cab.*, (N. F.) VI (6), pp. 1-24, pls. i-xii (1901); pp. 25-80, pl. xiii (1902); pp. 81-104 (1903); pls. xiv, xv (1904); pp. 105-124 (1912).

⁴ Thiele, J.—*Handbuch Syst. Weichtierkunde*, I, p. 186 (1929).

Sub-genus **Spiroglyphus** Daudin.

1800. *Spiroglyphus*, Daudin, *Receuil Moll.*, p. 39.
 1861. *Spiroglyphus*, Mörch, *Proc. Zool. Soc. London*, p. 326.
 1886. *Spiroglyphus*, Tryon, *Man. Conch.*, VIII, p. 166.
 1912. *Spiroglyphus*, Clessin in *Martini-Chemnitz's Conch. Cab.* (N. F.), VI (6), *Vermetidae*, p. 108.
 1929. *Spiroglyphus*, Thiele, *Handbuch Syst. Weichtierkunde*, I, p. 186.

The definitions of the sub-genus *Spiroglyphus* by Mörch, Tryon, and Thiele are very general, and consequently the precise limits of the sub-genus are obscure. The authors mentioned describe the shell of *Spiroglyphus* as being attached to stones or shells in which, according to Tryon, it may excavate a groove which is covered over "with shelly material and thus forming a tubular planorbiform case" Mörch and Tryon describe the operculum as large, thick, convex exteriorly and plane interiorly, while Thiele only describes it as concentric.

So far as the form of the shells before us is concerned, the species can safely be assigned a place in the genus, with the definitions of which it is in accord. Although the operculum of our specimens differs in some respects from that of other species of the genus studied by Mörch and Tryon, we have provisionally assigned our species to the sub-genus *Spiroglyphus*. The differences in the description of the operculum may possibly be due to errors of observation on the part of the earlier authors.

The young shells of the Andaman species agree in some features with those of the sub-genus *Segmentella* Thiele, particularly in that of the earlier whorls being attached to the surface of *Trochus*, but the aperture of the free vertical portion of the shell is not expanded as in *Vermetus* (*Segmentella*) *agulhasensis* Thiele¹.

Vermetus (Spiroglyphus) andamanicus, sp. nov.

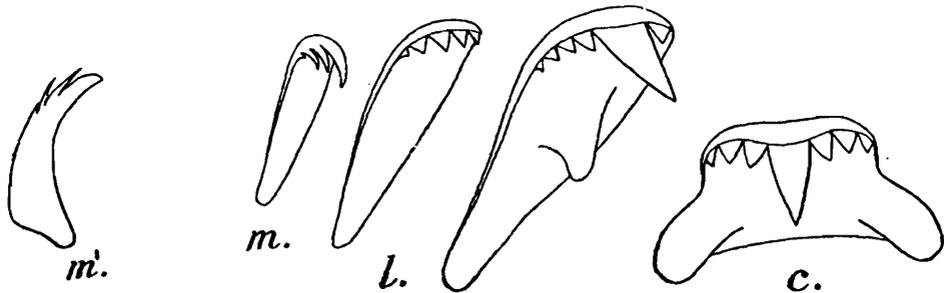
The shell is elongated, irregularly coiled or planorbiform, 5.5 to 6 mm. long from the base of the coiled apical portion to the mouth when elongated or irregularly coiled, 3 mm. in maximum diameter when planorbiform. The mouth of the shell is often more or less distinct from the rest of the shell, somewhat narrowed, thinner, less opaque, irregularly oval to rounded, and 1 mm. in diameter. The shell is not fragile, and is less than 0.5 mm. thick in the thickest part. In the young shell the apical portion is conical, and lies in a transverse plane, and consists of 3-3½ whorls, the first of which is broadly rounded. A portion of the last whorl is raised vertically above the basal axis of the shell, and has a more or less rounded aperture. In the adult shell the conical portion is hardly evident, but when the animal is removed from the shell the apical spiral portion of the soft parts shows the nature of the earlier whorls of the shell. The outer surface of the adult shell has a corrugated appearance due to the irregularly transverse ridges, and bears a number of growth lines which appear to divide the shell into several chambers. There is often a median longitudinal ridge along the whole length of the upper surface of the shell which is, therefore, triangular in cross-section where the ridge is prominent. In the young shell the transverse ridges are minute and more or less regularly spaced

¹ Thiele, J.—*Valdivia Exped.*, VIII, *Gastropoden*, p. 110 (76), pl. xx (viii), fig. 17 (1925).

so that they give the last whorl a chambered appearance. On the second and third whorls of the young shell, however, there are 4-5 spiral striae parallel to and above the suture, but the transition between the spiral striae and the ridges on the last whorl is very abrupt. The inner surface of the adult as well as the young shell is smooth, and in the adult shining, with the nacreous layer well-formed all over the shell. The colour of the shell is a dull yellowish to purplish brown in the adult, and a deep-amber or brown in the young. The shell is rather opaque in the adult owing to the thickness, but translucent in the young.

The operculum is thin, semi-translucent, rounded, and fits exactly into the mouth of the aperture. It is concave in the centre of the outer surface, slightly raised near the periphery of the concavity and slopes down abruptly to a narrow membranous strip near the edge. On the inner surface the central portion of the operculum is raised into a broad boss which has a narrow canal at its base and the narrow membranous strip of the edge outside the canal. Very fine oblique striae are present in the canal, and the boss is covered with minute granules of various sizes. The muscles of the foot are attached to the boss on the inner surface.

The radular teeth (Text-fig. 1) closely resemble those figured by Troschel for *Vermetus* sp. (*Gebiss der Schnecken*, Pl. xiii, figs. 1 and 3,



TEXT-FIG. 1.—Radular teeth of *Vermetus* (*Spiroglyphus*) *andamanicus* sp., nov.
c. central, l. laterals, m. marginal *in situ*, m'. the same slightly tilted to the left.

1861) but differ in the marginal having three teeth instead of two, the inner comparatively large and the two outer ones small, with a minute denticle at the base of the outer of the two small teeth.

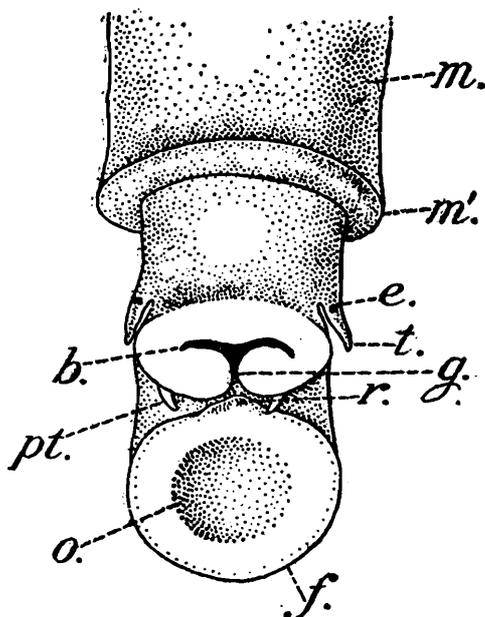
The pedal filaments, foot-tentacles, or anti-buccal appendages of authors are present in our preserved specimens in a much contracted state (Text-fig. 2) in a deep cleft between the head and the foot. A full view of these can be obtained only when the head and the foot are held apart. They lie parallel to the long axis of the body and closely adpressed to the upper surface of the foot. Hedley¹ regards these filaments "as the relic of a degenerated propodium", and suggests that "the process of evolution perhaps continued in the direction of utilising the appendices of the propodium as tentacles" Lacaze-Duthiers² regards them as tactile organs, while Boettger³ suggests that they may act as sense-organs for the perception of water-currents. The margin

¹ Hedley, C.—*Mem. Austral. Mus.*, III, p. 427 (1899).

² Lacaze-Duthiers, H.—*Ann. sci. Nat.*, XIII, pl. 5, figs. 1 & 2, pl. 6 (1860).

³ Boettger, C. R.—*Biol. Zentralbl.*, L, p. 597 (1930).

of the upper surface of the foot where the operculum is attached has a fleshy tubercle which fits into the groove on the underside of the mouth.



TEXT-FIG. 2.—Front view of the head and foot of *Vermetus (Spiroglyphus) andamanicus* sp. nov. (from a preserved specimen).

b. mouth, *e.* eyes, *f.* foot, *g.* groove under the mouth, *m.* mantle, *m'.* thickened edge of mantle, *o.* opercular scar on the foot, *pt.* pedal filaments or foot-tentacles, *r.* protuberance on the foot which fits into the groove on the underside of the head, *t.* tentacle.

The eyes are represented by two dark pigment spots, one on either side of the outer base of the tentacle.

Holotype.—M $\frac{14302}{2}$ on the shell of *Trochus niloticus* in the collection of the Zoological Survey of India, Indian Museum, Calcutta. The young shells are from scrapings of calcareous deposits on *Trochus niloticus*.

Habitat.—Common in Andaman waters on the shells of *Trochus niloticus* and *Trochus pyramis*. The Vermetid often leaves deep depressions on the periostracal layer (Pl. x, fig. 3), thus detracting from the commercial value of *Trochus*.

Remarks.—*Vermetus (Spiroglyphus) andamanicus* does not agree with any of the species described by Mörch or by later authors, though there is some reason to believe that it may be var. *immersa* Mörch of *Spiroglyphus spiruliformis* De Serres described from Tranquebar as occurring on *Polydonta granularis* Bolten. Unfortunately Mörch does not give any detailed description beyond stating that the shell is deeply immersed with whorls plane, and the lines of growth arcuate, and minutely raised. This description is, however, inadequate to help in identifying the variety referred to above. Chemnitz's figure (*Conch. Cab.*, IX, Pl. cxvi, fig. 999) cited by Mörch and reproduced in Tryon¹, is too poor to be of any use in the identification of this species.

¹ Tryon, G. W.—*Op. cit.*, pl. 51, fig. 49 (1886).