

II. MATERIALS FOR A GENERIC REVISION OF THE FRESHWATER GASTROPOD MOLLUSCS OF THE INDIAN EMPIRE.

NO. 4. THE INDIAN AMPULLARIIDAE.

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The Indian species of this family present great difficulties to the systematist. A large number of species have been described, but between many of them annectant forms occur and some of them exhibit considerable individual variability. Hitherto all have been placed in a single genus, which has been variously called *Ampullaria*, *Pila* and *Pachylabra*, but recently one of us has expressed the belief¹ that Reeve's *Ampullaria nux* was probably worthy of generic distinction. Unfortunately very little is yet known of the anatomy of this species, but both the shell-characters and those of the radula certainly offer conspicuous differences from those of Swainson's *Ampullaria globosa* (the type-species of both *Pila*, Bolten and *Pachylabra*, Swainson) and its allies. Indeed the only difficulty in the way of granting generic rank to *A nux* lay in the existence of the form referred to by Nevill² as "*Ampullaria nux*, var. (? n. sp.)" As we have been able to examine the radula of this form and find that it belongs to the normal *Pachylabra*-type, while that of *A nux* shows distinct differences, we now feel justified in regarding the latter as the genotype of a new genus, for which we propose the name *Turbini-cola* in reference to its habits. We describe this genus here and also the apparently intermediate form, which we regard as an undescribed species, calling it after Nevill, *Pachylabra nevilliana*.

Genus *Pachylabra*, Swainson.

The shell is dextral,³ large or very large, moderately thick, with a short globose spire and itself subspherical or broadly but irregularly ovoid. Its mouth is large but not greatly expanded; with a complete or almost complete but not very prominent peristome, and with the outer lip as a rule slightly thickened. The columellar callus is never expanded or incrassate. The sculpture

¹ Annandale, *Journ. Nat. Hist. Soc. Siam* IV, p. 2 (1920).

² Nevill, *Hand List Moll. Ind. Mus.* II, p. 4 (1885).

³ Abnormal sinistral shells occur very rarely.

is never prominent and the surface of the shell always has a smooth appearance. The periostracum is of some olivaceous tint, often with dark spiral bands. The interior of the shell is pale but still more frequently with dark spiral bands.

The *operculum* is thick and testaceous with an outer horny layer, more or less flame-shaped in outline. It exhibits no trace of spiral sculpture, but bears on the internal surface a large elongate sculptured scar. Its nacre is polished but not iridescent.

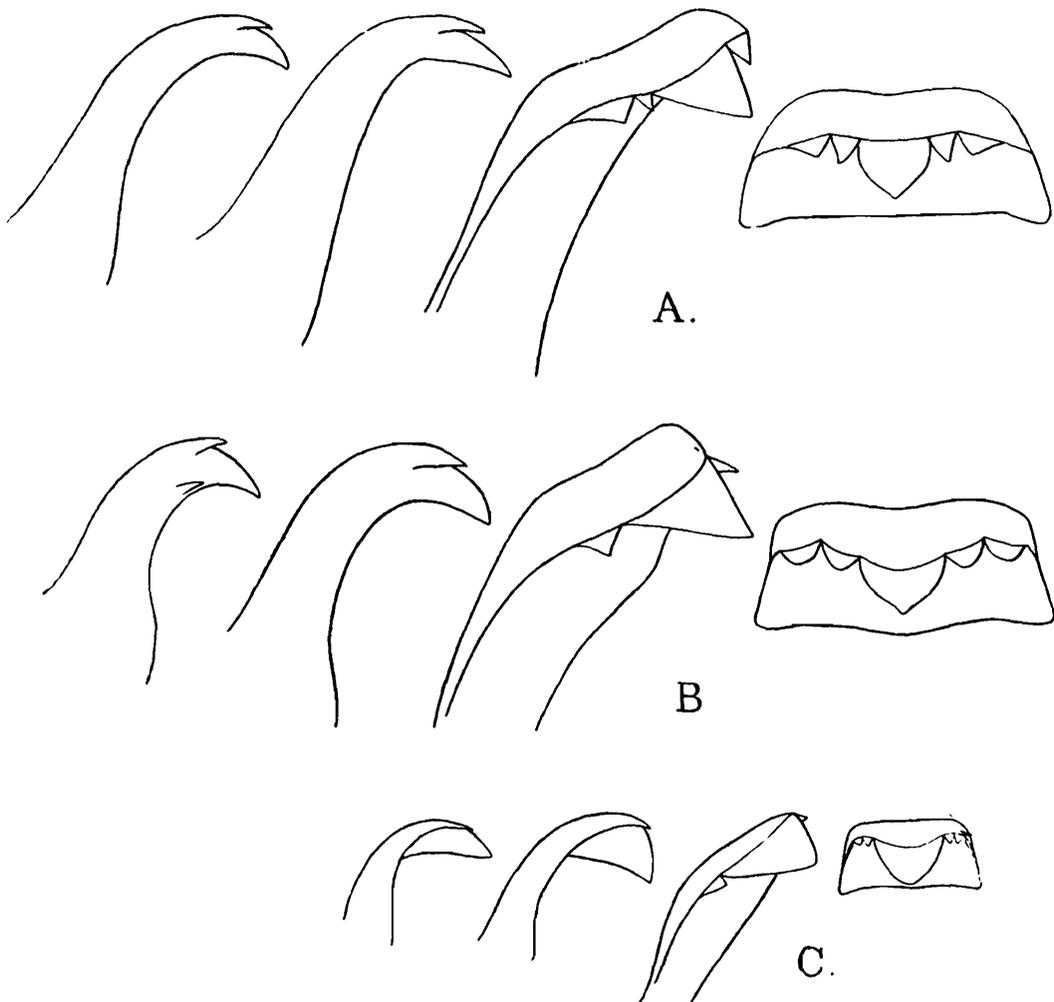


FIG. 1.—Radular teeth of Ampullaridae, $\times 50$.

- A. *Pachylabra globosa*.
- B. *Pachylabra nevilliana*.
- C. *Turbinicola nux*.

The *radula*.—Owing to the poor figures published by Troschel¹ and Fischer² great confusion has been caused as to the exact structure of the radular teeth of *Pachylabra*. One of us has recently (*loc. cit.*) figured the radular teeth of some of the Siamese species. We now figure those of *P. globosa*, the type-species of the genus. Without giving a detailed description we may note that the marginal teeth have three denticulations, of these the middle one is the largest and best developed and is always sharply pointed,

¹ Troschel, *Gebiss der Schnecken*, I, p. 88, pl. vi, fig. 5 (1856—1863).

² Fischer, *Man. Conchyliol.* p. 736, fig. 505 (1887).

while the outer one is usually much reduced and may even be absent. The lateral teeth have five cusps, of these the third or central one is the largest and the innermost cusp is very much reduced.

Soft parts.—The right epipodial lobe is prominent and well developed. The inhalent siphon, which is formed by the left epipodial lobe, has, when contracted, the form of a prominent fold, forming part of a circle, but with its extremities widely separated. When expanded it is funnel-shaped and much broader than long.

Type-species.—*Ampullaria globosa*, Swainson.

Geographical Range and Habitat.—The genus is found all over the Oriental Region except in mountainous country. No recent species are known from the Punjab, but sub-fossil remains have been found in the Salt Range. At present no characters are known by which African species can be distinguished from Asiatic forms.

The species are found in ponds, rice-fields and backwater swamps in which there is abundant submerged vegetation of a succulent kind.

Turbinicola, gen. nov.

The *shell* is dextral, comparatively small, regularly ovate and less globose than in *Pachylabra*. Its mouth is relatively high and narrow. The outer lip is thin, the peristome is complete and the callus of the columellar region is, though narrow, flat and porcelaneous. The umbilicus is closed.

The *operculum* is precisely like that of *Pachylabra*.

The *radula* has the following peculiarities: the lateral cusps of all the teeth are reduced, while the main cusp is extremely large and broad forming a scoop-like organ, more particularly on the laterals and the marginals. Only two cusps remain on the laterals and marginals and the inner cusp is vestigial, while the outer is expanded and obliquely truncate. We figure the radular teeth of the type-species, with that of *P. nevilliana* for comparison.

The *soft parts* have not been studied in detail, but it has been noted that the foot is short, broad and rounded behind and with the antero-lateral angles but slightly produced.

Type-species.—*Ampullaria nux*, Reeve.

Geographical Range and Habitat.—Only known from the northern part of the Western Ghats in the Nasik and Poona districts of the Bombay Presidency.

The type-species lives on rocks in small pools in mountain streamlets. The peculiar structure of its radular teeth doubtless permits it to scrape the algae from stones or to scoop up mud containing nutritious substances.

Turbinicola nux (Reeve).

1856. *Ampullaria nux*, Reeve, *Conchologia Iconica* X, *Ampullaria*, pl. xxviii, fig. 132.

1876. *Ampullaria nux*, Hanley and Theobald, *Conch. Ind.*, pl. cxv. fig.

1877. *Ampullaria nux* (typical), Nevill, *Cat. Moll. Ind. Mus.* Fasc. E., p. 5.
 1885. *Ampullaria nux*, *id.*, *Hand List Moll. Ind. Mus.* II, p. 3.
 1918. *Ampullaria nux*, Annandale and Prashad, *Rec. Ind. Mus.* XVI, pp. 149, 150, pl. v, fig. 8.

The shell is very small compared with other species of the family (not more than 30 mm. high), and has $4\frac{1}{2}$ whorls. The apex is bluntly pointed and the first $2\frac{1}{2}$ whorls, which are always slightly eroded, are minute. The third whorl is much larger but shallow, band-shaped and much narrower than the body-whorl. Its outlines are feebly convex. The suture is linear and slightly impressed; the whorls are not or very slightly flattened outside it. The body-whorl is narrowly heart-shaped with the upper extremity nearly straight and the lower pointed and turned inwards, its outer outline as seen from above forms a regular curve and is relatively short, while the inner outline is long and sinuate. The whorl as a whole is by no means greatly swollen. The aperture is oblique, rather narrow and pyriform. It extends upwards for at least $\frac{3}{4}$ of the height of the shell. The incrassate columellar margin is narrow and is joined to the upper lip above by a thin porcellaneous deposit; it is considerably produced below the umbilicus, which is closed or rimate. The aperture as a whole projects outwards from the body-whorl and also forwards below the umbilicus. In the latter region the surface of the whorl slopes inwards and forwards. The surface has a matt appearance owing to the minute sculpture which consists of minute longitudinal and spiral lines crossing one another very regularly and closely, and of coarse longitudinal sinuate striae. The periostracum is of a pale yellowish olivaceous tint with ill-defined longitudinal streaks of a darker shade, and in some shells obscure narrow spiral bands of a pale brownish colour can be detected on the external surface. The mouth is pure white, but the interior of the shell is sometimes tinted with brown.

The outline of the operculum resembles that of the mouth. The external surface is slightly concave and is covered with a delicate brown periostracum. The scar on the internal surface is relatively large; it is divided longitudinally by a narrow ridge and surrounded completely by a groove, its sculpture is lobose. The nacre has a pinkish tinge.¹

The characters of the radular teeth² are well shown in the figure. Unfortunately we have no detailed description of the animal. The following notes on its colouration were made from a living specimen at Khandalla. The foot and mantle are yellowish,

¹ Reeve's original figure and description are somewhat misleading. The former gives the impression, owing to the position of the operculum, that the outer lip is thickened, while the description, in stating that the columellar lip is unusually callously reflected, does not indicate that it is in close apposition to the surface of the shell.

² The figure of the radular teeth, in our paper cited already, is rather poor. It was unfortunately drawn from worn out teeth and does not show their real characters.

tinged and clouded with black above; the free edge of the mantle is bright yellow. The tentacles are leaden grey on the dorsal surface, paler at the base and below. The eye-stalks are bright yellow.

Geographical distribution.—The species is only known from small streams near Khandalla and Igatpuri (Poona and Nasik districts) in the Western Ghats and from altitudes between 2500 and 3000 feet.

We may now give a description of the new species *Pachylabra nevilliana*. The shell characters are so similar to those of *T. nux* that we can best do so by means of a short comparison.

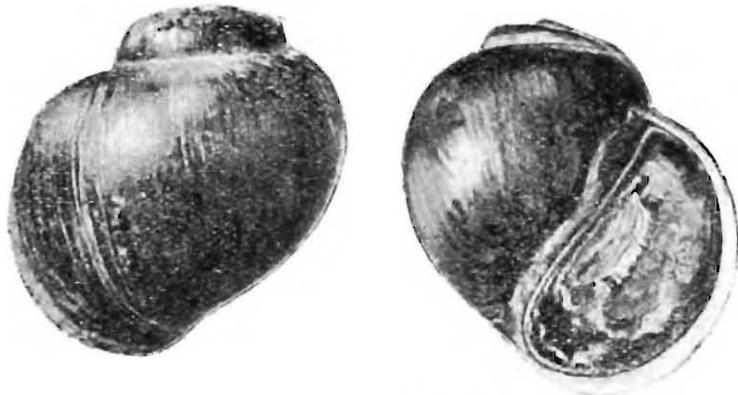


FIG. 2.—Photographs of the type-shell of *Pachylabra nevilliana*, natural size.

Pachylabra nevilliana, sp. nov.

1877. *Ampullaria nux*, var. (? n. sp.), Nevill, *op. cit.*, p. 5.

1885. *Ampullaria nux*, var. (? n. sp.), *id.*, *op. cit.*, p. 4.

The species is considerably larger, stouter and more globose than *T. nux*, the spire is more swollen, the body-whorl more transverse, the aperture broader above, the suture more oblique and the sculpture of the shell coarser and less regular. The external colour is deep chestnut, with which the interior is also tinged. The peristome is white. The scar of the operculum is relatively smaller and its central ridge broader and flatter.

We have extracted the radula from one of the shells examined by Nevill, which have been in Calcutta for at least 60 years, but still in several instances contain the dried animal in a fairly good state of preservation.

Type-specimens.—No. M 11864/2 Z. S. I. (*Ind. Mus.*)

Measurements of shells (in millimetres).

	<i>T nux.</i>			<i>P nevilliana.</i>		
Total height	26	23	17	35	37	34
Maximum diameter	20·5	19	14·5	28·5	33	29·5
Oblique height of mouth	18	16·5	13·5	25·5	27	25·5
Maximum diameter of mouth.	10	8·5	7	16	16	14·5

Locality.—The specimens are labelled, in writing on each shell, as being from Tranquebar, which is on the east coast of Southern India, and it is stated in the old catalogue of the A.S.B. collection that they were collected by Captain Lewis. Nevill, however, was of opinion that the “locality can only be accepted with considerable reserve.” We have seen no other specimens, but Nevill’s doubt as to the provenance of the type-series was probably due to his belief in its apparent specific identity with *T nux*.