

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

## INTRODUCTORY NOTE.

[Under the above title I propose, with the help of other members of the Zoological Survey of India, to issue a series of short papers embodying the main taxonomic results of our recent survey of the freshwater molluscs of India.<sup>1</sup> The definitions and limitations of the genera we have adopted are in many instances different from those hitherto accepted, and it will be as well that our views should be subjected to criticism, which we will welcome, before our final monograph is published. N. A.].

### NO. I—THE INDIAN GENERA OF MELANIINAE.

By N. ANNANDALE, D.Sc., F.A.S.B., Director, Zoological  
Survey of India.

It is convenient to separate the family Melaniidae or Tiaridae into two subfamilies, the Melaniinae (or Tiarinae) and the Paludominae, and to include in the former all the species with elongate narrow shells. Among the Indian forms with this type of shell only two genera have hitherto been generally recognized, namely *Faunus*, de Montfort and *Melania*, Lamarck (= *Tiara*, Bolten); but *Melania* has been divided into a number of subgenera, as to the names of which there has been considerable confusion. My conclusions may be introduced conveniently by a key to the genera I now recognize. Their status and limits will be discussed thereafter.

### *Key to the Indian Genera of Melaniidae.*

1. Outer lip of shell forming a broad and prominent lobe defined above and below by well-developed canal-like prolongations of the aperture. Operculum thick, without spiral figure ... .. *Faunus*.
2. Outer lip not lobular, upper and lower canals of the aperture ill-defined or absent.
  - A. Shell very small (less than 1 cm. high), hairy, sculptured with spiral incised lines only. Operculum extremely thin, paucispiral, with the nucleus eccentric. Foot produced into a filamentous process behind. Marginal tooth of radula with three sharp denticulations and a pointed process near the base ... .. *Mainwaringia*.
  - B. Shell large or of moderate size, as a rule without hairs, with at least a trace of longitudinal grooves and ridges. Operculum at least moderately thick. Foot without posterior process.

---

<sup>1</sup> See Kemp and Gravely, *Ind. Jour. Med. Research*, VII, p. 252 (1919).

Radular teeth without basal process, either with more than three sharp denticulations or with three much broader blunt denticulations.

- i. Shell large, heavy, ovoid, with strong spines round the upper extremity of the body-whorl. Operculum without spiral figure, long, narrow, oval... .. *Melania (=Tiara).*
- ii. Shell as a rule more elongate, without, or with relatively feeble, spines. Operculum bearing a spiral figure.
  - a. Shell never very thick or large and as a rule relatively long and slender, tapering to a sharp point at the apex, with the aperture ovate and never produced above, the sculpture consisting of numerous longitudinal and spiral grooves which form by their intersection a reticulate or nodular pattern, rarely obsolescent. Spines sometimes present on upper extremity of body-whorl. Operculum relatively large, ovate, paucispiral, with the nucleus situated near the inner lower margin and the spiral figure occupying only a small part of the surface. Mantle bearing on its inner surface near the margin a row of digitiform processes. Radular teeth relatively long, with numerous sharp denticulations ... .. *Melanoides.*
  - b. Shell as a rule large heavier and broader, with more solid sculpture or nearly smooth, more or less biconical in outline and with the aperture frequently produced slightly both above and below. Spines never present on the upper margin of the body-whorl. Operculum relatively small, subcircular, with a spiral figure that occupies most of its surface. No processes on or near edge of mantle. Radular teeth relatively short with fewer and blunter denticulations ... *Acrostoma.*

*Faunus* and *Mainwaringia* do not belong to the freshwater fauna as both are estuarine. The geographical range of the former is wide but in the main insular, while *Mainwaringia*<sup>1</sup> is known only from the Gangetic delta. The synonymy and diagnosis of the two freshwater genera may be discussed further.

#### Genus *Melanoides*, Olivier (*nec* H. and A. Adams).

1807. *Melanoides*, Olivier, *Voy. l'Emp. Ottoman*, II, p. 40.  
 1854. *Plotia, Melania, Tarebia*, H. and A. Adams, *Gen. Recent Moll.*, I, pp. 295, 301, 304.  
 1874. *Melanoides, Melania*, s.s. (in part), *Plotia, Tarebia, Striatella*, Brot. *Conch. Cab.*, pp. 6, 7.  
 1885. *Melania* (s.s.), *Striatella, Melanella* (in part), *Tarebia, Plotia*, Nevill, *Hand List Moll. Ind. Mus.*, II, pp. 221, 231, 271, 272, 280.

<sup>1</sup> Annandale & Prashad, *Rec. Ind. Mus.*, XII, p. 251, fig. 5, pl. xx, fig. 8 (1919).

1897. *Stenomelania, Melanoides, Plotia, Tarebia*, von Martens in Weber's *Zool. Ergebn. Reis. Niederl. Ost-Ind.*, IV, pp. 40, 50, 62, 69.  
 1898. Neomelanien (in part), P. and F. Sarasin, *Sussw. Moll. Celebes*, p. 38.  
 1915. *Radina, Striatella, Melanella* (at least in part), *Tarebia, Plotia*, Preston *Faun. Brit. Ind., Freshw. Moll.*, pp. 10, 15, 32, 33, 35.  
 1919 *Melanoides*, Annandale and Prashad, *Rec. Ind. Mus.*, XVIII, p. 28.

There has been much confusion in nomenclature owing to the fact that H. and A. Adams used the name *Melanoides* in quite a different sense from that in which it had been introduced thirty-seven years earlier by Olivier, who applied it to a race or phase of the common "*Melania*" *tuberculata*. A reference to this author's "voyage" shows that Nevill (*op. cit.*, p. 248) was wrong in stating that the form of the name employed was "Melanoïde," a form that might not have been considered valid, and Preston has ignored von Marten's remarks on the subject.

*M. tuberculatus* (Müller), the type of this genus, is perhaps the most widely distributed of all the non-marine Gastropods that occur in India, for it is found in most parts of the Oriental and Ethiopian regions and even in parts of the Palaeartic and Australasian Regions adjacent to them. With this species a large number of Oriental forms must be associated generically on account of the fact that they possess the characters noted in the key. The Sarasins were the first authors to lay stress on the peculiarities of the radulae and opercula of these forms, but they were apparently not acquainted with the peculiarities of the mantle. They did not regard the structures they examined as of generic importance and associated species I retain in *Melania* with those here assigned to *Melanoides* in their group "Neomelanien."

The description given in the key, with the figures published in the various works to which I have referred, should render the recognition of species of the genus easy, if the animal as well as the shell be examined. The processes of the mantle are arranged in a small series along a line running parallel to the margin. As a rule they increase in size from left to right. When the animal is fully expanded they are elongate and pointed and often resemble small parasitic leeches protruding from the mouth of the shell. In preserved specimens they are as a rule contracted and much less conspicuous.

#### Genus *Acrostoma*, Brot.

1854. *Melanoides*, H. and A. Adams (*nec* Olivier), *Gen. Recent Moll.*, 1, p. 296.  
 1874. *Melanoides, Acrostoma*, Brot, *op. cit.*, p. 7.  
 1885. *Melanoides, Acrostoma*, Nevill, *op. cit.*, pp. 248, 270.  
 1897. *Brotia*, von Martens, *op. cit.*, p. 33.  
 1898. Palaeomelanien, P. and F. Sarasin, *op. cit.*, p. 30.  
 1915. *Melanoides, Acrostoma*, Preston, *op. cit.*, pp. 21, 30.

I cannot find any difference of generic importance between the soft parts, radula, operculum or shell of *Brotia*, von Martens (= *Melanoides*, auct.) and *Acrostoma*, Brot. Indeed, in the single species I call *Acrostoma variabile* (Benson) an almost complete

gradation can be observed. In the type-species of *Acrostoma* (*A. hügelii*) the structure is similar in every respect to that of *A. variable* and the shells of certain individuals of the latter are by no means unlike those of the former.

I have been able to find no trace of digitiform processes on or near the edge of the mantle in either living or preserved specimens of *A. variable* or in preserved specimens of *A. hügelii*. In both, however, there is a peculiar arrangement of the pigment on the inner surface of the mantle. It is distributed in alternate longitudinal dark and pale streaks, the pale pigment in the living animal being of a bright yellow colour but fading to white in spirit.

Some of the largest of the freshwater Mollusca are included in this genus. It is usually found in running water, but *A. variable* is common in ponds in Calcutta. The headquarters of the genus are in Burma and the Sunda Is., but the type-species has an apparently discontinuous range in Assam and South India, and *A. variable*, though mainly Assamese and Burmese, extends for some distance up the Ganges.

I am not yet quite sure as to the generic position of the Burmese species assigned by Nevill and Preston to *Pachychilus*, Lea. They are probably dwarf forms of *Acrostoma* and do not seem to be closely related to the Central American species for which the genus *Pachychilus* was originally used.

#### Genus *Melania*, Lamarck.

- (1798. *Tiara*, Mus. Bolten.)
- 1799. *Melania*, Lamarck, *Prodromus*.
- 1854. *Tiara*, H. and A. Adams, *op. cit.*, p. 294.
- 1874. *Tiara*, Brot., *op. cit.*, p. 7.
- 1884. *Tiara*, Nevill, *op. cit.*, p. 278.
- 1897. *Melania*, s.s., von Martens, *op. cit.*, p. 66.
- 1898. Neomelaniens (in part), P. and F. Sarasin, *op. cit.*, p. 38.
- 1915. *Tiara*, s.s., Preston, *op. cit.*, p. 10.

The distribution of this genus is mainly insular and largely Pacific. Within the limits of the Indian Empire it is found only in the Nicobars and (doubtfully) in one of the Anadaman Islands. I know nothing of the animal, but the shell and operculum are very distinct from those of *Melanoides* or *Acrostoma*. Troschel<sup>1</sup> and P. and F. Sarasin (*op. cit.*) describe and figure the radular teeth of species of *Melania* as very like those of *Melanoides*, with which the latter authors associate these species in their group of Neomelaniens. The type-species is *Helix amarula*, Linn. Those interested in the revival of forgotten generic names may refer to Dall's<sup>2</sup> account of the *Museum Boltenianum*, reviewed in the *Ann. Mag. Nat. Hist.* (8) XVI, p. 232 (1915) by "B.B.W."

<sup>1</sup> Troschel, *Geb. der Schnecken. z. Begründung ein. nat. Classification*, I, pl. viii (Berlin: 1856-1863).

<sup>2</sup> Dall, *Misc. Publ. Smithsonian Inst.* No. 2360 (1915). Not available to me.