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On some species of the buccinid genus *Babylonia* (Mollusca, Gastropoda)

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ABSTRACT

The synomymies and characters of *Babylonia spirata* (L.), *B. valentiana* (Sws.), *B. ambulacrum* (Sow.) and *B. borneensis* (Sow.) are discussed. A lectotype of *Buccinum spiratum* L. is selected so as to perpetuate Lamarck's interpretation of this species. By restricting Schumacher's name *Nassa canaliculata* to the first of the two references on which it has been based it is made an objective synonym of Linnaeus's species.

Recently Habe (1965, Bull. nat. Sci. Mus., **8**: 116—124) published a very useful revision of the buccinid genus *Babylonia* Schlüter. He divided the genus into two groups, the first containing four species in which the shell has a decidedly canaliculate suture, the second comprising six species with shells in which the suture is said to be not canaliculate and the whorls shouldered.

When checking the material in the Rijksmuseum van Natuurlijke Historie against Habe's paper, I came to a somewhat different classification of the species in the first group. Of this group *B. kirana* Habe is lacking in our collection, hence it will not be discussed here. I think that four instead of three other species should be distinguished in this group and readjustment of the synonyms leads to the conclusion that other names are to be used for two species. A discussion of these four species is the main purpose of this paper.

As to Habe's second group, it contains two species, *B. formosae* (Sow.) and *B. papillaris* (Sow.), of which I would rather qualify the suture as subcanaliculate. For the rest I agree with the classification and nomenclature of the species placed in this group by Habe.

Rovereto (1900, Atti R. Univ. Genova, **15**: 168, non vidi) established the subgenus *Peridipsaccus* for species in which the operculum has a central nucleus, like *B. valentiana* (Sws.). I found the nucleus to be excentric in

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B. spirata (L.), *B. ambulacrum* (Sow.), *B. borneensis* (Sow.), *B. formosae* (Sow.), *B. lutosa* (Lam.), *B. japonica* (Reeve) and *B. papillaris* (Sow.).

Habe's fig. 3 clearly shows *B. kirana* to have an operculum with an excentric nucleus. The operculum of his specimen of *B. lutosa* (fig. 9), however, has a central nucleus, which does not agree with the only specimen of this species with an operculum I could examine, a shell from China in the Amsterdam Museum.

I am indebted to Messrs. A. C. van Bruggen of Leiden University, S. P. Dance of the Manchester Museum, T. O'Grady, secretary of the Linnean Society of London, and to mr. N. Tebble of the British Museum (Natural History) for photographs and information without which this paper could not have been written.

Mr. H. E. Coomans kindly gave me access to the molluscan collection of the Zoölogisch Museum of Amsterdam University. Each time I visit that museum the most pleasant memories from the time I worked there as a student come back to my mind. Hence I am glad to have been given the opportunity of contributing to the volume which will be presented to its director, Prof. Dr. H. Engel, at his 70th birthday.

To locality records based on specimens in the Amsterdam Museum '(ZMA)' is added; all other records are based on samples in the Leiden Museum. Some shells deriving from old collections are labelled 'Moluccas'. As there is no reliable evidence of the genus occurring in the eastern part of the East Indian Archipelago, these records have been disregarded. Unless otherwise stated the figures referred to in the synonymies represent shells only.

Babylonia spirata (L.)

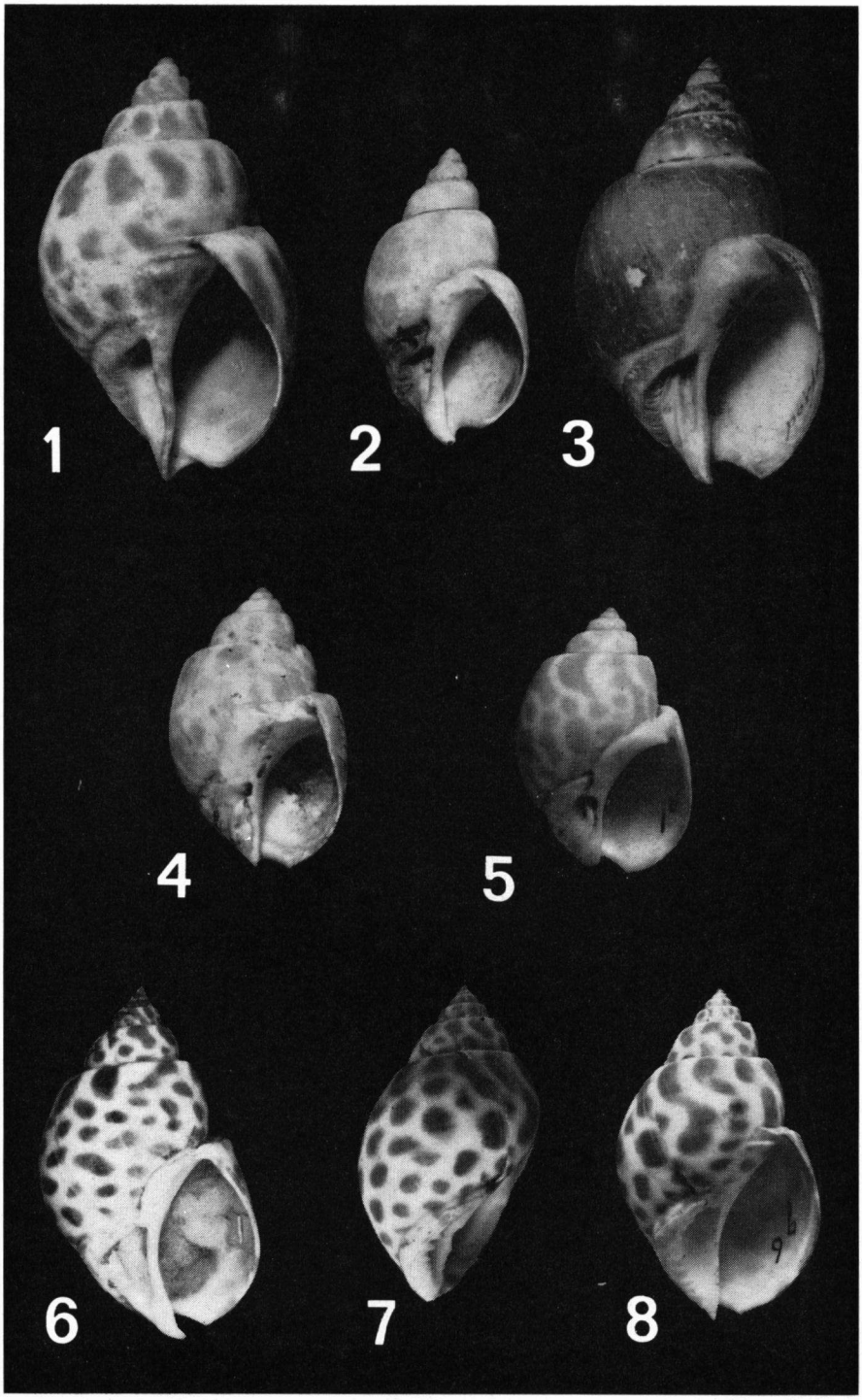
Buccinum spiratum Linnaeus, 1758, Syst. Nat. ed. 10, **1**: 739 no. 405 (in M. Mediterraneo); Linnaeus, 1767, Syst. Nat. ed. 12, **1** (2): 1203 no. 469.

Ancilla pallida Perry, 1811, Conchol.: pl. 31 fig. 3 (New Holland).

Nassa canaliculata Schumacher, 1817, Essai nouv. Syst. Vers test.: 224 (no loc.).

Eburna spirata: Lamarck, 1822, Hist. nat. An. s. Vert., **7**: 281; Quoy & Gaimard, 1832, Voy. Astrolabe, (Zool.) **2**: 458, pl. 3 figs. 10, 11 (operculum), 12 (anatomy), 13 (radular teeth); Kiener, 1835, Spéc. gén. Icon. Coq. viv., Purpurif. **2**, Eburne: 7 [partim], pl. 1 fig. 1 (animal with shell and operculum), pl. 3 fig. 5; Eydoux & Souleyet, 1852, Voy. Bonite, (Zool.) **2**: 611, pl. 4 figs. 28 (animal with shell), 29 (sole of foot), 30 (operculum); Reeve, 1849, Conch. Ic., **5**, *Eburna* sp. 7, fig. 7; Küster, 1857, Conch. Cab., (2) **3** (1b): 80, pl. 65 figs. 3, 5; Tryon, 1881, Man. Conch., **3**: 212, pl. 82 figs. 466, 467, pl. 82 fig. 468 (animal with shell), pl. 84 fig. 526 (anatomy).

PLATE I. Figs. 1—4: *Buccinum spiratum* from the Linnean collection; 1, *Babylonia areolata* (Link); 2, *B. lutosa* (Lam.); 3, *B. japonica* (Reeve); 4, lectotype of *B. spirata* (L.). — Fig. 5: *Babylonia spirata* (L.) from Madura, Leiden Museum. — Figs. 6—8: *Babylonia borneensis* (Sow.) from Borneo; 6, British Museum (Natural History); 7, 8, Leiden Museum. — All figures natural size. — Figs. 1—4 by courtesy of the Linnean Society of London. Fig. 6 by courtesy of the British Museum (Natural History).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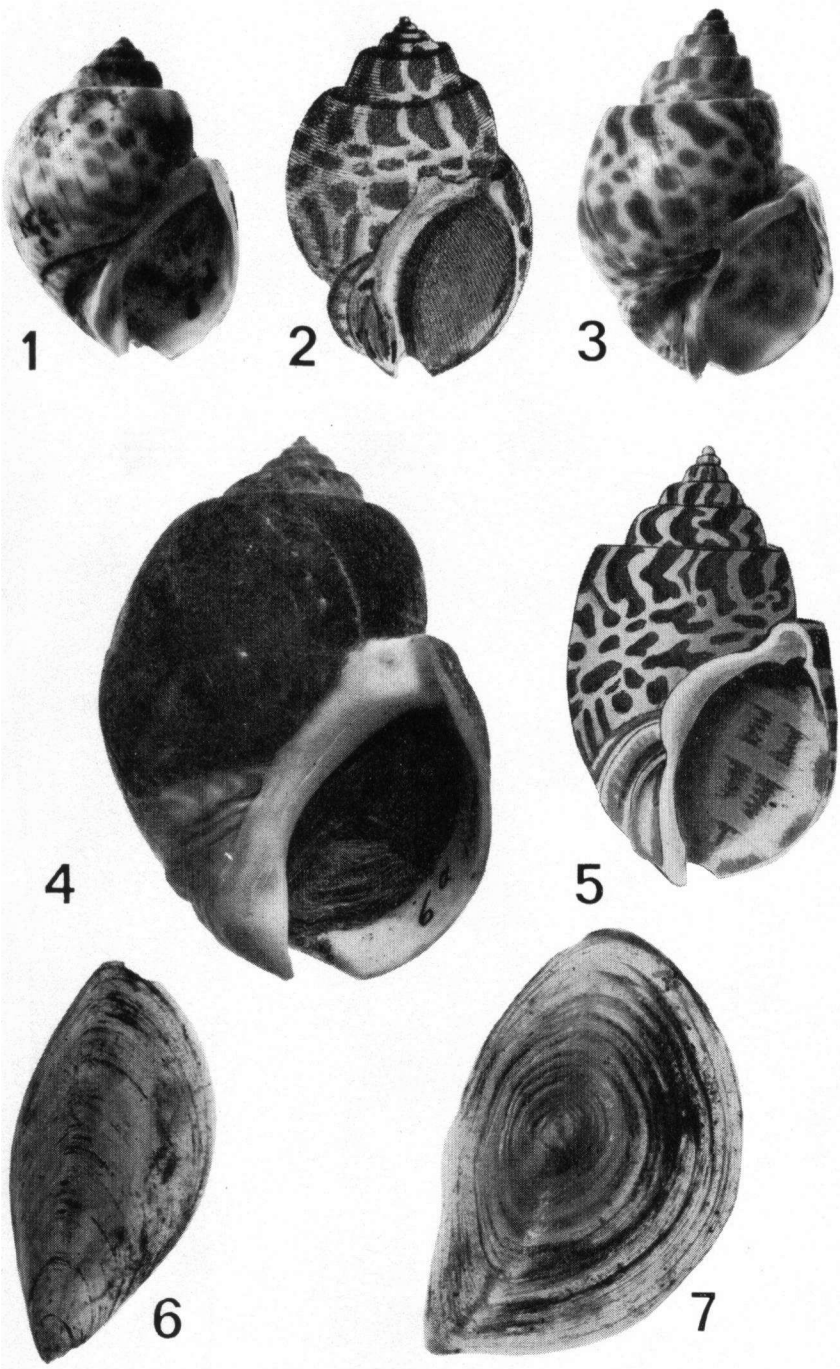
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?*Eburna valentiana* [partim, non Swainson]: Küster, 1857, Conch. Cab., (2) **3** (1b): pl 65 fig. 4 [tantum].

Eburna canaliculata: Sowerby, 1859, Thes. Conch., **3**: 69, pl. 215 figs. 2, 3.

Eburna semipicta Sowerby, 1866, Thes. Conch., **3**, *Eburna* suppl. p., pl. 291 figs. 12, 13 (Hab.?); Tryon, 1881, Man. Conch., **3**: 213, pl. 82 fig. 470.

Eburna chrysostoma Sowerby, 1866, Thes. Conch., **3**, Eburna suppl. p., pl. 291 figs. 15, 16 (Ceylon); Tryon, 1881, Man. Conch., **3**: 212, pl. 82 fig. 469 (an *spirata* var.?).

Latrunculus canaliculatus: Oostingh, 1923, Meded. Landbouwh. Wageningen, **26** (3): 115.

Babylonia (Babylonia) spirata: Wenz, 1941, Handb. Paläozool., **6** (1): 1186, fig. 3374.

Babylonia canaliculata: van Regteren Altena, 1945, Zool. Meded., **25**: 147; Abbott, 1962, Sea Shells World: 83 textfig.; Habe, 1965, Bull. nat. Sci. Mus., **8**: 117 [partim].

Babylonia spirata: Kaicher, 1957, Indo-Pac. Shells, Muric., Buccin.: pl. 6 fig. 20; Habe, 1965, Bull. nat. Sci. Mus., **8**: 117, pl. 1 figs. 5, 6.

non *Buccinum spiratum*: Linnaeus, 1764, Mus. Lud. Ulr.: 611 no. 265; Hanley, 1855, Ipsa Linn. Conch.: 254.

non *Babylonia spirata*: Thiele, 1929, Handb. syst. Weichtierk., **1**: 312, fig. 345; Abbott, 1962, Sea Shells World: 83 textfig.

Linnaeus certainly included more than one species in his *Buccinum spiratum* (cf. Dodge, 1956, Bull. Amer. Mus. nat. Hist., **111** (3): 207). Most authors accepted Lamarck's interpretation of this species, but some followed Hanley who restricted Linnaeus's name to the species more generally known as *Babylonia areolata* (Link).

Of the figures cited by Linnaeus in 1758 fig. D of [Schijnvoet in] Rumphius and Argenville's fig. N may represent Lamarck's *Eburna spirata* and such is even more probable for Gualtieri's fig. B, while I hardly doubt that fig. 41 of Regenfuss represents it. On the other hand Columna's poor figure, if really a *Babylonia*, rather represents a species of Habe's second group. Figure C of [Schijnvoet in] Rumphius probably is *B. areolata*, while Bonanni's fig. 70 represents that species beyond doubt. I failed to find a figure 370 in Bonanni's book.

In the twelfth edition references are added to the Museum R. Ludovicae Ulricae where the more elaborate description of *Buccinum spiratum* refers to *Babylonia areolata* (Link), and to a series of figures in Seba's Thesaurus of which figs. 21, 22, 24, 25 represent Lamarck's *Eburna spirata* and figs. 23, 26 *B. areolata*. Evidently these two species were the first to reach European collections. I consider the reference to fig. H of Gualtieri's a clerical error for fig. B, which is correctly cited in the 10th edition and the M. L. U.

In the Linnean collection four specimens have been segregated by Hanley and Dance as most probably not added to this collection after Linnaeus's

PLATE II. Fig. 1: *Babylonia valentiana* (Sws.) from Aden, Leiden Museum. — Fig. 2: copy of Chemnitz's pl. 122 fig. 1118. — Fig. 3: *Babylonia spirata* (L.) from Bombay, Leiden Museum. — Fig. 4: *Babylonia valentiana* (Sws.) from Karachi, Leiden Museum. — Fig. 5: *Ancilla pallida* Perry, copy of original figure. — Figs. 6, 7: opercula; 6, of *Babylonia spirata* (L.) from Pasar Ikan, Java, Leiden Museum; 7, of *B. valentiana* (Sws.) from Karachi, Leiden Museum. — Figs. 1, 3, 4: natural size; figs. 6, 7: × 2.

death. Two of these are marked '405' and belong to *Babylonia areolata* (Link) and *B. lutosa* (Lam.) respectively, one is marked '405' and 'perforat' and is, in my opinion, *B. japonica* (Reeve), while the fourth, marked '469', is *Eburna spirata* of Lamarck (pl. I figs. 1—4).

In order to prevent further confusion in the use of the name *Babylonia spirata* (L.) the last mentioned shell (pl. I fig. 4) is here selected as the lectotype of the species. Unfortunately this specimen bears the number which Linnaeus used for the species in the twelfth edition of the Systema Naturae, whereas the others are numbered in accordance with the tenth edition. Hence one may object that the lectotype presently selected was probably not yet in Linnaeus's possession in 1758. However, this can not be proved and I agree with Dance when he writes in his important report on the Linnean shell collection (1967, Proc. Linn. Soc. Lond., **178** (1): 8) that 'in practice, however, systematists have been content to designate as types shells which they believe he owned at any time up to his death. This bending of the official rules is, perhaps, justifiable if its objective is nomenclatural stability; .....' (the spacing is mine).

I prefer to select a shell rather than a figure as lectotype, but if my selection of this particular shell is not accepted by future workers, I think that stability in nomenclature would be served best by selecting Regenfuss's figure 41 instead.

The shell marked '469' in the Linnean collection agrees very well with a specimen from Madura figured here (pl. I fig. 5).

Perry's figure of *Ancilla pallida* in my opinion rather represents the present species than *B. ambulacrum* (Sow.). As Perry's book is rare, his figure is copied here (pl. II fig. 5).

Schumacher's *Nassa canaliculata* is characterized by two references: (1) to *Buccinum spiratum* L., (2) to pl. 122 fig. 1118 of Chemnitz (1780, Conch. Cab., **4**). Chemnitz's figure is ambiguous and has been differently interpreted. Sowerby (1859, Thes. Conch., **3**: 69) cites it for his *Eburna molliana* which certainly is the same species as *B. valentiana* (Sws.). On the other hand Oostingh (1923, Meded. Landbouwh. Wageningen, **26** (3): 155) considers *Nassa canaliculata* to be '*Eburna spirata*. Lamarck (*non* Linné)'. Hence it is clear that in Oostingh's opinion Chemnitz's figure represents what is here considered to be Linnaeus's species. Indeed the general form of the shell is strongly suggestive of *B. valentiana* (Sws.), while the penultimate whorl and the siphonal fasciole rather remind one of *B. spirata* (L.) (cf. pl. II figs. 1—3). The name *Eburna* or *Babylonia canaliculata* has been used for the present species by those authors who followed Hanley in considering *spirata* the valid species name of *B. areolata* (Link). Hence, for the sake of stability in nomenclature, Schumacher's name is here restricted to his first reference, which makes *Nassa canaliculata* an objective synonym of *B. spirata* (L.).

After examination of shells agreeing with Sowerby's *Eburna semipicta* and *E. chrysostoma*, I consider both to be forms of the present species.

This species differs from the next by having less convex whorls, a wider

sutural canal and a more pronounced siphonal fasciole. The umbilicus may be wide, narrow, or very narrow, but it seldom is quite closed. Contrary to the next species the operculum has an excentric nucleus, as shown in the figures of Quoy & Gaimard, Kiener, and Eydoux & Souleyet and, e.g., in a large series from Pasar Ikan near Djakarta (pl. II fig. 6). A large specimen from Ceylon in the Amsterdam Museum has an operculum with a central nucleus glued to cotton wool in the aperture. Although the operculum fits very well to the shell, I consider them not to belong to each other.

I saw specimens from Bombay (also ZMA), Ceylon (also ZMA), Madras (also ZMA), Calcutta, Penang, Belawan (Sumatra), Tandjong Tiram (E. coast of Sumatra, ZMA), Tjilatjap (S. coast of Java), several localities on the N. coast of Java, and Madura. We have a fine series of specimens collected alive on a muddy bottom at a depth of 0.5—1.5 m at Pasar Ikan, near Djakarta, Java.

Babylonia valentiana (Swainson)

Eburna valentiana Swainson, 1822, App. Cat. Bligh: 6 (fide Sherborn, non vidi); Swainson, 1823, Zool. Illus., **3**: pl. 144 (Red Sea); Reeve, 1849, Conch. Ic., **5**, *Eburna* sp. 9 fig. 9; Küster, 1857, Conch. Cab., (2) **3** (1b): 82, ? pl. 65 fig. 4 [an *B. spirata*?].
Eburna spirata var.: Kiener, 1835, Spéc. gén. Icon. Coq. viv., Purpurif. **2**, Eburne: 8.
Eburna molliana Sowerby, 1859, Thes. Conch., **3**: 69, pl. 215 fig. 1 (Persian Gulf).
Eburna valentiniana [sic]: Tryon, 1881, Man. Conch., **3**: 213, pl. 82, fig. 473.
Babylonia (Peridipsaccus) molliana: Wenz, 1941, Handb. Paläozool., **6** (1): 1186, fig. 3375.
Babylonia canaliculata [partim, non Schumacher]: Habe, 1965, Bull. nat. Sci. Mus., **8**: 117, pl. 1 fig. 1.

This species differs from the preceding one by its more convex whorls, its slightly narrower sutural canal and its less pronounced siphonal fasciole. Some young shells from Aden have a wide umbilicus, but in all other specimens I found the umbilicus to be very narrow or closed. The operculum has a central nucleus (pl. II fig. 7).

I examined specimens from Aden, the Persian Gulf (ZMA), Kunarak (Persia) and Karachi (also in ZMA). The largest specimens I saw are from Karachi and measure 78 × 51 mm (ZMA) and 74 × 54 mm (pl. II fig. 4).

Babylonia ambulacrum (Sowerby)

Eburna ambulacrum Sowerby, 1825, Cat. Shells Tankerville, App.: XXII (fide Sherborn, non vidi); Sowerby, 1833, Conch. Ill., **20** (*Eburna*): Cat. (Java), fig. 2; Reeve, 1849, Conch. Ic., **5**, *Eburna* sp. 5, fig. 5; Küster, 1857, Conch. Cab., (2) **3** (1b): 82, pl. 65 fig. 6, 7; Sowerby, 1859, Thes. Conch., **3**: 70, pl. 215 fig. 8; Tryon, 1881, Man. Conch., **3**: 213, pl. 82 fig. 472.
Eburna spirata [partim, non L.]: Kiener, 1835, Spéc. gén. Icon. Coq. viv., Pupurif. **2**, Eburne: 7, pl. 1 fig. 2.
?*Eburna immaculata* Jousseaume, 1883, Bull. Soc. zool. France, **8**: 192, pl. 10 fig. 2 (Habitat?).
Babylonia ambulacrum: Kaicher, 1957, Indo-Pac. Shells, Muric., Buccin.: pl. 6 fig. 19.

Babylonia pallida [partim, non Perry]: Habe, 1965, Bull. nat. Sci. Mus., **8**: 118, pl. 1 fig. 2.

Eburna immaculata Jousseaume may be this species, but I am not convinced that it is not an earlier name for *B. kirana* Habe.

B. ambulacrum is characterized by its convex whorls, narrow sutural canal, wide umbilicus with pronounced siphonal fasciole and its dark colour pattern being generally less pronounced than in the three other species discussed here. The operculum has an excentric nucleus.

With *Ancilla pallida* Perry and *Eburna borneensis* Sowerby removed from the synonymy this species may have a more restricted range than given by Habe for '*Babylonia pallida*'. I examined specimens from the Phillippines (ZMA), the Andaman Islands, and the beach of Sibolga in the Tapanuli district on the W. coast of Sumatra (ZMA).

Babylonia borneensis (Sowerby)

Eburna borneensis Sowerby, 1866, Thes. Conch., **3**: *Eburna* suppl. p., pl. 291 fig. 14 (Borneo); Tryon, 1881, Man. Conch., **3**: 212, pl. 82 fig. 464.
Babylonia pallida [partim, non Perry]: Habe, 1965, Bull. nat. Sci. Mus., **8**: 118.

This is certainly a good species, mainly characterized by the knobbed spiral ridge in the umbilicus, just inside the siphonal fasciole. This character is not visible in Sowerby's original figure, but it is mentioned in his latin description ('callo spirali umbilici crenulato').

Mr. van Bruggen was so kind as to compare our two specimens (from Borneo) with the samples under the name *borneensis* in the British Museum (Natural History). He found them to agree with some young shells from Aden (H. C. Dinshaw leg.) which had the knobs only faintly indicated and more so with three shells from Borneo (Hugh Cuming leg.) which clearly showed this character. The type of *B. borneensis* was not found by Mr. van Bruggen.

As I suspected that one of the shells from the Cuming collection might be the type, I asked Mr. Tebble, curator of Mollusca at the British Museum (Natural History), to compare these shells with Sowerby's figure. Mr. Tebble kindly sent me photographs of the three shells of which the largest (pl. I fig. 6) is in his opinion the shell figured by Sowerby. In the photograph the knobs on the spiral ridge in the umbilicus are not visible, but Mr. Tebble writes me (in lit. 16th August 1967) 'The knobs you mention are visible in the figured specimen, but only faintly so as if they had been worn away in this region due to weathering. All three specimens are identical in this aspect except for the products of weathering or of age;. . . .'

When comparing the photograph of this shell with Sowerby's original figure, it appears that they agree as to the form of the shell, but differ in the pattern of dark markings. I am, therefore, not convinced that this really is the shell figured by Sowerby, but there can be no doubt as to their specific identity.

This species can be readily recognized by the knobbed spiral ridge in the umbilicus (pl. I figs. 7, 8), a character it shares with a species in Habe's second group, *B. zeylanica* (Brug.), where it is, however, much more pronounced. In fresh specimens the markings are darker than in *B. spirata* (L.) and the body whorl is somewhat more convex than in the latter species. The operculum has an excentric nucleus.

The occurrence of this species off Aden needs confirmation, as all the other specimens are from Borneo. In the Amsterdam Museum there is one shell with a more exact locality: beach of Balik Papan, Borneo.

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