

# A REVISION OF CERITHIDEA (CERITHIDEOPSILLA) CINGULATA (GMELIN) AND SOME RELATED SPECIES (MOLLUSCA, GASTROPODA)

by

C. O. VAN REGTEREN ALTENA

Amsterdam

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## INTRODUCTION

Engaged in the study of fossil shells belonging to Thiele's sectio *Cerithideopsilla* of the genus *Cerithidea* Swainson and deriving from plio-pleistocene beds in East Java, I failed to find a satisfying account on the recent species of this group. Therefore I resolved to examine as large a material as possible myself in order to settle the value of the different species and varieties that have been described in literature.

This investigation led me to the conclusion that even after the inspection of some 1950 specimens I cannot speak the final word, as ecological observations seem necessary to test the taxonomic value of the characters used for distinction. But a preliminary order may be established by the following revision of the material available to me, in which I propose to distinguish four species until field observations have thrown more light on the variability of these molluscs <sup>1</sup>).

Tryon (1887, pp. 159/160)—with his usual taste for lumping—cites the following synonyms of "*Potamides fluviatilis* Potiez et Michaud" in his Manual of Conchology: *Cerithium microptera* Kiener, *Cerithium alatum* Philippi, *Cerithium radix* Dufo, *Cerithium incisum* Hombron et Jacquinot, *Cerithium retiferum* G.B. Sowerby 2 and *Tympanotonos euryptera* A. Adams M. S., G. B. Sowerby 2.

Judging from the description (Dufo, 1840, p. 62) Dufo's *radix* seems to be a true *Cerithium*. My material contained no specimens matching the figure and description of *Cerithium retiferum* G. B. Sowerby 2 (1855, p. 892, pl. 186 fig. 295) and therefore I shall not discuss this form, which at any rate

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<sup>1</sup>) Perhaps anatomical research may bring to light new characters; my material is insufficient for that purpose, as all the specimens which are kept in alcohol belong to the same species, *C. cingulata* (Gmel.), except one not adult specimen which I consider to belong to *C. alata* (Phil.).

seems closely related to *Cerithidea cingulata* (Gmel.). The remaining forms may be grouped as four species, which ought to bear the following names:

*Cerithidea* (*Cerithideopsilla*) *cingulata* (Gmelin) [= *fluviatilis* (Pot. & Mich.)],

*Cerithidea* (*Cerithideopsilla*) *djadjariensis* (K. Martin) [= *incisum* (Hombr. & Jacq.), = *alata* (G. B. Sowerby 2 nec Philippi)],

*Cerithidea* (*Cerithideopsilla*) *alata* (Philippi) [= *euryptera* (G. B. Sowerby 2)], and

*Cerithidea* (*Cerithideopsilla*) *microptera* (Kiener).

Sowerby (1866, pl. 2 figs. 7—10) in his monograph of the genus *Tympanotonos* already distinguished these four species, but without discussing their variability. Other authors followed Tryon, or they took some intermediate position between this author and Sowerby.

#### SURVEY OF THE SPECIES STUDIED

The fossil occurrence of the species discussed is not to be considered here; I intend to deal with some fossil forms of this group shortly.

The first valid description of each species has been indicated by a +.

Unless otherwise stated the specimens examined are in the collection of the Rijksmuseum van Natuurlijke Historie at Leiden.

After the name of each locality the number of specimens, the name of the collector or donor, the date of collecting and (if necessary) the collection in which the sample is kept are enumerated successively; when one or more of these items are wanting, they are simply omitted and not replaced by a ?. When more than one sample derive from the same locality, the references bearing on each of them are separated by a ;.

The following abbreviations have been used:

alc. : kept in alcohol,

G.I.A. : collection of the Geologisch Instituut at Amsterdam,

Z.M.A.: Collection of the Zoölogisch Museum at Amsterdam.

Genus **Cerithidea** Swainson 1840

Subgenus **Cerithideopsis** Thiele 1929

Sectio **Cerithideopsilla** Thiele 1929

#### 1. **Cerithidea** (**Cerithideopsilla**) **cingulata** (Gmelin) (Plate XX figs. I—II)

1685 ..... — Lister, Hist. Conch., vol. 2, pl. 122 fig. 19.

1780 *Turbo granulatus minor*, ... — Chemnitz in: Martini, Syst. Conch. Cab., vol. 4, p. 328, pl. 157 fig. 1492.

+1790 *Murex cingulatus*. — Gmelin in: Linné, Syst. Nat., ed. 13, vol. 1, p. 3561.

- 1798 *Strombus Picta*. — Roeding, Mus. Boltinianum, p. 97.  
 1838 *Cerithium fluviatile*. — Potiez & Michaud, Galerie d. Moll., vol. 1, p. 363, pl. 31 figs. 19, 20.  
 1842 *Cerithium fluviatile* Potiez. — Kiener, Icon. Coq. Viv., vol. 5, *Cerithium*, p. 92, pl. 29 figs. 3, 3.  
 1852 *Cerithium (Pyrazus) cingulatum* Gm. — Mörch, Cat. Conch. Yoldi, p. 57.  
 1855 *Cerithium fluviatile* Potiez et Michaud. — G. B. Sowerby 2, Thes. Conch., vol. 2, p. 891 (partim), pl. 186 fig. 298 (tantum).  
 1866 *Tympanotonos fluviatilis*. — G. B. Sowerby 2 in: Reeve, Conch. Ic., vol. 15, *Tympanotonos*, pl. 2 figs. 9a, b.  
 1887 *Potamides fluviatilis* Potiez et Michaud. — Tryon, Man. Conch., vol. 9, p. 159 (partim), pl. 31 fig. 38 (tantum).  
 1923 *Potamides (Tympanotonos) cingulatus* Gmelin. — Oostingh, Meded. Landbouwhoogeschool Wageningen, vol. 26, part 3, p. 73 (partim), fig. 11.

#### Distribution according to literature:

In numerous publications on Indo-Pacific mollusca this species is referred to. I have only included those references in the synonymy, which are accompanied by a figure representing the present species. Though the greater part of the remaining references is likely to bear on the present form, there always remains some doubt, as they also may apply to one or more of the other species (especially *C. djadjariensis* (K. Martin)). Thus the following localities recorded in literature can only be cited here: Tranquebar (type locality, Chemnitz); in brackish water near Malabar (Potiez & Michaud); Coast of Java near the mouth of the Tji Lamaja (Oostingh).

#### Material examined:

- Locality? (27; 12 alc.);  
 India: Madras (3, H. C. Fulton) — Adyar, Madras (1; 2, L. Muller, 1925, Z.M.A.)  
 — Mouth of Adyar near Madras (2, miss C. Bayer, 1935/36);  
 Ceylon: Petepana near Negombo (34, J. Knock, 27 I 1939);  
 Island of Salanga [= Salang Is., Siam?] (1, A. Müller, Z.M.A.);  
 Malaya: Penang (5, Vignal, Z.M.A.);  
 East Indies (2, Z.M.A.);  
 Poeloe Weh (10, P. Buitendijk; 5, idem, IV 1926);  
 Sumatra: Belawan, Deli (29, P. Buitendijk, XI 1913; 107, idem, XI 1915, VII 1926 & XI 1926; 1, idem, V 1926; 17, idem, 1928; 32, idem, 1930; 2 from mangrove, Prof. Dr. H. Gerth, G.I.A.; 26, Jhr. F. C. van Heurn, Z.M.A.) — Perbaengan Serdang (1 from mangrove, J. E. A. den Doop, Z.M.A.) — shore at Batang Kwiss near Soengei Toean (50, Jhr. F. C. van Heurn, Z.M.A.) — Pantai Tjermin, S.O.K. (2, miss G. M. van Regteren Altena, 30 IV 1937, Z.M.A.);  
 Banka (2, J. Semmelink; 2, Z.M.A.);  
 Java and Madoera: Batavia (10 from freshwater fish pond, P. Buitendijk, 1907; 1 from fish pond at Pasar Ikan, Prof. Dr. H. Gerth, III 1927, G.I.A.; 5 from fish pond behind the laboratory for marine investigation, Dr. F. P. Koumans, 18 VII 1938) — River Antjol near Batavia (225, E. F. Jochim; 1, Dr. F. P. Koumans, 15 VII 1938) — Tandjong Priok (17, P. Buitendijk, VII 1907; 63, idem, II 1909; 3, idem, VIII 1926; 1, idem, IX 1927; 9, idem, XII 1927; 49, idem, V 1928; 1 from fish pond, J. Semmelink, Z.M.A.) — Cheribon (70, Jhr. W. C. van Heurn, VII 1921) — Boengkirit Tjoeningan, Residency of Cheribon (4, J. Semmelink; 8, J. Semmelink, Z.M.A.) —

Little island off Karang Anjar, W. of Semarang (3, miss G. M. van Regteren Altena, 5 VII 1937, Z.M.A.) — shore near the village of Kedoeng, E. of Semarang (2, G. Slootweg & A. Koert, 23 IV 1930) — Grisse, W. of Soerabaja (3, Prof. Dr. H. Gerth, G.I.A.) — Soerabaja (4, P. Buitendijk, VI 1924; 9, idem, V 1926; 34, idem, VIII 1926; 65, idem, XI 1926; 5, idem, II 1927; 25, idem, IX 1927; 21, idem, XII 1927; 52, Jhr. W. C. van Heurn,  $\pm$  1935; 1, C. Scheepmaker Gzn., Z.M.A.) — Soekalelo, E. of Soerabaja (16, miss G. M. van Regteren Altena, IX 1937, Z.M.A.) — Madoera and Soerabaja (3, P. Buitendijk, XI 1926) — Madoera (1, P. Buitendijk, I 1914; 3, idem, III 1930) — Kamal, S. coast of Madoera (8, Prof. Dr. H. Gerth, G.I.A.) — Passoeroean (36, J. Knock, 20 IX 1938) — Near reef of Batjoelmati (1 from Siboga Expedition, Z.M.A.) — Patjitan (63, E. F. Jochim);  
 Lombok: Bay of Laboean Tring (1 from Siboga Expedition, Z.M.A.);  
 Soembawa: Bay of Bima near south fort (1 from Siboga Expedition, Z.M.A.);  
 Celebes: Celebes? (286) — Makassar (9, Jhr. W. C. van Heurn, V 1920—II 1921; 56, idem, 5 II 1921; 25, Prof. Dr. M. Weber, Z.M.A.);  
 New Guinea: Kaimana (4, L. de Priester, Z.M.A.);  
 Philippines (3, Z.M.A.);  
 Amoy (5, G. Schlegel);  
 Japan (4, Siebold; 1, idem, Z.M.A.).

Total number of specimens examined: 1550.

The specimens collected at Makassar (Celebes) by Professor Weber have been mentioned by Martens (1897, p. 184); those from the Siboga Expedition by Schepman (1909, p. 168<sup>1)</sup>); that from Perbaoengan Serdang (Sumatra) by Prashad (1921, p. 494). The 12 specimens (alc.) referred to by Horst & Schepman (1899, p. 236) in their catalogue could not be found again in the collection of the Leiden Museum.

#### Discussion:

This and the following species are characterized by their outer lips being not expanded and wingshaped as is the case in the third and fourth species (compare figs. 1—19 with 20—25).

The most reliable characters to distinguish *C. cingulata* from *C. djadjariensis* are the flat sides of the spire and the very distinct varix in the body whorl, usually situated opposite to the mouth<sup>2)</sup> (fig. 8a). In my material only 4 of the more than 1500 specimens show an indistinct varix (fig. 11) as is characteristic of *C. djadjariensis*. In two of these four the last whorl had been damaged just before the formation of the varix, which accounts for its rudimentary state. In the other two all the remaining characters are so strikingly those of *C. cingulata*, that I consider them to be aberrant specimens of this species too.

1) "Stat. 33. Bay of Labuan Tring etc." error for: Stat. 19 etc.

2) In this paper the shells are orientated with the apex upwards and the aperture facing the observer. So the (physiological) front side becomes the inferior, the (physiological) back part the superior side.

The varix may be situated closer to the mouth, so that it does not influence the form of the profile (fig. 9a). In that case the habitus of the shell may at first sight remind of that of *C. djadjariensis*, but by the conspicuous varix and by the sculpture the specimen can still easily be recognised as *C. cingulata*.

In most specimens of this species the beads on the inferior and middle spiral ridges may merge into each other, as the groove between these spirals is only a shallow one. The middle and superior spiral ridges are, however, separated by a distinct spiral groove (e.g., figs. 5, 6, 7, 8, 9; exception: fig. 2). In *C. djadjariensis* these two grooves are of equal strength.

The altitude of adult specimens of this species is normally about 28 mm, it varies between 18 and 36 mm.

The number of axial ribs (= axial rows of beads on the spiral ridges) in the penultimate whorl varies between 14 and 24. In the greater part of my samples the average number is less than 20 (about 17), but this average may also amount to about 20 (sample from Cheribon).

The colour of *C. cingulata* may be plain chestnut brown with yellowish white spirals being visible inside the outer lip; sometimes the shell is more greyish or violet brown. The spiral ridges are often yellowish white in the last whorl; occasionally the inferior one or even all three are yellowish white in the spire too.

In Chemnitz' figure the sides of the spire are convex. Notwithstanding this I think Gmelin's name, which is based on this figure, must apply to the present form, as a distinct varix is indicated. Moreover specimens of a sample from Cheribon (fig. 7), belonging to the present form, are so strikingly alike Chemnitz' figure, that I do not hesitate to use Gmelin's name for this species. Specimens matching the figure of "*Cerithium fluviatile*" of Potiez and Michaud are not rare in my material (fig. 2) and a series of forms passing from this type to the specimen agreeing with Chemnitz' figure could be composed and is figured on the plate (figs. 2—7).

2. **Cerithidea (Cerithideopsilla) djadjariensis** (K. Martin) (Plate XX  
figs. 12—19)

1853 *Cerithium incisum* (Nob.) [non (Zieten)<sup>1</sup>]. — Hombron & Jacquinot, Voy. Pôle Sud, Atlas, Mollusques, pl. 23 figs. 8, 9<sup>2</sup>).

1854 *Cerithium incisum* Hombr. et Jacq. — L. Rousseau, Voy. Pôle Sud, Zoologie, vol. 5, (= vol. 4, part 2), p. 97<sup>2</sup>).

1) d'Orbigny, 1850, p. 271.

2) Of the Zoologie of the "Voyage au Pôle Sud" only part of the plates are available in our country; pl. 23 of the mollusca is wanting and so are the 5 volumes of text. I am indebted to Dr. W. Adam of Brussels for information about and copies from this publication.

- ?1855 *Cerithium fluviatile* [non] Potiez et Michaud. — G. B. Sowerby 2, Thes. Conch., vol. 2, p. 891 (partim), pl. 186 fig. 296 (tantum).  
 1866 *Tympanotonos alatus* [non (Philippi)]. — G. B. Sowerby 2 in: Reeve, Conch. Ic., vol. 15, *Tympanotonos*, pl. 2 fig. 10.  
 1887 *Potamides fluviatilis* [non] Potiez et Michaud. — Tryon, Man. Conch., vol. 9, p. 159 (partim), pl. 32 fig. 49 (tantum).  
 +1899 *Potamides (Cerithidea) djadjariensis* spec. nov. — K. Martin, Samml. geol. Reichsmus. Leiden, N. S., vol. 1, p. 216, pl. 33 figs. 502, 502a.

Distribution according to literature:

The type locality of this species is the pliocene near Tjidjadjar, Cheribon, Java (K. Martin). Moreover this species has been recorded from Borneo (Hombron & Jacquinot) and West Africa (Sowerby in Reeve), but this last record must be erroneous.

Material examined:

- ? (1);  
 Madagascar: Nossy-Toby (2, Pollen & Van Dam, IX 1866);  
 Mauritius (1, Semmelink);  
 Burma: Mergui (1, Z.M.A.);  
 East Indies (2, Z.M.A.);  
 Poeloe Weh (12, P. Buitendijk);  
 Sumatra: Belawan, Deli (1, P. Buitendijk, V 1926; 1, idem, VI 1927; 1, idem, XII 1927; 1, idem, VII 1930);  
 Banka: Blinjoe (7, C. Verdonck coll., L. de Priester don., 11 IX 1928; 1, L. de Priester, 8 IV 1930; 3, L. de Priester, 1 XI 1930) — River near Tobali (2, Kobus, Z.M.A.);  
 Java and Madoera: Batavia (2 from freshwater fish pond, P. Buitendijk, 1907; 4 from fish pond, P. van Oye, 9 VII 1916, Z.M.A.; 6 from fish pond at Pasar Ikan, Prof. Dr. H. Gerth, III 1927; 12 from fish pond behind the laboratory for marine investigation, Dr. F. P. Koumans, 18 VII 1938) — River Antjol near Batavia (5, E. F. Jochim; 86, Dr. F. P. Koumans, 15 VII 1938) — Tandjong Priok (1 from fish pond, J. Semmelink, Z.M.A.; 7, P. Buitendijk, II 1909; 1, idem, IX 1927; 11, idem, V 1928) — Cheribon (10, Jhr. W. C. van Heurn, VII 1921) — Little island off Karang Anjar, W. of Semarang (1, miss G. M. van Regteren Altena, 5 VII 1937, Z.M.A.) — Grissee (2, Prof. Dr. H. Gerth, G.I.A.) — Soerabaja (1 from Oedjong, J. Semmelink, I 1880; 1, P. Buitendijk, VI 1924; 5, idem, VIII 1926; 1, idem, II 1927; 3, idem, IX 1927; 2, idem, XII 1927) — Madoera (5, E. F. Jochim; 2 from S. coast, P. Buitendijk, XI 1925; 2, idem, III 1930) — Sepoeloe, N. coast of Madoera (6, Prof. Dr. H. Gerth, G.I.A.) — Kamal, S. coast of Madoera (1, Prof. Dr. H. Gerth, G.I.A.) — Besoeeki (1 alc., J. Semmelink) — Patjitan (2, E. F. Jochim);  
 Borneo: Borneo (6, Schwaner; 2, idem, Z.M.A.) — Balik Papan (1, F. J. Faber);  
 Celebes: Makasar (3, Prof. Dr. M. Weber, Z.M.A.; 18, Jhr. W. C. van Heurn, V 1920—II 1921; 2, idem, 5 II 1921);  
 Chinese coast: Macao (4, Buddingh) — Foo Chou (2, H. C. Fulton);  
 Japan (1, Siebold).

Total number of specimens examined: 254.

The specimens collected at Makassar (Celebes) by Professor Weber have been mentioned by Martens (1897, p. 184) as "*Potamides cingulatus* Gm.", I found them mixed up with specimens really belonging to the latter species

(25 specimens, cf. p. 214) in the collection of the Zoölogisch Museum at Amsterdam. The specimens recorded as "*Potamides alatus* Philippi" by Horst & Schepman (1899, p. 236) appeared to belong to the present species; two specimens (alc.) from "Océan Indien, M. Reinwardt" mentioned in the same place were not found again.

#### Discussion:

I have met with some transitional forms between this species and *C. cingulata* and sometimes I was inclined to unite the two forms on account of these intermediate shells. But, as intermediate specimens are relatively few in number, I think it more rational to keep the two species apart, as long as we are not informed about an eventual correlation between the variability of some characters and the ecological circumstances under which the specimens lived.

*C. djadjariensis* is characterized by the following features: The profile of the spire is always convex. The varix is mostly indistinct, whenever it is more pronounced it never reaches the conspicuousness characteristic of the previous species. Two spiral grooves of equal strength run between the three spiral ridges. The altitude of the adult specimens is normally about 35 mm, it varies between 25 and 43 mm. The number of axial ribs (= axial rows of beads in the spiral ridges) in the penultimate whorl varies between 15 and 25 and the average number is 19—20. The colour is mostly plain chestnut brown, with white spiral bands only inside the outer lip. I also saw a specimen with white spirals in the body whorl and several shells with the inferior spiral (which runs round the periphery in the body whorl) being of a yellowish or white hue in the spire.

The relation altitude: diameter is variable. I have figured a very slender specimen from Balik Papan (fig. 13) and very broad shells from Blinjoë, Banka (fig. 15) and from Foo Chou (fig. 16). Large specimens frequently appear to have grown further after the formation of an outer lip and another outer lip closes the second periode of growth by which more than two whorls may be added to the shell (figs. 17, 18). A specimen from Mauritius has regenerated after damage with four instead of three spiral ridges (fig. 19).

According to the Catalogue of the library of the British Museum (Nat. Hist. vol. 2, p. 605, 1904) the Atlas of the Zoologie of the "Voyage au Pôle Sud" has been published 1842—1853, which date, as Mr. R. Winckworth kindly informed me, has apparently been taken from the title page. As long as there is no evidence that pl. 23 of the mollusca has been issued earlier, 1853 must stand as the year of publication of *Cerithium incisum* Hombron et Jacquinot, which name is thus preoccupied by *Cerithium incisum* (Zieten).

Martin points out the following differences between his "*Potamides djadjariensis*" and the present species (s.n. *P. alatus* [non] Philippi, with a reference to Sowerby's figure in Reeve): 1) the axial sculpture is more sharp-edged ("scharfkantig"); 2) in the recent species the axial sculpture vanishes more distinctly in the body whorl. The last mentioned character appeared to be variable in my recent material too. I even found some specimens which show beads in the middle spiral ridge beyond the varix, which occurs only rarely in the recent shells, but is distinctly indicated in Martin's figures of *C. djadjariensis*. As to the first feature I amply compared the type of Martin's species, which is kept in the Rijksmuseum van Geologie en Mineralogie at Leiden, with the large number of recent specimens at my disposal and I am convinced that it is of small importance; it may even be due to the state of preservation of the fossil shell. Thus *C. djadjariensis* (K. Martin) may be considered a synonym of *C. incisa* (Hombron & Jacquinot) and though I do not like to take a fossil type for a recent species, there seems to be no other possibility.

### 3. *Cerithidea* (*Cerithideopsilla*) *alata* (Philippi) (Plate XX figs. 20—22)

- +1849 *Cerithium alatum* Ph. — Philippi, Abb. u. Beschr., vol. 3, part 4, p. 17, *Cerithium* pl. 1 fig. 11.
- 1855 *Cerithium fluviatile* [non] Potiez et Michaud. — G. B. Sowerby 2, Thes. Conch., vol. 2, p. 891 (partim), pl. 186 fig. 297 (tantum).
- 1866 *Tympanotonos euryptera*. — G. B. Sowerby 2 in: Reeve, Conch. Ic, vol. 15, *Tympanotonos*, pl. 2 figs. 8a, b.
- 1869 *Potamides fluviatilis* Potiez und Michaud (*Cerithium*) Varietas. — Lischke, Japan. Meeresconch., vol. 1, p. 76.
- 1887 *Potamides fluviatilis* [non] Potiez et Michaud. — Tryon, Man. Conch., vol. 9, p. 159 (partim), pl. 32 fig. 52 (tantum).
- 1887 *Potamides* (*Cerithidea*) *alatus* Philippi. — Martens, Journ. Linn. Soc., Zool., vol. 12, p. 169.
- 1889 *Tympanotomus eurypterus* A. Adams. — Morlet, Journ. de Conch., vol. 37, p. 144.
- 1890 *Cerithium* (*Tympanotonos*) *euryptera* A. Adams. — Kobelt, Syst. Conch. Cab., (2), vol. 1, part 26, p. 75, pl. 14 figs. 7, 8.
- 1897 *Potamides alatus* Phil. — Martens in: Weber, Zool. Erg. Reise Niederl. O.-Indien, vol. 4, p. 183.
- 1904 *Potamides fluviatilis* Potiez et Michaud, var. *euryptera* A. Adams. — Fischer & Dautzenberg, Cat. Indo Chine in: Mission Pavie, Études div., vol. 3, p. 416.
- 1905 *Tympanotonos euryptera* A. Adams. — Hidalgo, Revista Real Ac. Ciencias ex. fis. & nat. Madrid, vol. 2, p. 17.

Distribution according to literature:

I have not included all the records of "*C. alata* (Phil.)" which I found in literature in the synonymy. References to "*C. alata* (Phil.)" must be considered with great care, as Sowerby's figure (in Reeve) bearing this name really represents the preceding species and the Conchologia Iconica



may have been more often used for the identification of shells than Philippi's original work.

The type locality of this species is "Mergui in ditione quondam Birmanorum" (Philippi); moreover it has been recorded from Madras, Elphinstone Island, Lagoon Bay, Kisseraing Island and mud flats at Mergui (Martens 1887); the Gulf of Siam and Tonkin (Morlet, Fischer & Dautzenberg); Negros (Sowerby); Manila (Lischke) and Mindoro Island (Elera fide Hidalgo).

Material examined <sup>1)</sup>:

- ? (2+, 4—);  
 Burma: Mergui (2+, Z.M.A.);  
 Malaya: Port Swettenham (39+, 18—, J. Knock, 27 I 1939);  
 Poeloe Weh (1—, P. Buitendijk);  
 Sumatra: Belawan, Deli (3+, 8—, P. Buitendijk, V 1926; 8+, idem, XI 1926; 1+, idem, VIII 1928; 1+, idem, VII 1930; 3— from mangrove, J. E. A. den Doop, 22 IV 1917, Z.M.A.; 1+, Prof. Dr. H. Gerth, G.I.A.);  
 Banka: River near Tobali (1+, Kobus, Z.M.A.);  
 Java and Madoera: Bay of Batavia (1—, P. Buitendijk) — Batavia (1+, 1— from fish pond behind the laboratory for marine investigation, Dr. F. P. Koumans, 18 VII 1938) — River Antjol near Batavia (1+, 3—, Dr. F. P. Koumans, 15 VII 1938) — Tandjong Priok (1+, from fish pond, P. Buitendijk, II 1909) — Soerabaja (6+, C. Scheepmaker Gzn., Z.M.A.; 2+, P. Buitendijk, VI 1924; 7+, 2—, idem, XI 1926; 2—, idem, II 1927; 2+, 3—, idem, IX 1927) — Soekalelo, E. of Soerabaia (3—, miss G. M. van Regteren Altena, 9 IX 1937, Z.M.A.) — Madoera (1—, P. Buitendijk; 1—, idem, I 1914; 1—, from S. coast, idem, XI 1925; 1—, idem, III 1930) — Djoemiang, Madoera (1—, E. F. Jochim) — Besoeki (1— alc., J. Semmelink);  
 Bali: Benoa, S. coast of Bali (3—, Prof. Dr. H. Gerth, G.I.A.);  
 Celebes: Makassar (2+, Jhr. W. C. van Heurn, V 1920—II 1921);  
 Philippines (2+, H. C. Fulton);

Total number of specimens examined: 140.

The specimens collected in the mangrove at Belawan, Deli by Den Doop have been recorded by Prashad (1921, p. 494, partim cf. p. 213) as "*Potamides cingulatus* (Gmelin)".

Discussion:

In this species the profile of the spire is always convex and the varix is distinct, though not so conspicuous as in *C. cingulata* and *C. microptera*. The two spiral grooves are of equal strength. The number of axial ribs (= axial rows of beads on the spiral ridges) in the penultimate whorl varies between 13 and 26. The average number is about 16 in the sample from Port Swettenham (Malaya), but generally it is higher: about 20. The

<sup>1)</sup> I have mentioned the entire adult specimens (+) and those lacking the definitive outer lip (—), separately, as the identification of the latter is never quite sure.

altitude of adult specimens of this species varies between 24 and 37 mm. I saw no exceptions to the inferior spiral ridge being of a lighter hue<sup>1)</sup> than the remainder of the shell (not visible in my figures); mostly it is yellowish white, the rest of the shell being brown. In the body whorl this light spiral continues as a peripheral band up to the mouth. In one specimen I saw the other spirals being also of a light colour in the body whorl.

4. **Cerithidea (Cerithideopsilla) microptera** (Kiener) (Plate XX  
figs. 25—35)

- +1842 *Cerithium microptera* Nobis. — Kiener, Icon. Coq. Viv., vol. 5, *Cerithium*, p. 93, pl. 30 figs. 3, 3.  
 1853 *Cerithium fluviatile* [non] (Pot.). — Hombron & Jacquinot, Voy. Pôle Sud, Atlas, Mollusques, pl. 23 figs. 10, 11<sup>2)</sup>.  
 1854 *Cerithium fluviatile* [non Potiez & Michaud]. — L. Rousseau, Voy. Pôle Sud, Zoologie, vol. 5 (= vol. 4, part 2), p. 98<sup>2)</sup>.  
 1855 *Cerithium fluviatile* [non] Potiez et Michaud. — G. B. Sowerby 2, Thes. Conch., vol. 2, p. 891 (partim), pl. 186 fig. 299 (tantum).  
 1858 *Tympanotonos fluviatilis* [non Potiez & Michaud]. — Troschel, Gebiss d. Schnecken, vol. 1, p. 145, pl. 12 figs. 2 a—d.  
 1859 *Tympanotomus microptera* Kiener. — Chenu, Man. Conch., vol. 1, p. 285, fig. 1924.  
 1866 *Tympanotonos microptera*. — G. B. Sowerby 2 in: Reeve, Conch. Ic., vol. 15, *Tympanotonos*, pl. 2, figs. 7 a, b.  
 1869 *Potamides fluviatilis* Potiez und Michaud (*Cerithium*) Varietas. — Lischke, Japan. Meeresconch., vol. 1, p. 77.  
 1869 *Tympanotonos microptera* Kien. — Frauenfeld, Verh. k. k. zool. bot. Ges. Wien, vol. 19, Abhandl., p. 866.  
 1887 *Potamides fluviatilis* [non] Potiez et Michaud. — Tryon, Man. Conch., vol. 9, p. 159 (partim), pl. 31 fig. 39 (tantum).  
 1890 *Cerithium (Tympanotonos) microptera* Kiener. — Kobelt, Syst. Conch. Cab., (2), vol. 1, part 26, p. 74, pl. 14 figs. 5, 6.  
 1897 *Potamides micropterus* Kiener. — Martens in: Weber, Zool. Erg. Reise Niederl. O.-Indien, vol. 4, p. 185.  
 1905 *Tympanotonos microptera* Kiener. — Hidalgo, Revista Real Ac. Ciencias ex. fis. & nat. Madrid, vol. 2, p. 17.  
 1905 *Tympanotonos cingulatus* Gmelin, var. *microptera* Kiener. — Dautzenberg & Fischer, Journ. de Conch., vol. 53, p. 134.  
 1906 *Tympanotonos cingulatus* Gmelin, var. *microptera* Kiener. — Dautzenberg & Fischer, Journ. de Conch., vol. 53, p. 410.  
 1921 *Potamides micropterum* (Kiener). — Prashad, Rec. Ind. Mus., vol. 22, p. 495.  
 1935 *Tympanotonos microptera* (Kiener). — Yen, Notes de Malac. Chinoise (Musée Heude), vol. 1, part 2, p. 23.

1) Philippi's figure represents a uniformly greenish specimen. I am convinced that it was drawn after an uncleaned shell, as in several similar specimens I had first to remove a layer of clay, before I could examine their real colour.

2) See note 2, p. 215.

Distribution according to literature:

The type locality of this species is the Indian Ocean (Kiener). Moreover it has been recorded from the E. coast of Sumatra (with doubt, Prashad); from Singapore (Hombron & Jacquinot); from Hatien (Cochin China) and Tonkin (Dautzenberg & Fischer); from Pak-hoy (Chinese coast) (Yen); from the Philippines (Sowerby in Reeve); Manila (Lischke) and Cebu Island (Hidalgo). Martens cites the locality "Borneo, Kiener", but as I am unable to find this record in Kiener's work, I think it must be an error.

Material examined:

Indian Ocean (1, Z.M.A.);  
Singapore (1, Schröder, 1909; 1, Jhr. F. C. van Heurn, 20 III 1919, Z.M.A.);  
Philippines (1, G. Scheepmaker Wzn., Z.M.A.) — Argao, Cebu Island (5, W. H. Weeks, Z.M.A.).

Total number of specimens examined: 9.

Discussion:

In this species the outer lip is expanded as in the preceding one, but the shape of the mouth is different, as appears from my figures (compare figs. 20—22 with 23—25). The profile of the spire has straight sides, the varix is conspicuous and there are two spiral grooves of equal strength. The number of axial ribs (= axial rows of beads on the spiral ridges) in the penultimate whorl varies between 18 and 22, the altitude of the shell between 33 and 50 mm. As appears from Kiener's figure this species has typically a cream-yellow colour with red-brown grooves. Among the shells, which I examined, there are, however, specimens in which the spirals are of a darker hue, though never so dark as the intermediate grooves.

The figures 10 and 11 of Hombron & Jacquinot clearly represent the present species and not *C. cingulata*, as will appear from a comparison with my figure 23.

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## EXPLANATION OF PLATE XX

- Figs. 1—11: *Cerithidea* (*Cerithideopsilla*) *cingulata* (Gmelin)  
 figs. 1, 3, 4, 5, 6, 8a, 8b: Soerabaja (Java), P. Buitendijk, VIII 1926  
 fig. 2: Kamal (S. coast of Madoera), Prof. Dr. H. Gerth, G.I.A.  
 figs. 7a, 7b: Cheribon (Java), Jhr. W. C. van Heurn, VII 1921  
 figs. 9a, 9b: River Antjol near Batavia (Java), E. F. Jochim  
 fig. 10: Celebes?  
 fig. 11: Tandjong Priok (Java), P. Buitendijk, II 1909
- Figs. 12—19: *Cerithidea* (*Cerithideopsilla*) *djadjariensis* (K. Martin)  
 fig. 12: Cheribon (Java), Jhr. W. C. van Heurn, VII 1921  
 fig. 13: Balik Papan (Borneo), F. J. Faber  
 fig. 14: Makassar (Celebes), Jhr. W. C. van Heurn, V 1920 or II 1921  
 fig. 15: Blinjoe (Banka), L. de Priester  
 fig. 16: Foo Chou (Chinese coast), H. C. Fulton  
 figs. 17, 18: Poeloe Weh, P. Buitendijk  
 fig. 19: Mauritius, J. Semmelink
- Figs. 20—22: *Cerithidea* (*Cerithideopsilla*) *alata* (Philippi)  
 fig. 20: Belawan (Sumatra), P. Buitendijk, XI 1926  
 fig. 21: Soerabaja (Java), P. Buitendijk, VI 1924  
 fig. 22: Soerabaja (Java), P. Buitendijk, IX 1927
- Figs. 23—25: *Cerithidea* (*Cerithideopsilla*) *microptera* (Kiener)  
 figs. 23, 24: Argao (Cebu, Philippines), W. H. Weeks, Z.M.A.  
 fig. 25: Philippines, G. Scheepmaker Wzn., Z.M.A.
- Figures 1—11:  $\times 1\frac{1}{5}$ ; figures 12—18, 20—25:  $\times 1$ ; figure 19:  $\times 1\frac{1}{2}$ .

