ON A COLLECTION OF MOLLUSCA FROM THE COROMANDEL COAST OF INDIA[1].

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[Plate III]

INTRODUCTION.

The present paper is based on the study of a large collection of mollusca sent for identification to the Zoological Survey of India by Professor P. R. Awati of the Bombay University. The collection comprises specimens of land, freshwater, marine and estuarine forms, which were collected by Professor Awati from the Coromandel Coast. Unfortunately records of exact localities from which the different species were obtained, the dates of collection and other data are not available.

A considerable amount of work has already been done on the Mollusca of the Madras Coast. The most comprehensive work on the subject is that of Melvill and Standen[2] who catalogued about four hundred species of marine shells. Mörch[3] dealt with a comparatively small number of terrestrial and fluviatile species only, and Hornell[4] mostly discussed the habits and utility of the edible mollusca of South India. Crichton[5] while giving a list of shells of Madras laid particular stress on the habits of the animals. In so far as the number of species is concerned, Gravely's[6] work is quite extensive and it proves useful in some respects.

Crepidula fornicata (Linn.), previously known from America, Europe and Africa, and *Fusinus rostratus* (Olivi) from the Mediterranean, the Red Sea and the Canary Islands in the north Atlantic are being recorded for the first time from Indian waters. Hora and Mukherji[7] in the case of fish and Chopra and Das[8] in the case of crabs have recently recorded instances of the Atlantic forms being found in the eastern part of the Indo-Pacific area. Alcock[9] had also previously given many similar examples, and it appears that the occurrence in Indian waters of species of animals that were so far considered as inhabitants of the Atlantic Ocean is not very uncommon. Three new species have been described and several others recorded for the first time from the Coromandel Coast. The collection that I have studied includes 62 genera and 83 species in all. Altogether 44 families are represented.

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[1] Published with the kind permission of the Director, Zoological Survey of India.

[2] Melvill, J. C. and Standen, R. *Journ. Conch. IX*, pp. 30-48, 75-85 (1898).

[3] Mörch, O. A. L. *Journ. Conchyliol.* XX, pp. 333-345 (1872).

[4] Hornell, J. *Mad. Fish. Bull. XI*, pp. 1-51 (1917); XIV, pp. 97-215 (1924).

[5] Crichton, M. D. *Journ. Bomb. Nat. Hist. Soc. XLII* (1), pp. 324-341 (1941).

[6] Gravely, F. H. *Bull. Mad. Govt. Mus.* (N. S.), V (1), pp. 23-112 (1941); V (2), pp. 1-110 (1942).

[7] Hora, S. L. and Mukherji, D. D. *Nature*, CXXXVII (Jan., 25), p. 152 (1936); *Rec. Ind. Mus.* XXXVII, pp. 15-39 (1936).

[8] Chopra, B. N. and Das, K. N. *Rec. Ind. Mus.* XXXIX, p. 381 (1937).

[9] Alcock, A. *Journ. As. Soc. Bengal*, LXVIII, p. 14 (1899); *Investigator Deep-Sea Madreporaria, Calcutta* (1898); *Investigator Deep-Sea Brachyura, Calcutta* (1899).

Lastly, I acknowledge my sincere thanks to Dr. B. N. Chopra, Director, Zoological Survey of India, for his useful suggestions. I am also grateful to Dr. B. Prashad, Fisheries Development Adviser, Government of India, for his valuable comments and criticisms. My thanks are also due to Babu A. K. Mondal, one of the Artists of the Survey, for the care and accuracy with which he has prepared the figures used in this paper.

Class LORICATA.

Order CHITONIDA.

Family CHITONIDAE.

Subfamily *CHITONINAE.*

Genus **Chiton** Linnaeus, 1758.

Subgenus **Chiton** S. S.

Chiton squamosus Linnaeus, 1764.

1764. *Chiton squamosus*, Linné, *Mus. Lud. Ulricae*, p. 465.

1785. *Chiton scaber variegatus* and *Ch. marmoreus*, Chemnitz, *Conch.*-Cab, VIII, pp. 276, 282, pl. xciv, figs. 792, 793, pl. xcv, figs. 803-805.

1847. *Chiton marmoreus*, Reeve, *Conch. Icon.* IV, pl. xii, fig. 64.

1892. *Chiton (Chiton) squamosus*, Tryon, *Man. Conch.* XIV, pp. 155, 156, pl. xxxv, figs. 80-82.

1903. *Chiton (Tonicia) marmoreus*, Clessin, *in Martini and Chemnitz's Syst. Conch.-Cab. VI*, Abth. 4, pp. 21, 22, pl. ii, figs. 7-9.

The species is represented in the collection by only two specimens which have light green shells with minutely beaded lateral areas.

Distribution.—It is a West Indies form and its occurrence on the Coromandel Coast is, therefore, of interest. I have also examined one example of this interesting species sent for identification by Dr. T. S. Mahabale, Gujrat College, who collected it from Port Okha in Baroda.

Class GASTROPODA.

Subclass *PROSOBRANCHIA.*

Order ARCHAEOGASTROPODA.

Family FISSURELLIDAE.

Subfamily *EMARGINULINAE.*

Genus **Diodora** Gray, 1821.

Diodora ruppellii (Sowerby, 1834).

1834. *Fissurella rüppellii*, Sowerby, *Proc. Zool. Soc. London*, p. 128.
1927. *Diodora rüppellii*, Tomlin, *Trans. Zool. Soc.* XXII (3), pp. 298, 316.
1929. *Capiluna rüppellii*, Dautzenberg, *Faune des Col. Franc.* III, p. 546.
1937. *Diodora rüppellii*, Viader, *Maur. Inst.* Bull. 1 (2), p. 57.
1939. *Fissurella (Capiluna) rüppellii*, Moazzo, *Mem. Inst. Egypte*, XXXVIII, pp. 213, 214.

The single specimen in the collection has a shell with closely evenly latticed sculpture and bluish-white interior. For a detailed synonymy of this species reference may be made to Moazzo's paper cited above. This species, as stated by Schepman (1908, p. 87), is erroneously treated by Pilsbry as identical with *D. nigriradiata* (Reeve).

Distribution.—Red Sea, Gulf of Suez, Aden, Mekran Coast, Mauritius, Madagascar, King Island, Cape of Good Hope, Madras, Ceylon, Penang, Malacca and the Philippines. The species, as stated by Tomlin, is common throughout the Suez Canal.

Family PATELLIDAE.

Subfamily *NACELLINAE.*

Genus **Cellana** H. Adams, 1889.

Cellana capensis (Gmelin, 1790).

1790. *Patella capensis*, Gmelin, *Syst. Nat.* ed. XIII, pp. 3720, 3721, No. 150.
1848. *Patella capensis*, Krauss, *Die Südafrik. Moll.*, p. 53, pl. iii, fig. 13.
1929. *Helcioniscus capensis*, Dautzenberg, *Faune des Col. Franc.* III, p. 551.

In the two shells of this species in the collection the central spatula appears to be whitish, instead of brown or orange—a character very rarely found in this form.

Distribution.—Persian Gulf, Gwadur (Baluchistan), Natal, Madagascar, Ceylon and Tranquebar.

Cellana testudinaria (Linnaeus, 1758).

1758. *Patella testudinaria*, Linné, *Syst. Nat.* ed. X, p. 783, No. 674.
1908. *Helcioniscus testudinarius*, Schepman, *Prosobr. Siboga Exped. Monogr.* XLIX[1]b, p. 98.
1938. *Helcioniscus testudinarius*, Suvatti, *Moll. of Siam, Bangkok*, p. 2.
1939. *Cellana testudinaria*, Lamy and Fischer-Piette, *Bull. Mus. Nat. Hist. Nat.* (2) XI (2), p. 263.

There are only two specimens in the collection which belong to *C. testudinaria*. The shell is depressedly conical and decussated with low, radiating and concentric riblets. Adam and Leloup (1938, p. 10, fig. 2) have figured the radular teeth of this species and have also given its detailed synonymy.

Distribution.—The range of this common species extends widely throughout the Indo-Pacific.

Family TROCHIDAE.

Subfamily *TROCHINAE.*

Genus **Trochus** Linnaeus, 1758.

Subgenus **Trochus** S. S.

Section **Infundibulum** Montfort, 1810.

Trochus radiatus Gmelin, 1790.

1790. *Trochus radiatus*, Gmelin, *Syst. Nat.* ed. XIII, p. 3572, No. 33.
1937. *Trochus radiatus*, Viader, *Maur. Inst. Bull.* 1(2), p. 55.
1938. *Trochus (Infundibulum) radiatus*, Adam and Leloup, *Mém. Mus. Roy. Hist. Nat. Belg. II*, Fasc. 19, pp. 25, 26.

The two specimens in the collection agree with the description of the typical form.

Distribution.—Like the preceding species, it is found all over the Indo-Pacific. But its range also extends as far as the Red Sea.

Genus **Cantharidus** Montfort, 1810.

Subgenus **Thalotia** Gray, 1847

Cantharidus kotschyi (Philippi, 1848).

1848. *Trochus kotschyi*, Philippi, *Zeitschr. f. Malakozool.*, p. 127.
1889. *Cantharidus (Thalotia) kotschyi*, Tryon, *Man. Conch.* XI, p. 144, pl. xlvi, figs. 70-72.
1901. *Cantharidus kotschyi*, Melvill and Standen, *Proc. Zool. Soc. London*, II, p. 348.

One young depressedly-conical shell of chocolate-brown colour represents this species in the collection. The carina of the last whorl is ornamented with regular whitish nodules.

Distribution.—Karrak, Persia, Persian Gulf, Mekran Coast, Karachi, Bombay and Gwadur. It does not appear to have hitherto been recorded from the Coromandel Coast.

Genus **Gibbula** (Leach MS.) RISSO, 1826.

Subgenus **Enida** A. Adams, 1860.

Gibbula nobomii, sp. nov.

(Plate III, figs. 1, 2.)

Shell small, solid, dextral, depressedly-conical, widely umbilicated, white but slightly tinged with yellow, conspicuously irregularly radiately blotched with dark grey, blotches appearing much larger on the surface than below the periphery; whorls 5½, each neatly ornamented

with spirally granular, more or less equidistant lirae (fig. 1) which appear to vary considerably in size, but only slightly in number (the larger ones regularly alternating with the smaller ones and are arranged as 5 + 4 + 4 + 4 + 4 (counting from the last whorl, excluding the carina), in the interstices between the lirae are fine smooth oblique striae varying in number from 2 to 4 in each, crossed by very fine vertical striae which give the surface a fine network-like appearance, the last whorl strongly carinated and crenulated ; suture canaliculate ; below the periphery are six prominent lirae, though not so unequal in size as the upper ones, with interstices similarly adorned with spiral and vertical striae ; base flattened ; aperture subquadrate, interior whitish, columella whitish, excavate, peculiarly crossed by a prominent median oblique ridge (fig. 2) which becomes tuberculous at the tip while ending just on its inner margin, slightly above it is another tubercle bulging into the cavity, while below it in the same line are two more tubercles of similar calibre, the last one lying just above the union of the lower end of the columella with the outer lip, the distance between these four tubercles is more or less same, the angle between the inner and the outer lips pronounced.

Measurements.—There are only two shells in the collection which measure 8 mm. in length and 11 mm. in breadth and 7 mm. in length and 10 mm. in breadth respectively.

Type-locality.—Coromandel Coast of India, Madras, S. India.

Holotype.—Reg. No. M 15941/2 Zool. Surv. Ind.

Paratype.—Reg. No. M 15944/2 Zool. Surv. Ind.

Remarks.—*Gibbula* (*Enida*) *nobomii* closely resembles *G.* (*E.*) *persica* (Melv. and Stand.)[1] from the Gulf of Oman in the general form of the shell as well as in the shape of its aperture, but differs from it in colouration, in having the angle between the inner and the outer lips more pronounced, and also in other important details as mentioned above. In *E. japonica* and *E. speciosa* the inner lip is quite smooth, while in *E. gemmulosa* it is lirate and crenate at the margin. The new species, however, may be readily distinguished from all in having the columella crossed by a median oblique ridge and its margin distinctly tuberculated.

Subfamily *UMBONIINAE.*

Genus **Umbonium** Link, 1807

Umbonium vestiarium (Linnaeus, 1758).

1758. *Trochus vestiarius*, Linné, *Syst. Nat.* ed. X, p. 758, No. 515.

1842. *Rotella vestiaria*, Reeve, *Conch. Syst.* II, p. 162, pl. ccxvi, fig. 2.

1931. *Umbonium vestiarium*, Winckworth, *Proc. Malac. Soc. London*, XIX (4), p. 189.

Seven elegantly painted shells of this very common and extremely variable species, including the var. *rosea*, are present in the collection. In all of them, however, the margin is more or less rounded and the umbilical callosity is large and thick.

[1] Melvill and Standen, *Ann. & Mag. Nat. Hist.* (7) XII, p. 294, pl. xx, fig. 10 (1903).

Distribution.—This variously coloured species is found in the Persian Gulf, Mekran Coast, Karachi, Bombay, Bassein, Goa, Madras, Tranquebar, Pulicat Lake, Tuticorin, Krusadai Island, Ceylon to Java, Singapore, Siam, New Ireland, the Philippines and Japan.

Genus **Monilea** SWAINSON, 1840.

Section **Priotrochus** P. Fisher, 1880.

Monilea obscura (Wood, 1828).

1828. *Trochus obscurus*, Wood, *Index Testaceol. Suppl.*, pl. v, fig. 25.
1880. *Trochus (Aphanotrochus) obscurus*, von Martens, *in Mobius's Beitraye zur Meeresfauna der Insel Mauritius und der Seychellen*, p. 296.
1929. *Monilea (Priotrochus) obscura*, Dautzenberg, *Faune des Col. Franc.* III (4), p. 540.
1937. *Priotrochus obscurus*, Viader, *Maur. Inst. Bull.* 1 (2), p. 55.

There is one beautiful shell of this species in the collection which can easily be recognized by its black streaks or maculations on the surface.

Distribution.—Red Sea, Persian Gulf, Mauritius, Madagascar, Seychelles, Zanzibar, Natal and also in some parts of the Indian and Pacific Oceans. It is interesting to record for the first time its occurrence on the Coromandel Coast.

Subfamily *MARGARITINAE.*

Genus **Sotmatella** Lamarck, 1819.

Subgenus **Stomatella** S. S.

Stomatella elegans Gray, 1847

1847. *Stomatella elegans*, Gray, *in Appendix to a Narrative of the Voy. H. M. S. 'Fly'*, II, p. 359, pl. ii, fig. 1.
1901. *Stomatella elegans*, Melvill and Standen, *Proc. Zool. Soc. London*, II, p. 345.

The two specimens of *S. elegans* in the collection agree in their shell characters with Gray's description and figure.

Distribution.—Karrak, Persia, Mekran Coast and Karachi. Coromandel Coast appears to be a new record.

Family TURBINIDAE.

Subfamily *TURBININAE.*

Genus **Turbo** Linnaeus, 1758.

Subgenus **Senectus** Mus. Cal.

Turbo brunneus (Röding, 1798).

1798. *Lunatica brunea*, Röding, *Mus. Bolt.*, p. 102, No. 1315.

1930. *Turbo (Senectus) intercostalis*, Oostingh, *Misc. Zool. Sumatrana*, XLIX, p. 2.

1938. *Turbo (Marmarostoma) bruneus*, Adam and Leloup, *Mèm. Mus. Roy. Hist. Nat. Belg.* II, Fasc. 19, pp. 34-37, Text-fig. 9 (radular teeth), pl. iii, fig. 4a-b (shell).

1942. *Turbo brunneus*, Gravely, *Bull. Mad. Govt. Mus.* (*N. S.*), V (2), p. 17, fig. 2a-b.

There has been much confusion as to the synonymy of *Turbo brunneus* (Röding), but Tomlin (1936)[1] has clearly shown that *T intercostalis* Menke (1843) and *T radiatus* Reeve (nec. Gmelin), which were considered by Schepman, Tryon and others as distinct from *brunneus*, are only synonyms of the latter. Ostergaard's (1935)[2] remark "It is a question whether *T intercostalis* Menke should not also be considered a variety of *T argyrostomus*" appears rather unsatisfactory. Adam and Leloup figured the radular teeth of *T brunneus* in the paper cited above. Tomlin has nicely summed up the main points of opercular distinction between the groups *senectus* Mus. Cal. and *Sarmaticus* Gray, which evidently show that *T brunneus* belongs to the former, though Adam and Leloup have placed it into the group *Marmarostoma* Swainson, which Thiele (1929) considers as synonymous with *Lunella* Röding.

T brunneus is represented in the collection by only two specimens which appear to be quite typical of the species.

Distribution.—This is a very common South Indian form and occurs widely in the Red Sea, Gulf of Suez, Persian Gulf, Mekran Coast, Karachi, Bombay, Goa, Panjim, Mauritius, Madagascar, Sandwich Islands, Maldives, Ceylon, Maungmagan, Akyab, Arakan, Singapore, Andamans, Nicobars, East Indian Archipelago, Australia, New Caledonia, Gulf of Siam, Annam and the Philippines.

Family NERITIDAE.

Subfamily *NERITINAE*.

Genus **Nerita** Linnaeus, 1758.

Subgenus **Theliostyla** Mörch, 1852.

Nerita plexa Chemnitz, 1781.

1781. *Nerita plexa*, Chemnitz, *Conch.-Cab.* V, p. 288, pl. cxc, figs. 1944, 1945.

1885. *Nerita plexa*, von Martens, *in Martini and Chemnitz's Syst. Conch.-Cab.* II, Abth. 11, pp. 10, 107, pl. iv, figs. 1-3.

1905. *Nerita plexa*, Hidalgo, *Cat. Moll. Test. Filipinas*, p. 223.

1932. *Nerita plexa*, Dautzenberg, *Journ. de Conchyliol.* LXXVI, p. 75.

Of the two specimens of this species in the collection, one bears nodose spiral ribs, while the other, which is slightly smaller, has rugose ribs only. Other important characters appear to be quite conspicuous in both.

[1] Tomlin, J. R. le B. *Proc. Maluc. Soc. London*, XXII (3), pp. 136, 137 (1936).

[2] Ostergaard, *Bull. B. P. Bishop Mus.* CXXXI, p. 47 (1935).

Distribution.—Red Sea, Mekran Coast, Karachi, Bombay, Mauritius, Madagascar, Mozambique, Natal, Zanzibar, Seychelles, Madras, Tranquebar, Ceylon and the Philippines.

Order MESOGASTROPODA.

Family PILIDAE.

Subfamily *PILINAE.*

Genus **Pila** Röding, 1798.

Pila virens (Lamarck, 1822).

1822. *Ampullaria virens*, Lamarck, *Hist. Nat. Anim. Sans Verteb.* VI (2), p. 179.

1925. *Pila virens*, Prashad, *Mem. Ind. Mus.* VIII, pp. 75, 76, pl. xiv, figs. 1-3.

1943. *Pila virens*, Ray, *Journ. Roy. As. Soc. Bengal, Sci.* IX, p. 71.

Three large specimens with smooth and yellowish shells represent *P. virens* in the collection.

Distribution.—Prashad has discussed the chief characteristics and the wide range of distribution of this interesting species in the paper cited above. Its occurrence in the Santal Parganas in Bihar was recorded in my paper mentioned above.

Family TURRITELLIDAE.

Genus **Turritella** Lamarck, 1799.

Subgenus **Haustator** Montfort, 1810.

Section **Zaria** Gray, 1847

Turritella duplicata (Linnaeus, 1767).

1767. *Turbo duplicatus*, Linné, *Syst. Nat.* ed. XII, p. 1239, No. 643.

1849. *Turritella duplicata*, Reeve, *Conch. Icon.* V, pl. 1, fig. 2.

1929. *Turritella* (*Zaria*) *duplicata*, Thiele, *Handb. der Syst. Weichtierk.* 1, pp. 181, 182.

This well-known species is represented in the collection by only two specimens, of which one is a badly worn bleached shell, while the other a half-broken posterior part of a shell. The latter exhibits the true fulvous colour and the strongly keeled spiral ridges of the typical form. Gravely (loc. cit., pp. 22, 99, fig. 3c, 1942) considers *T duplicatus* Linn. as a synonym of *T acutangulus* Linn. (1767), while Dautzenberg[1] combines the latter with the former as a variety.

Distribution.—Mauritius, Madagascar, Bombay, Madras, Krusadai Island, Pamban, Ceylon, Hinzé Basin, Nicobars, Malay Archipelago and the Philippines.

[1] Dautzenberg Ph. *Ann. Soc. Roy. Malacol.* XXIV, p. 4 (1899).

Family PLANAXIDAE.

Subfamily *PLANAXINAE.*

Genus **Planaxis** Lamarck, 1822.

Subgenus **Planaxis** S. S.

Section **Planaxis** S. S.

Planaxis sulcatus (Born, 1780).

1780. *Buccinum sulcatum*, Born, *Test. Mus. Caes. Vindob.*, p. 258, pl. x, figs. 5, 6.

1908. *Planaxis sulcatus*, Schepman, *Prosobr. Siboga Exped. Monogr.* XLIX[1] b, p. 171.

1938. *Planaxis (Planaxis) sulcatus*, Adam and Leloup, *Mém. Mus. Roy. Hist. Nat. Belg.* II, Fasc. 19, p. 97.

1942. *Planaxis sulcatus*, Gravely, *Bull. Mad. Govt. Mus.* (*N. S.*), V (2), pp. 24, 94, fig. 3b.

There is a single eroded shell of this species in the collection which can readily be distinguished by its deep transverse sulcations on the surface, strongly tooth-ridged interior, and crenated margin.

Distribution.—This common and variable species is widely distributed in the Indo-Pacific. But its range also extends as far as the Gulf of Suez.

Planaxis breviculus Deshayes, 1844.

var. **tessellata** Nevill, 1884.

1872. *Planaxis breviculus* var., Smith, *Ann. & Mag. Nat. Hist.* (4) IX, p. 39.

1884. *Planaxis breviculus* var. *tessellata*, Nevill, *Hand List Moll. Ind. Mus.* II, p. 186.

1887. *Planaxis sulcatus* var. *tessellata*, Tryon, *Man. Conch.* IX, p. 277.

1901. *Planaxis breviculus* var. *tessellata*, Melvill and Standen, *Proc. Zool. Soc. London*, II, p. 377.

The single specimen of the variety *tessellata* in the collection has a bluish-black shell covered with a horny epidermis. The spire is more acuminate and the transverse sulcations on the surface are finer than in the *forma typica*, and so are the lirae within the mouth of the shell.

Distribution.—This rare form has so far been known from the Persian Gulf only.

Family POTAMIDIDAE.

Subfamily *POTAMIDINAE.*

Genus **Cerithidea** Swainson, 1840.

Subgenus **Cerithideopsis** Thiele, 1929.

Section **Cerithideopsilla** Thiele, 1929.

Cerithidea cingulata (Gmelin, 1790).

1790. *Murex cingulatus*, Gmelin, *Syst. Nat.* ed. XIII, p. 3561, No. 138.

1938. *Cerithidea (Cerithideopsilla) cingulata*, Adam and Leloup, *Mém. Mus Roy. Hist. Nat. Belg.* II, Fasc. 19, pp. 98, 99.

1939. *Potamides cingulatus*, Panikkar and Aiyar, *Proc. Ind. Acad. Sci.* IX B (6), p. 357.

1941. *Cerithidea fluviatilis*, Gravely, *Bull. Mad. Govt. Mus.* (*N. S.*), V(2), pp. 22, 24, 25, 94, fig. 3f.

C. cingulata is a common estuarine form, though Townsend considers it distinctly marine. The only instance of this brackish water form occurring in pure freshwater is furnished by Dr. Annandale[1], who collected several dead and worn shells in the lake deposit at Nasariyeh, Lower Mesopotamia. It is represented in the collection by only one small brownish shell which agrees with the description of the typical form. For a detailed synonymy of the species reference may be made to Adam and Leloup's paper cited above. A note on the breeding habits of this animal is given by Panikkar and Aiyar, while Troschel[2] has described and figured its radular teeth.

Distribution.—It has a wide range in the Indo-Pacific.

Genus **Telescopium** Montfort, 1810.

Telescopium telescopium (Linnaeus, 1758).

1758. *Trochus telescopium*, Linné, *Syst. Nat.* ed. X, p. 760, No. 561.

1817. *Telescopium fuscum*, Schumacher, *Ess. Nouv. Syst. Test.*, p. 232.

1921. *Potamides (Telescopium) telescopium*, Prashad, *Rec. Ind. Mus.* XXII, pp. 493, 494.

1938. *Telescopium telescopium*, Adam and Leloup, *Mém. Mus. Roy. Hist. Nat. Belg.* II, Fasc. 19, p. 99.

This well-known brackish water ponderous Potamidid has a single trochiform shell in the collection. An account of the anatomy of the soft parts of this animal was published by Berkeley and Hoffman (1835)[3].

Distribution.—Abundantly found in mangrove swamps on the coasts of India, the Gangetic delta, the Irrawaddy delta, Reunion, Madagascar, Ceylon, the Malay Archipelago, Singapore, Sambelong, Pulo Panjang, Nicobars, Australia and the Philippines. The range of its distribution is more or less similar to that of *Cerithidea cingulata* (Gmelin). It is also known in the fossil state in the Miocene of Java, Pliocene of Nias near Sumatra, Pliocene and Pleistocene of Timor, Pleistocene of Madura, Celebes and New Guinea.

Family Amaltheidae.

Genus **Amalthea** Schumacher, 1817.

Subgenus **Malluvium** Melvill, 1906.

Amalthea lissa (Smith, 1894).

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[1] Annandale, N. *Rec. Ind. Mus.* XV, p. 164 (1918).

[2] Troschel, F. H. *Das Gebiss der Schnecken*, Berlin, Part 3, p. 145, pl. xii, fig. 2 (1858).

[3] Berkeley, M. J. and Hoffman, G. H., *Zool. Journ.* V, p. 431, pls. xx, xxi (1835).

1894. *Capulus lissus*, Smith, *Ann. & Mag. Nat. Hist.* (6) XIV, p. 166, pl. iv, figs. 4-6.

1909. *Amalthea* (*Malluvium*) *lissa*, Schepman, *Prosobr. Siboga Exped. Monogr.* XLIX[1]b, pp. 199, 200.

1940. *Hipponyx* (*Malluvium*) *lissus*, Winckworth, *Proc. Malac. Soc. London*, XXIV (1), p. 20.

1942. *Amalthea* (*Malluvium*) *lissa*, Devanesen, *Curr. Sci.* XI (1), pp. 16, 17.

A series of specimens, numbering thirty-seven, represent the species in the collection. All of them have cup-shaped shells which are pale yellow in colour, but devoid of any radiating sculpture. Peile[1] has described and figured the embryo operculum and the radular teeth of this species, while Thorson[2] has illustrated its larval development.

Distribution.—Originally described from the Bay of Bengal, but subsequently its range has been extended to the Persian Gulf, Gulf of Oman, Mekran coast, Laccadive, east coast of Africa, Gt. Nicobar, East Indian Archipelago and Japan.

Family CALYPTRAEIDAE.

Genus **Crepidula** Lamarck, 1799.

Section **Crepidula** S. S.

Crepidula fornicata (Linnaeus, 1767).

1767. *Patella fornicata*, Linné, *Syst. Nat.* ed. XII, p. 1257, No. 751.

1886. *Crepidula fornicata*, Tryon, *Man. Conch.* VIII, p. 124, pl. xxxvi, figs. 1-8.

1929. *Crepidula fornicata*, Robson, *Proc. Malac. Soc. London*, VIII (6), pp. 272-275.

1934. *Crepidula fornicata*, Adam and Leloup, *Bull. Mus. Roy. Hist. Nat.* Belg. X, No. 45, pp. 1-6.

1937. *Crepidula fornicata*, Orton, *Oyster Biology and Oyster-Culture being the Buckland Lecture for 1935*, p. 162, London.

1942. *Crepidula fornicata*, Coe, *Journ. Morph. Philadelphia*, LXX (3), pp. 506, 507.

Two very fine shells of this interesting " Slipper-limpet " or "Boat Shell " or " Crow oyster ", as the species is commonly called, are present in the collection. The brown colour of the typical form is only faintly visible near the beak which is peculiarly curved or twisted. The internal partition is distinctly concave and rounded at the periphery.

Distribution.—C. fornicata was originally described from North America, but subsequently recorded from Europe (where it is said to have been introduced) and Africa. Adam and Leloup have discussed its range in Europe. while Robson has given a detailed account of its dispersal in English waters, where it has proved a great menace to oyster culture. Coe has shown the possible transformation undergone by the reproductive organs of this species and its allies during the change from male to female phase. Its occurrence for the first time in Indian waters is, therefore, remarkable.

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[1] Peile, A. J. *Proc. Malac. Soc. London*, XXI(4), p. 251 (1935).

[2] Thorson, G. *Danish Sci. Invest. in Iran*, Part II, pp. 160, 172, figs. 4c-f (1940).

Family Xenophoridae.

Genus **Xenophora** Fischer von Waldheim, 1807.

Subgenus **Xenophora** S. S.

Xenophora pallidula (Reeve, 1842).

1842. *Phorus pallidulus*, Reeve, *Proc. Zool. Soc. London*, p. 162.
1882. *Xenophora pallidula*, Dunker, *Index Moll. Maris Japonici*, p. 123.
1940. *Xenophora pallidula*, Winckworth, *Proc. Malac. Soc. London*, XXIV (1), p. 21.
1942. *Xenophora pallidula*, Devanesen, *Curr. Sci.* XI(1), pp. 16, 17.

X. pallidula, though truly a Japanese species, occurs in Indian waters. It is well-represented in the collection by specimens of varying sizes, in which the shell appears to be faintly yellowish and characteristically agglutinated over with fragments of shells of different kinds. The umbilicus is apparently wide in the young shells, but partially closed in the adult.

Distribution.—East coast of Africa, off the Andaman Islands and Travancore coast, coast of Negapatam (Madras), Madura Sea, Sulu Sea, Timor Sea, Flores Sea, Nias-Sud-Canal, Molucca-Passage, the Philippines and Japan.

Family Strombidae.

Genus **Tibia** Röding, 1798.

Subgenus **Tibia** S. S.

Tibia curvirostris (Lamarck, 1822).

1822. *Rostellaria curvirostris*, Lamarck, *Hist. Nat. Anim. Sans Vertęb.* VII, p. 192.
1898. *Rostellaria curvirostris*, Melvill and Standen, *Journ. Conch.* IX(2), p. 46.
1945. *Tibia curvirostris*, Winckworth, *Proc. Malac. Soc. London*, XXVI (4 & 5), p. 144.

A handsome specimen of *T curvirostris* in the collection has a more or less light fulvous brown shell with 6-dentate outer lip and a curved canal. In the character of its outer lip it somewhat resembles *T delicatula* (Nevill)[1] from the Bay of Bengal.

Distribution.—Red Sea, Persian Gulf, Gulf of Oman, Aden, Arabian Sea, Madras, Indian Ocean and Moluccas.

Family Naticidae.

Genus **Natica** Scopoli, 1777.

Section **Natica** S. S.

Natica pellis-tigrina Chemnitz, 1781.

[1] Nevill, G. *Journ. As. Soc. Bengal*, L(2), p. 262 (1881).

1781. *Natica pellis-tigrina*, Chemnitz, *Conch-Cab.* V, p. 265, pl. clxxxvii, figs. 1892, 1893.

1850. *Natica pellistigrina*, Philippi, *in Martini and Chemnitz's Syst. Conch. Cab.* II, Abth. 1, p. 20, pl. xv, figs. 1, 2.

1871. *Natica pellistigrina*, Lischke, *Jap. Meeres Conchylien*, II, p. 75.

1886. *Natica pellis-tigrina*, Tryon, *Man. Conch.* VIII, p. 16, pl. ii, fig. 33.

The two specimens in the collection have their shells densely painted throughout with purplish chestnut dots.

Distribution.—Persian Gulf, Bombay, Madras, Ceylon, Hinzé Basin, Penang, Akyab, Andamans, Singapore, Java, Australia. Hongkong, China, Japan and Manila.

Family CYPRAEIDAE.

Subfamily *CYPRAEINAE.*

Genus **Mauritia** Troschel, 1863.

Subgenus **Arabica** Jousseaume, 1884.

Mauritia arabica (Linnaeus, 1758).

race **dilacerata** Schilder and Schilder, 1939.

1939. *Mauritia (Arabica) arabica* race *dilacerata*, Schilder and Schilder, *Proc. Malac. Soc. London*, XXIII (4), p. 183.

1945. *Mauritia (Arabica) arabica* race *dilacerata*, Ray, *Journ. Roy. As. Soc. Bengal, Sci.* XI, p. 50.

The single specimen of this race in the collection agrees in all its essential shell characters with the description given by Schilder and Schilder.

Distribution.—Its range does not seem to extend beyond Mauritius on the west and Singapore on the east. For further details my paper cited above may be consulted.

Mauritia histrio (Gmelin, 1790).

One bleached shell with promiscuous purplish-black spots on its thickened sides and base represents this species in the collection.

Distribution.—Schilder and Schilder have given a detailed list of records of its distribution in the paper cited above.

Subgenus **Mauritia** Troschel, 1863.

Mauritia mauritiana (Linnaeus, 1758).

1758. *Cypraea mauritiana*, Linné, *Syst. Nat.* ed. X, p. 721.

1945. *Mauritia (Mauritia) mauritiana*, Ray, *Journ. Roy. As. Soc. Bengal, Sci.* XI, p. 51.

Of the two juvenile shells of *M. mauritiana* in the collection, one measures 47 mm. in length and 22 mm. in breadth, while the other measures 42 mm. in length and 19½ mm. in breadth. In general form, colouration and sculpture they conform to Reeve's description and figure

Distribution.—A list of records of its distribution is given in my paper cited above; a few more localities which escaped my notice previously are Pamban, Tuticorin, Nalahia Bay, Nusa-Laut island and Tonga.

Family CYMATIIDAE.

Genus **Gyrineum** Link, 1807.

Section **Gyrineum** S. S.

Gyrineum natator (Röding, 1798).

1798. *Tritonium natator*, Röding, *Mus. Bolt.*, p. 127.

1901. *Gyrineum (Argobuccinum) tuberculatum*, Melvill, *Proc. Zool. Soc. London*, p. 387.

1932. *Gyrineum natator*, Wrigley, *Proc. Malac. Soc. London*, XX(2), p. 137.

1933. *Argobuccinum (Gyrineum) natator*, Bayer, *Zool. Meded.* XVI, pp. 38, 39.

In the two shells representing this neatly sculptured species in the collection the teeth on the outer lip are small and widely separated, unlike those of *Bursa granularis*. For further details regarding the synonymy of this species Bayer's paper may be consulted.

Distribution.—Red Sea, Persian Gulf, Mekran Coast, Karachi, Bombay, Madras, Adyar, Ceylon, Andamans, Nicobars, Sumatra, Java, New Guinea, Timor, Banka, Madura, Malacca, Gulf of Siam, China, Japan, Manila and Tahiti.

Section **Biplex** Perry, 1811.

Gyrineum perca (Perry, 1811).

var. **aculeata** Schepman, 1909.

1909. *Gyrineum (Biplex) perca* var. *aculeata*, Schepman, *Prosobr. Siboga Exped. Monogr.* XLIX[1]b, pp. 115, 116, pl. x, fig. 1a-c.

1233. *Argobuccinum (Biplex) perca* var. *aculeata*, Bayer, *Zool. Meded.* XVI, p. 40.

G. perca var. *aculeata* is represented in the collection by a series of specimens which correspond to Schepman's description and figure.

Distribution.—This rare form has so far been known only from the Sulu and Timor Seas in the East Indian Archipelago. Its occurrence on the Coromandel Coast is, therefore, of interest.

Family BURSIDAE.

Genus **Bursa** (Bolten) Röding, 1798.

Bursa awatii, sp. nov.

(Plate III, figs. 3-5.)

Shell fusiformly-ovate, moderately thick, dextral, slightly creamy-white, whorls seven, regularly increasing, rounded, each ornamented with 4 to 6 regular distinct more or less equidistant primary spirals (the one lying in the middle of the whorl appearing, in most cases, to

be more prominent than the rest) which are beset with small spiny tubercles, in the last whorl, however, the number of such spirals is much more greater and varies from eleven to twelve (here the 3rd or 4th one only is more prominent) and their spiny tubercles tend to be gradually smaller as they pass downwards, in the interstices between the spirals in all the whorls are small secondary spirals which are more or less tuberculated in the same way and are crossed by very fine vertical striae throughout which give the surface a network-like appearance ; besides these, each whorl has a pair of low rounded ridges or varices, one on each side of the shell forming rather a row which, in most cases, appears discontinuous, especially in the lower whorls ; suture impressed ; aperture more or less oval, longer than broad, chanelled at both ends, the lower channel being more wider than the upper one, especially in front, the callus of the columellar border has a distinct outer margin and shows a continuation of the spiral banding on the inflated part of the whorl (fig. 4), a prominent denticle occurs on the inner margin of the columella just a little below the upper channel, but this may be rudimentary or obsolete in the young individuals, the outer lip is thin on the margin but divided into ten (rarely eleven) well-defined interspaces by the primary whorl spirals (as shown in fig. 5) which bear unequal denticles, varying in number from 12 to 15 in the series, and are arranged in groups from rear to front as mentioned below ; in the young shells, however, the denticles are rudimentary or absent. The interior of the aperture is whitish.

No. of shells.	Measurements in millimetres.				Division of outer lip into interspaces.	Number and arrangement of denticles in the interspaces from rear to front.
	Length of shell.	Breadth of shell.	Length of aperture.	Breadth of aperture.		
1	40·5	26	26	13·5	10	absent (young shell).
2	51	30	30	15	10	1+3+2+2+1+1+1 +1+1+1 =14.
3	40·5	23	24·5	12	11	absent (young shell).
4	46	27	28	14	10	absent (excepting one or two).
5	45	27·5	26	14·5	10	1+2+2+2+1+1+2 +1+1+1= 14.
6	41	23·5	25	11	11	absent (young shell).
7	55·5	30·5	34	18	10	1+2+1+1+1+1+2 +2+2 +1=14.
8	49	25	29	14	10	1+2+2+1+1+1+1 +1+1+1=12.
9	50	26	29	15	10	1+2+2+1+1+1+1 +1+1+2=13.
10	46	26	29	15·5	10	1+2+2+1+1+1+1 +1+1+1=12.
11	37·5	20	22·5	11	10	absent (young shell).
12	37	21	22	12	10	absent (,, ,,).
13	34	19	21	11	10	absent (,, ,,).
14	37	21	23	12	10	2+2+3+2+1+1+1 +1+1+ 1=15.
15	38	21	23	12	10	1+2+3+1+1+1+1 +1+1+1=13.
(Figured) 16	48	27·5	31	16·5	10	1+2+3+2+1+1+1 +1+1+1=14.

Type-locality.—There are sixteen individuals of different size and growth in the series which were collected by Prof. P. R. Awati from the Coromandel Coast of India, Madras.

Holotype.—Reg. No. M 15942/2 Zool. Surv. Ind.

Paratypes.—Reg. No. M 15945/2 Zool. Surv. Ind.

Remarks.—The shell of *Bursa awatii* resembles that of *R. vexillum* Sowerby in shape and in the inflated nature of its whorls, but differs from it in being much thinner, in colouration and also in details of sculpture. The division of the outer lip and the consequent arrangement of the denticles are peculiar in the new species and do not agree with what has been described and figured by Wrigley (1942-*Proc. Malac. Soc. London*, XX(2), pp. 127-140, pl. xi) for the Bursidae or Cymatiidae.

Order STENOGLOSSA.

Family MURICIDAE.

Genus **Murex** Linnaeus, 1758.

Subgenus **Murex** S. S.

Section **Murex** S. S.

Murex tribulus Linnalus, 1767

1767. *Murex tribulus*, Linnè, *Syst. Nat.* ed. XII, p. 1214, No. 519.

1845. *Murex ternispina*, Reeve, *Conch. Icon.* III, pl. xviii, fig. 73, pl. xix, fig. 76.

1911. *Murex (Tribulus) ternispina*, Schepman, *Prosobr. Siboga Exped. Monogr.* XLIX[1]b, pp. 340-342.

1939. *Murex tribulus*, Moazzo, *Mem. Inst. Egypte*, XXXVIII, pp. 155, 156.

1940. *Murex tribulus*, Winckworth, *Proc. Malac. Soc. London*, XXIV, p. 22.

The single specimen of this graceful species in the collection has a slightly yellowish shell with three-varicose whorls. Schepman has illustrated the radular teeth of a female specimen of this species.

Distribution.—The range of this species is very wide and extends from the Red Sea to the Phillippines and Japan. Tomlin[1] reports it as the commonest species in the southern part of the Suez Canal, but not north of the Bitter Lakes.

Subgenus **Chicoreus** Montfort, 1810.

Section **Chicoreus** S. S.

Murex adustus Lamarck, 1822.

1822. *Murex adustus*, Lamarck, *Hist. Nat. Anim. Sans Verteb.* VII, p. 161.

1938. *Murex (Chicoreus) adustus*, Adam and Leloup, *Mem. Mus. Roy. Hist. Nat. Belg.* II, Fasc. 19, p. 155.

[1]Tomlin, J. R. le B. *Trans. Zool. Soc. London*, XXII(3), pp. 294, 318, 320 (1927).

A small worn but heavy shell represents *M. adustus* in the collection ; it is jet-black in colour ; there are, however, no fronds on the varices in this specimen.

Distribution.—Its range accords more or less with that of the preceding species.

Subgenus **Hexaplex** Perry, 1811.

Section **Hexaplex** S. S.

Murex chicoreus Gmelin, 1790.

1790. *Murex chicoreum*, Gmelin, *Syst. Nat.* ed. XIII, p. 3530, No. 17.
1822. *Murex endivia*, Lamarck, *Hist. Nat. Anim. Sans Verteb.* VII, p. 168C.
1880. *Murex (Phyllonotus) endivia*, Tryon, *Man. Conch.* II, p. 102, pl. xxvi, figs. 221-224.
1938. *Murex (Hexaplex) chicoreus*, Adam and Leloup, *Mem. Mus. Roy. Hist. Nat. Belg.* II, Fasc. 19, p. 154.

A small shell in the collection belongs to *M. chicoreus*. The fronds on the varices appear to be very poorly developed, but the characteristic red marginal colouring of its columella and outer lip as well as the dark-brown bands on the whorls are more or less conspicuous. Adam and Leloup have given the full synonymy of this species in the paper cited above.

Distribution.—Persian Gulf, Arabian Sea, Indian and Pacific Oceans. It does not appear to have hitherto been recorded from the Coromandel Coast of India.

Family THAISIDAE.

Genus **Thais** Röding, 1798.

Subgenus **Thais** S. S.

Section **Thais** S. S.

Thais rudolphi (Chemnitz, 1788).

1788. *Buccinum rudolphi*, Chemnitz, *Conch.-Cab.* X, p. 196, pl. cliv, figs. 1467, 1468.
1822. *Purpura rudolphi*, Lamarck, *Hist. Nat. Anim. Sans Verteb.* VII, p. 235.
1879. *Purpura (Microtoma) rudolphi*, von Martens, *Monatsb. der Königl. Akad. Wiss.*, p. 278.
1938. *Purpura (Purpura) rudolphi*, Adam and Leloup, *Mem. Mus. Roy. Hist. Nat. Belg.* II, Fasc. 19, p. 168, pl. vii, fig. 4.

The single specimen of *Th. rudolphi* in the collection can readily be distinguished by the reddish and longitudinally grooved columella and brownish-black outer lip of the shell. Melvill and Abercrombie (*loc. cit.* p. 30) have wrongly treated *Th. persica* (Linn.) as synonymous with *Th. rudolphi*.

Distribution.—Widely distributed in the Indo-Pacific, but its range also extends as far as the Red Sea.

Section **Stramonita** Schumacher, 1817.

Thais bufo (Lamarck, 1822).

1822. *Purpura bufo*, Lamarck, *Hist. Nat. Anim. Sans Verteb.* VII, p. 239.

1846. *Purpura bufo*, Reeve, *Conch. Icon.* III, pl. ii, fig. 7.

1901. *Purpura (Thalessa) bufo*, Melvill and Standen, *Proc. Zool. Soc. London*, II, p. 399.

1942. *Thais bufo*, Crichton, *Journ. Bomb. Nat. Hist. Soc.* XLII, p. 333.

The single specimen in the collection agrees with the description of the species.

Distribution.—The range of this species is more or less like that of *Th. rudolphi* with which it is always found to be closely associated.

Thais bufo (Lamarck)

var. **callosa** (Lamarck, 1822).

1822. *Purpura callosa*, Lamarck, *Hist. Nat. Anim. Sans Verteb.* VII, p. 239.

1859. *Purpura bufo* var. *callosa*, Küster, *in Martini and Chemnitz's Syst. Conch.-Cab.* III, Abth. 1a-b., pp. 100, 101, pl. xviii, figs. 1, 2.

1929. *Purpura bufo* var. *callosa*, Dautzenberg, *Faune des Col. Franc.* III, p. 425.

There are two fine specimens of the var. *callosa* in the collection with remarkable thickening on the columellar lip.

Distribution.—The range of *Thais bufo* var. *callosa* appears to be the same as that of the *forma typica*.

Genus **Drupa** Röding, 1798.

Subgenus **Drupa** S. S.

Section **Morula** Schumacher, 1817.

Drupa margariticola (Broderip, 1832).

1832. *Murex margariticola*, Broderip, *Proc. Zool. Soc. London*, p. 117.

1911. *Sistrum (Morula) fiscellum*, Schepman, *Prosobr. Siboga Exped. Monogr.* XLIX[1]b, p. 357.

1938. *Drupa (Morula) margariticola*, Adam and Leloup, *Mém. Mus. Roy. Hist. Nat. Belg.* II, Fasc. 19, p. 161, pl. vi, fig. 16.

Some authors consider *Sistrum undatum* and *Ricinula fiscellum* of Chemnitz as distinct from *margariticola*, but, as has been shown by Adam and Leloup, these are only synonyms of the latter. The species is represented by two very beautiful shells which are strongly shouldered with round longitudinal ridges crossed by raised spiral lines. The interior of the aperture is bluish-white.

Distribution.—First described from the Lord Hood's Island, but subsequently its range has been extended to the Red Sea, Gulf of Suez, Karachi, Baluchistan, Mauritius, Madagascar, Natal, Madras, Pamban, Kilakarai, Tranquebar, Ceylon, Andamans, Sumatra, Celebes, Sumbawa, New-Guinea, Australia, Lombok, Macassar, Halmaheira, Banda Neira, Bay of Bima, between islands of Wowoni and Buton, Tual in Kei-islands, Pulu Kaniungan Ketjil, South Sea Islands, China, Japan and Polynesia.

Family BUCCINIDAE.

Genus **Babylonia** F. Schlüter, 1838.

Babylonia spirata (Linnaeus, 1767).

1767. *Buccinum spiratum*, Linné, *Syst. Nat.* ed. XII, p. 1203.
1887. *Eburna canaliculata*, von Martens, *Journ. Linn. Soc.* (*Zool.*) XXI, p. 180.
1898. *Latrunculus spiratus*, Melvill and Standen, *Journ. Conch.* IX, p. 41.
1941. *Babylonia spirata*, Crichton, *Journ. Bomb. Nat. Hist. Soc.* XLII, p. 334.

Four shells of *B. spirata* in the collection have horny epidermal layers on the surface more or less concealing the colouration.

Distribution.—This is a wide-spread Indo-Pacific form, but has also been recorded from the Mediterranean Sea.

Genus **Cantharus** Röding, 1798.

Section **Pollia** Sowerby, 1834.

Cantharus undosus (Linnaeus, 1767).

1767. *Buccinum undosum*, Linné, *Syst. Nat.* ed. XII, p. 1203.
1901. *Tritonidea undosa*, Melvill and Standen, *Proc. Zool. Soc. London*, II. p. 415.
1931. *Cantharus (Pollia) undosus*, Oostingh, *Arciv f. Molluskenk.* LXIII, p. 216.
1935. *Cantharus undosus*, Ostergaard, *Bull. B. P. Bishop Mus. Honolulu*, CXXXI, pp. 7, 18.

This ancient and well-known species is represented in the collection by only two specimens. The blackish-brown spiral ridges on the shell are quite conspicuous.

Distribution.—Abundantly found along the whole of the West Coast of India proper and Baluchistan to Persia and Mauritius, but eastwards its range also extends from Ceylon and Madras through the Malay Archipelago to the Philippines and Polynesia.

Family NASSARIIDAE.

Genus **Nassarius** Dumeril, 1806.

Subgenus **Hima** (Leach MS.) Gray, 1852.

Nassarius stolatus (Gmelin, 1790).

1790. *Buccinum stolatum*, Gmelin, *Syst. Nat.* ed. XIII, p. 3496.
1930. *Nassarius (Phrontis) stolatus*, Bisacchi, *Ann. Mus. Civ. Stor. Nat. Gen.* LV (24), p. 11.
1938. *Nassa stolata*, Suvatti, *Moll. of Siam, Bangkok*, p. 34.

Two worn shells of this backwater species are found in the collection. The three large spiral chestnut bands, so characteristic of the species, can only be seen in the interior of the aperture, though not on the surface where they are totally lost. *Buccinum ornatum* Kiener is a synonym of this species.

Distribution.—This variable species is found plentifully in Bombay, but has also been recorded from the Persian Gulf, Gulf of Aden, Mauritius, Ceylon, Madras, Tranquebar, Pamban, Calcutta, Mergui, Singapore, Java, Borneo, Gulf of Siam and the Philippines.

Family FASCIOLARIIDAE.

Genus **Fusinus** Rafinesque, 1815.

Fusinus rostratus (Olivi, 1792).

1792. *Murex rostratus*, Olivi, *Zool. Adriat.*, p. 153.
1869. *Fusus rostratus*, Issel, *Malac. del Mar. Rosso, Pisa*, p. 386.
1883. *Fusus rostratus*, Dautzenberg. *Journ. de Conchyliol.* XXXI, p. 321.
1885. *Fusus rostratus*, Watson, *Zool. Chall. Exped.* XV (2), p. 207.
1937. *Fusus* (*Fusus*) *rostratus*, Sieber, *Archiv f. Molluskenk.* LXIX, pp. 145, 146, 149, 158.

The single specimen of this delicate and beautifully sculptured species in the collection agrees with the description of the typical form.

Distribution.—This rare form has so far been known from the Mediterranean Sea, Red Sea and the Canary Islands in the North Atlantic. Its existence for the first time in Indian waters is, therefore, remarkable.

Fusinus rubrolineatus (Sowerby, 1870).

1870. *Fusus rubrolinectus*, Sowerby, *Proc. Zool. Soc. London*, p. 252.
1880. *Fusus rubrolineatus*, Sowerby, *Thes. Conch.* IV (35 & 36), p. 80, pl. ccccxi, fig. 68.
1925. *Fusus rubrolineatus*, Thiele, *Wiss. Ergebn. Deutsch. Tiefsee-Exped. Gastropoda*, XVII (2), p. 360.
1940. *Fusinus rubrolineatus*, Winckworth, *Proc. Malac. Soc. London*, XXIV (1), p. 22.

A series of specimens, numbering eighteen, represents this species in the collection. The shell appears to be slightly yellowish and lineated with spiral red lines, becoming prickly on the ribs.

Distribution.—First described by Sowerby from the Agulhas Bank, South Africa, but subsequently recorded from off the Malabar Coast. This species does not appear to have been recorded before from the Coromandel Coast.

Family OLIVIDAE.

Subfamily *OLIVINAE*.

Genus **Olivancillaria** Orbigny, 1839.

Section **Agaronia** Gray, 1839.

Olivancillaria nebulosa (Lamarck, 1822).

1822. *Oliva nebulosa*, Lamarck, *Hist. Nat. Anim. Sans Vertеb.* VII, p. 436.
1876. *Oliva* (*Olivancillaria*) *nebulosa*, Weinkauff, *in Martini and Chemnitz's Syst. Conch.-Cab.* V, Abth, 1, p. 55, pl. iv, figs. 11, 12; pl. xviii, figs. 6, 7, 9.

1895. *Olivancillaria nebulosa*, Thurston, *Bull. Mad. Govt. Mus.* III, p. 123.
1942. *Oliva nebulosa*, Gravely, *Bull. Mad. Govt. Mus.* (*N. S.*), V (2), p. 63.

Of the two young shells of *O. nebulosa* in the collection, one is worn and the other partly broken. This species is often confounded with *O. gibbosa* (Born) owing to the remarkable similarity in shell characters, especially in the young conditions. But the slender and less inflated body-whorls, concavely depressed columella, and more or less acuminate spire are the chief diagnostic features of this species which easily separate it from its allies.

Distribution.— Bombay, Karachi, Goa, Madras, Tuticorin, Pamban, Krusadai Island, Ceylon, Byikhwaaw Bay, Torres Straits and Gulf of Siam.

Family CONIDAE.

Genus **Conus** Linnaeus, 1758.

Subgenus **Chelyconus** Mörch, 1852.

Conus achatinus Chemnitz, 1788.

1788. *Conus achatinus maximus*, etc. Chemnitz, *Conch.-Cab.* X, p. 66, pl. cxlii, fig. 1317.
1792. *Conus achatinus*, Hwass, *in Bruguière's Ency. Meth.* 1, p. 671, pl. cccxxx, fig. 6.
1937. *Conus achatinus*, Dautzenberg, *Mém. Mus. Roy. Hist. Nat. Belg.* II, Fasc. 18, pp. 8-11.
1937. *Conus achatinus*, Tomlin, *Proc. Malac. Soc. London*, XXII (4 & 5), p. 207.

The two specimens of *C. achatinus* seem to agree in their essential shell characters with the description of the typical form. Dautzenberg in his paper cited above has given the full synonymy and a list of records of distribution of this wide-spread species. Melvill and Abercrombie (1893, p. 26) seem to have wrongly combined it with *C. monachus* (Linn.) as a variety.

Family TURRIDAE.

Subfamily *TURRINAE.*

Genus **Turris** O. F. Müller, 1766.

Subgenus **Gemmula** Weinkauff, 1876.

Section **Gemmula** S. S.

Turris congener (Smith, 1894).

1894. *Pleurotoma congener*, Smith, *Ann. & Mag. Nat. Hist.* (6) XIV, p. 160, pl. iii, figs. 4, 5.
1905. *Pleurotoma congener*, Melvill and Standen, *Journ. Bomb. Nat. Hist. Soc.* XVI (2), p. 223.
1917. *Pleurotoma* (*Gemmula*) *congener*, Vredenburg, *Rec. Ind. Mus.* XIII, pp. 315-320.

1940. *Turris* (*Gemmula*) *congener*, Winckworth, *Proc. Malac. Soc. London*, XXIV (1), p. 24.

The single specimen of this species in the collection has a shell with a narrow tuberculated band round the middle of its whorls. Vredenburg's note on some important peculiarities of the outer lip of its shell is of interest.

Distribution.—Originally described from west of Colombo, off the Coast of Ceylon, but subsequently recorded from off the Travancore and Malabar Coasts, Persian Gulf, Gulf of Oman, Andaman Sea, Bali Sea and near Batjan. The Coromandel Coast appears to be a new record.

Turris vagata (Smith, 1896).

1896. *Pleurotoma vagata*, Smith, *Ann. & Mag. Nat. Hist.* (6) XVI, p. 3, pl. i, fig. 3.

1906. *Pleurotoma vagata*, Smith, *Ann. & Mag. Nat. Hist.* (7) XVIII, p. 161.

1906. *Pleurotoma vagata*, Smith, *Illustr. Zool.* "*Investigator*", pl. xiv, figs. 3, 3a.

Of the three specimens of *T vagata*, one is small and in good condition, while the other two are considerably larger but slightly worn. In all of them, however, the characteristic tuberculated keel on the middle of the whorls is quite conspicuous.

Distribution.—Off Trincomalee, off the Travancore and Malabar Coasts, W of Malabar Coast and off the Andaman Islands.

Subfamily *CLAVATULINAE*.

Genus **Clavatula** Lamarck, 1801.

Subgenus **Turricula** Schumacher, 1817.

Section **Surcula** H. & A. Adams, 1852.

Clavatula javana (Linnaeus, 1767).

1767. *Murex javanus*, Linné, *Syst. Nat.* ed. XII, p. 1221, No. 550.

1822. *Pleurotoma nodifera*, Lamarck, *Hist. Nat. Anim. Sans Verteb.* VII, p. 96.

1925. *Surcula javana*, Thiele, *Wiss. Ergebn. Deutsch. Tiefsee-Exped.* XVII, p. 370.

1929. *Clavatula* (*Surcula*) *javana*, Thiele, *Handb. der Syst. Weichtierk.* 1, p. 360.

One worn shell of pale yellow colour represents this species in the collection. The synonymy of the species is given by Hedley (1922)[1].

Distribution.—Panjim, Goa, Karachi, Bombay, Dar-es-Salaam, Sullivan Island, Ceylon, Pamban, Tranquebar, Madras, Annam, Gulf of Siam, Singapore, Java, Malacca, Poulo-Pinang, Queensland, the Philippines and Japan.

Order STYLOMMATOPHORA.

Family ONCIDIIDAE.

Genus **Oncidium** Buchanan, 1800 (Emend. Plate 1893).

[1] Hedley, C. *Rec. Austr. Mus.* XIII, p. 254 (1922).

Oncidium verruculatum Cuvier, 1830.

1830. *Onchidium verruculatum*, Cuvier, *Le Regne Animal* (2nd ed.), III, p. 46.

1893. *Onchidium verruculatum*, Plate, Zool. Jahrb. VII, pp. 168-170, 232-234, pl. vii, figs. 15-21, pl. viii, figs. 26-29, 33, pl. ix, figs. 40, 42, pl. x, figs. 50a, 55, pl. xi, figs. 56, 60, pl. xii, figs. 83, 86, 88, 90, 98, 99.

1928. *Oncidium verruculatum*, Hoffmann, *Zool. Jahrb.* LV, pp. 44, 45, 72-75.

1933. *Oncidium verruculatum*, Awati, *Journ. Univ. Bomb.* 1(5), pp. 62, 70.

1939. *Onchidium verruculatum*, Connolly, *Ann. S. Afric. Mus.* XXXIII, pp. 454-456.

This well-known species has only two specimens which have their mantles studded over with simple and compound tubercles. Connolly who has given the synonymy of the species considers *O. savignyii* and *O. peronii* Cuvier (1817) as identical with it.

Distribution.—Red Sea, Gulf of Suez, Karachi, Bombay, Owen Island, Natal, Madagascar, Krusadai Island, Pamban, Tranquebar, Ceylon, Singapore, Andamans, Nicobars, Java, Celebes, Malacca, Timor, New Guinea, Australia, Japan, New Caledonia, Honolulu and Oahu, and the Philippines. In distribution this species appears somewhat similar to *O. peronii* Cuv. (1804)[1].

Genus **Oncis** Plate, 1893.

Oncis Stuxbergi (Westerlund, 1883).

1883. *Vaginulus stuxbergi*, Westerlund, *Nachr. Bl. Malak. Ges.* XV, p. 165.

1885. *Onchidium coriaceum*, Semper, *Reisen im Archipel der Philippinen*, III, pp. 271-273, pl. xix, figs. 1, 16, pl. xxi, fig. 7, pl. xxiii, fig. 12.

1928. *Oncis stuxbergi*, Hoffmann, *Zool. Jahrb.* LV, pp. 55, 56, 88, 89.

1931. *Oncis coriacea*, Thiele, *Handb. der Syst. Weichtierk.* 1, p. 488.

The single specimen in the collection exhibits the distinctive characters of the species.

Distribution.—First described from Borneo, but later on from the Sullivan Island, Penang, Burma, Singapore, Nicobars, Java, Celebes, Malacca, Australia, Gulf of Siam, Cochin-China, and the Philippines. Its occurrence on the Coromandel Coast is, therefore, of interest.

Family ARIOPHANTIDAE.

Subfamily *ARIOPHANTINAE.*

Genus **Ariophanta** Desmoulins, 1829.

Subgenus **Ariophanta** S. S.

Ariophanta interrupta (Benson, 1832-34).

1832-34. *Helix interrupta*, Benson, *Zool. Journ.* V, p. 461.

1943. *Ariophanta (Ariophanta) interrupta*, Ray, *Journ. Roy. As. Soc. Bengal, Sci.* IX, pp. 68, 69.

The single specimen of *interrupta* in the collection corresponds to Benson's description.

[1] Cuvier, G. L. C. F. D. *Ann. Mus. Nat. Hist. Paris*, V, p. 38 (1804).

Distribution.—Widely distributed in the Gangetic Provinces of India and the Himalayan Mountains. But records are also known from South India.

Ariophanta laevipes (Müller, 1774).

1774. *Helix laevipes*, Müller, *Verm. Terr. and Fluv. Hist.* II, p. 22.
1876. *Helix trifasciata*, Hanley and Theobald, *Conch. Ind.*, p. 52, pl. cxxxi, fig. 4.
1908. *Ariophanta (Ariophanta) laevipes*, Blanford and Godwin-Austen, *Faun. Brit. Ind. Moll.*, pp. 29, 30, Text—fig. 18.
1931. *Ariophanta (Ariophanta) laevipes*, Thiele, *Handb. der Syst. Weichtierk.* 1, p. 631.

I assign to this species only one white shell ornamented with three chestnut spiral bands which are characteristic of the species. This peculiar feature perhaps gave some authors the opportunity of describing it as a new species under the name of *trifasciata*.

Distribution.—This land snail, like *Macrochlamys pedina* (Bens.), is very common in gardens of Bombay. It was originally described from the Rajpipla Hills, but has since been recorded from the Satpura Hills, Tranquebar and Coromandel.

Class BIVALVIA.

Order TAXODONTA.

Family ARCIDAE.

Genus **Arca** Linnaeus, 1758.

Subgenus **Arca** S. S.

Section **Arca** S. S.

Arca deyrollei (Jousseaume, 1893).

1893. *Scapharca deyrollei*, Jousseaume, *Le Naturaliste*, 15e année, p. 191.
1907. *Arca (Anadara) deyrollei*, Lamy, *Journ. de Conchyliol.* LV, p. 254. pl. iii, fig. 5.

The single specimen of the species in the collection has an inaequilateral shell with a marked concavity in the middle.

Distribution.—Penang, Tavoy Coast, Sandheads (River Hooghly) and Madras.

Section **Cunearca** Dall, 1898.

Arca rhombea Born, 1780.

1780. *Arca rhombea*, Born, *Test. Mus. Caes. Vindob.*, p. 90.
1938. *Arca (Cunearca) rhombea*, Fischer and Fischer-Piette, *Bull. Mus. d'Hist. Nat. Paris*, (2)X (4), p. 406.
1939. *Arca (Cunearca) rhombea*, Adam and Leloup, *Mem. Mus. Roy. Hist. Nat. Belg. II*, Fasc. 20, p. 44.

Two young pale rusty-red shells represent *A. rhombea* in the collection.

Distribution.—Elphinstone Island, Bombay, Madras, Ceylon, Salang, Sumatra, Java and the Chinese Seas.

Subgenus **Acar** (Gray) H. & A. Adams, 1857.

Section **Bathyarca** Kobelt, 1891.

Arca profundicola Verrill, 1885.

1885. *Arca profundicola*, Verrill, *Trans. Connect. Acad. Sci.* VI, p. 439, pl. xliv, figs. 23, 23a.

1886. *Arca (Barbatia) pteroessa*, Smith, *Rept. Chall. Lamellibr.*, p. 262, pl. xvii, fig. 4-b.

1907. *Arca (Bathyarca) profundicola*, Lamy, *Journ. de Conchyliol.* LV, p. 286.

1931. *Arca (Acar) profundicola*, Thiele and Jaeckel, *Wiss. Ergebn. Deutsch. Tiefsee-Exped.* XXI(1), pp. 172, 178.

1940. *Arca pteroessa*, Winckworth, *Proc. Malac. Soc. London*, XXIV(1), p. 26.

There are some dirty white shells of *A. profundicola* in the collection, which correspond to Verrill's description and figures. For a detailed synonymy of the species reference may be made to Lamy's paper cited above.

Distribution.—Ceylon, Bay of Bengal, Gulf of Guinea, Atlantic and the Pacific Oceans.

Subgenus **Argina** Gray, 1842.

Arca indica Gmelin, 1790.

1784. *Arca indiae orientalis*, Chemnitz, *Conch.-Cab.* VII, p. 196, pl. lv, fig. 543.

1790. *Arca indica*, Gmelin, *Syst. Nat.* ed. XIII, p. 3312, No. 27.

1909. *Arca (Scapharca) indica*, Lynge, *D. Kgl. Dansk. Vidensk. Selsk. Skr. Nat.-Math.* (7)V, p. 30, pl. ii, figs. 5-12.

1935. *Anadara (Argina) indica*, Reinhart, *Bull. Mus. Roy. Hist. Nat. Belg.* XI, p. 44.

The single specimen of *A. indica* has a whitish inaequilateral shell bearing thirty broad and flattened ribs on each valve. The concavity in the middle of the shell is also well-marked.

Distribution.—Originally described from Travancore, but subsequently from Bombay, Madras, Pulicat Lake, Sumatra, N.-W Australia and the Gulf of Siam.

Subgenus **Barbatia** Gray, 1842.

Arca obtusoides Nyst, 1848.

1848. *Arca obtusoides*, Nyst, *Mém. Acad. Roy. Belg.* XXII, p. 50.

1932. *Arca (Barbatia) obtusoides*, Prashad, *Siboga Exped. Monogr. Pelecypoda*, LIIIC, p. 47.

1936. *Barbatia obtusoides*, Hirase, *A Coll. of Jap. Shells*, p. 3, pl. ii, fig. 3.

The modiola-like form of the shell with beak-like anterior and broad posterior ends is a remarkable feature of this species.

Distribution.—Widely distributed in Bombay, Madras, Ceylon, Bay of Labuan Tring, West Coast of Lombok, the Philippines, China, Japan, Korea and New Caledonia.

Family LIMOPSIDAE.

Genus **Limopsis** Sasso, 1827.

Subgenus **Limopsis** S. S.

Limopsis indica Smith, 1894.

1894. *Limopsis indica*, Smith, *Ann. & Mag. Nat. Hist.* (6) XIV, p. 171, pl. v fig. 7.

1932. *Limopsis indica*, Prashad, *Siboga Exped. Monogr. Pelecypoda*, LIIIC, p. 59.

1940. *Limopsis indica*, Winckworth, *Proc. Malac. Soc. London*, XXIV(1), pp. 19, 26.

This species is well-represented in the collection by a large number of specimens which correspond to Smith's description and figure.

Distribution.—Off Ceylon and off Travancore Coast, off Maldives and off Minikoi Island in the Arabian Sea.

Order ANISOMYARIA.

Family MYTILIDAE.

Genus **Lithophaga** Röding, 1798.

Subgenus **Botula** Mörch, 1853.

Lithophaga cinnamomea (Lamarck, 1819).

1819. *Modiola cinnamomea*, Lamarck, *Hist. Nat. Anim. Sans Verteb.* VI, p. 114.

1926. *Lithophaga (Botula) cinnamomina*, Pallary, *Mem. Inst. Egypte*, XI, p. 115, pl. xv, figs. 1-3, 8.

1932. *Lithophaga (Botula) cinnamomea*, Prashad, *Siboga Exped. Monogr. Pelecypoda*, LIIIC, pp. 79, 80.

1937. *Lithophaga cinnamomina*, Viader, *Maur. Inst. Bull.* 1(2), p. 60.

In the two fine specimens of *L. cinnamomea* the shell is peculiarly chestnut-coloured and has a swollen wedge-shaped modiola-like form. Prashad has given the full synonymy of this well-known species.

Distribution.—A list of records of its distribution is furnished by Lynge (1909, p. 138.).

Subgenus **Lithophaga** S. S.

Lithophaga cumingiana (Reeve, 1857).

1857. *Lithodomus cumingianus*. Reeve, *Conch. Icon.* X, pl. ii, figs. 8a, 8b.

1941. *Lithophaga cumingiana*, Gravely, *Bull. Mad. Govt. Mus.* (*N. S.*), V(1), pp. 37, 97.

1942. *Lithophaga cumingiana*, White, *Proc. Malac. Soc. Lond.* XXV(2), p. 49.

Two specimens with partly broken shells of pale brown colour and having tapered posterior ends represent the species in the collection.

Distribution.—Gulf of Suez, Gwadur, Karachi, Madras, North Australia, Mazatlan and the Philippines.

Family PINNIDAE.

Genus **Pinna** Linnaeus, 1758.

Subgenus **Atrina** Gray, 1842.

Section **Atrina** S. S.

Pinna vexillum Born, 1880.

1780. *Pinna vexillum, Born, Test. Mus. Caes. Vindob.*, p. 134, pl. vii, fig. 8.
1785. *Pinna nigra,* Chemnitz, *Conch-Cab.* VIII, p. 221, pl. lxxxviii, fig. 774.
1938. *Pinna (Atrina) vexillum,* Lamy, *Bull. Mus. Hist. Nat. Paris,* (2)X (4), pp. 397, 399, 400.
1942. *Pinna vexillum,* Crichton, *Journ. Bomb. Nat. Hist. Soc.* XLII, p. 196.

P. vexillum or "Fan-Oyster", as it is commonly known, is a greatly variable species which is represented in the collection by one young specimen only. The shell is smooth and slightly spinous and has a characteristic dark-brown colour of the species. Winckworth[1] treats *P. nigrina* Lam. (1819) as distinct, while Lamy, Dautzenberg and Prashad merge it with *P. vexillum.* A detailed list of its synonymy is given by Prashad.

Distribution.—Red Sea, Persian Gulf, Mauritius, Madagascar, Mozambique, King Island, Elphinstone Island, Amboina, Madras, Ennur, Trincomalee, Mergui, Andamans, Indo-China, Singapore, Sumatra, New Guinea, Poulo-Condor, North Australia, the Philippines, New Caledonia, Japan and Society Islands.

Family ANOMIIDAE.

Genus **Anomia** (Linné) Müller, 1776

Subgenus **Anomia** S. S.

Section **Anomia** S. S.

Anomia achaeus Gray, 1849.

1849. *Anomia achaeus,* Gray, *Proc. Zool. Soc. London,* p. 116.
1932. *Anomia (Anomia) achaeus,* Prashad, *Siboga Exped. Monogr. Pelecypoda,* LIIIC, pp. 29, 30, pl. i, figs. 54-57.
1941. *Anomia achaeus,* Gravely, *Bull. Mad. Govt. Mus.* (*N. S.*), V(1), pp. 41, 98, fig. 16d.

There are only two specimens in the collection which belong to this common and variable species. For a detailed synonymy reference may be made to Prashad's paper cited above.

Distribution.—Persian Gulf, Aden, Karachi, Bombay, Madras, Ceylon, Calcutta, Penang, Malacca, Kawa Bay and Ambon Anchorage.

[1] Winckworth, R. *Proc. Malac. Soc. London,* XVIII, pp. 287, 288 (1931).

Genus **Placenta** Retzius, 1788.

Subgenus **Placenta** S. S.

Placenta placenta (Linnaeus, 1758).

1758. *Anomia placenta,* Linné, *Syst. Nat.* ed. X, p. 703, No. 205.

1788. *Placenta orbicularis,* Retzius, *Diss. Sist. Nova Test. Gen.,* p. 15.

1931. *Placenta (Placenta) placenta,* Oostingh, *Archiv f. Molluskenk.* LXIII, p. 228.

1939. *Placuna placenta,* Moses, *Journ. Bomb. Nat. Hist. Soc.* XLI(1), pp. 119-122.

The two young specimens of *P. placenta* in the collection have more or less orbicular shells provided with the characteristic V-shaped ribs on the inner surface of their dorsal valves.

Distribution.—This is the most common "Window-pane oyster" which has an extensive range in the Indo-Pacific. Moses has enumerated the localities of its distribution in different parts of Baroda, laying particular stress on its fishery.

Family OSTREIDAE.

Genus **Ostrea** Linnaeus, 1758.

Ostrea gryphoides (Schlotheim, 1813)

var. **cuttackensis** Newton and Smith, 1912.

1912. *Ostrea gryphoides* var. *cuttackensis,* Newton and Smith, *Rec. Geol. Surv' Ind.* XLII(1), pp. 13-15, pl. vii & pl. viii, figs. A, B.

1921. *Ostrea gryphoides* var. *cuttackensis,* Hornell, *Mad. Fish, Bull.* XIV(6), p. 170.

The single specimen in the collection, though young, appears to agree in its general form and the character of the adductor scar with Newtor and Smith's description and figure.

Distribution.—So far known from Hukitola near False Point on the Cuttack Coast, Orissa, and Clive Street excavations at Calcutta. Coromandel Coast appears to be a new record.

Ostrea arakanensis SOWERBY, 1871.

1871. *Ostrea arakanensis* and *O. nigromarginata,* Sowerby, *Conch. Icon. XVIII,* pl. xxxiii, figs. 83, 85.

1916. *Ostrea madrasensis,* Preston, *Rec. Ind. Mus.* XII, pp. 33-35, figs. 11, 11a.

1931. *Ostrea arakanensis,* Winckworth, *Proc. Malac. Soc. London,* XIX, p. 189.

1939. *Ostrea arakanensis,* Panikkar and Aiyar, *Proc. Ind. Acad. Sci.* IXB(6), p. 356.

1942. *Ostrea madrasensis,* Paul, *Proc. Ind. Acad. Sci.* XVB (I), p. 2.

O. arakanensis is the most common edible mud or backwater oyster of Madras. It is extremely variable in form and, as such, described under various names by different authors. The single specimen in the collection appears to be quite typical of the species.

Distribution.—It is quite common in the Madras Presidency, but its range also extends as far as Arakan on the east. Panikkar and Aiyar have described the breeding habits of this animal, while Winckworth has discussed its synonymy.

Order EULAMELLIBRANCHIATA.

Suborder *SCHIZODONTA.*

Family UNIONIDAE.

Subfamily *UNIONINAE.*

Genus **Parreysia** Conrad, 1853[1].

Subgenus **Parreysia** S. S.

Parreysia corrugata (Müller, 1774)

var. **laevirostris** (Benson, 1862).

1862. *Unio laevirostris*, Benson, *Ann. & Mag. Nat. Hist.* (3)X, pp. 191, 192.

1876. *Unio corrugatus* var. *laevirostris*, Hanley and Theobald, *Conch. Ind.*, p. 21, pl. xliv, figs. 5, 6.

1915. *Parreysia (Parreysia) corrugata* var. *laevirostris*, Preston, *Faun. Brit. Ind. Moll. Freshw. Gastr. & Pelec.*, p. 156.

There are only two very beautiful specimens of this variety in the collection. The shell is thick, more or less yellowish, and the two raised dark rays on the posterior slopes are quite conspicuous.

Distribution.—Hutton first found this interesting variety in tanks and streams near the Fort of Chunar, above Banaras, U. P., but subsequently its range has been extended to the Chittagong Hills, Sudiya, Arrah and Hyderabad. It has not been recorded before from the Coromandel Coast of India.

Suborder HETERODONTA.

Family CORBICULIDAE.

Subfamily *CORBICULINAE.*

Genus **Corbicula** Megerle von Mühlfeldt, 1811.

Corbicula striatella Deshayes, 1854.

1928. *Corbicula striatella*, Prashad, *Mèm. Ind. Mus.* IX, pp. 18-20, pl. iii, figs. 9-11.

1943. *Corbicula striatella*, Ray, *Journ. Roy. As. Soc. Bengal, Sci.* IX, p. 77.

Six specimens of this extremely variable species are found in the collection. Prashad has discussed in detail the chief characteristics and the wide range of distribution of this well-known species in the paper already referred to.

[1] This genus was considered by Prashad (*Proc. Malac. Soc. London*, XXII, p. 120, 1936) as a synonym of *Potomida* Swainson (1840) and I also supported his view (*Journ. Roy. As. Soc. Bengal, Sci.* IX, p. 77, 1943). But recently Ellis (Proc. *Malac. Soc. London*, XXVII, pp. 105-108, 1946), after a careful study of the shell characters, has ranked both as generically distinct.

Family LIBITINIDAE.

Genus **Libitina** Schumacher, 1817.

Subgenus **Libitina** S. S.

Libitina vellicata (Reeve, 1843).

1843. *Cypricardia vellicata*, Reeve, *Proc. Zool. Soc. London*, p. 195.

1918. *Trapezium sublaeviyatum*, Lamy, *Journ. de Conchyliol.* LXIV, pp. 276-278, pl. viii, figs. 7, 8.

1941. *Libitina vellicata*, Gravely, *Bull. Mad. Govt. Mus.* (*N.S.*), V(1), pp. 44, 99, fig. 18.

A single specimen with whitish irregular shell represents *L. vellicata* in the collection. It is peculiarly pinched near the anterior part of its ventral margin, but is devoid of any purplish brown ray at its posterior end, as in the case of specimens recorded from the Gulf of Siam, Japan, Philippines and North Australia. Lamy has given the full synonymy of this species in the paper cited.

Distribution.—The range of this fairly common species extends from the Persian Gulf and Madagascar to the Philippines and Japan.

Family CARDIIDAE.

Genus **Cardium** Linnaeus, 1758.

Subgenus **Trachycardium** Mörch, 1853.

Cardium flavum Linnaeus, 1758.

1758. *Cardium flavum*, Linné, *Syst. Nat.* ed. X, p. 680, No. 71.

1819. *Cardium rugosum*, Lamarck, *Hist. Nat. Anim. Sans Verteb.* VI, p. 10.

1932. *Cardium* (*Trachycardium*) *flavum*, Prashad, *Siboga Exped. Monogr. Pelecypoda*, LIIIC, pp. 266-268.

1939. *Laevicardium* (*Trachycardium*) *flavum*, Adam and Leloup, *Mèm. Mus. Roy. Hist. Nat. Belg.* II, Fasc. 20, pp. 71-72.

The single specimen of *C. flavum* in the collection has a yellowish shell nicely banded on the surface with dark red spots. Prashad and Oostingh (with whom I also quite agree) consider *C. dupuchense* Rv. as identical with *C. flavum*, but Fischer and Fischer-Piette (*loc. cit.*, p. 409, 1938) separate it from the latter as a variety, while Dautzenberg ranks it as distinct.

Distribution.—Widely distributed throughout the Indo-Pacific, but its range also extends as far as the Red Sea and the Gulf of Suez.

Genus **Corculum** Röding, 1798.

Subgenus **Fragum** Röding, 1798.

Corculum simillimum (Smith, 1896).

1896. *Cardium* (*Fragum*) *simillimum*, Smith, *Ann. & Mag. Nat. Hist.* (6) XVIII, p. 372.

1898. *Cardium (Fragum) simillimum*, Smith, *Illustr. Zool. "Investigator"*, pl. vii, figs. 6, 6a.

1937. *Cardium simillimum*, Viader, *Maur. Inst. Bull.* 1(2), p. 68.

1940. *Corculum (Fragum) simillimum*, Winckworth, *Proc. Malac. Soc. London*, XXIV(1), p. 27.

Nine complete shells and four valves of *C. simillimum* are found in the collection; these agree in their essential shell characters with Smith's description and figure.

Distribution.—This extremely rare form has so far been recorded from off the Colombo Lighthouse, Ceylon, and Mauritius. Its occurrence on the Coromandel Coast is, therefore, of interest.

Family VENERIDAE.

Subfamily *DOSINIINAE.*

Genus **Dosinia** Scopoli, 1777.

Dosinia aspera (Reeve, 1850).

1850. *Artemis aspera*, Reeve, *Conch. Icon.* VI, pl. ix, fig. 49.

1852. *Artemis aspera*, Sowerby, *Thes. Conch.* II(13), p. 668, pl. clxiii, fig. 56.

1863. *Dosinia aspera*, Römer, *Novit. Conch.* II, *Suppl.* 1, *Dosinia*, pp. 56, 57, pl. x, fig. 4.

The single specimen of *D. aspera* in the collection has a shell sculptured with fine and sharp concentric striae, which are slightly raised at the sides, particularly at the edge of the ligamental area.

Distribution.—Penang, Maungmagan, Port Curtes and Manila. The Coromandel Coast is a new record[1].

Subfamily *MERETRICINAE.*

Genus **Meretrix** Lamarck, 1799.

Meretrix meretrix (Linnaeus, 1758)

var. **castanea** (Lamarck, 1835).

1835. *Cytherea castanea*, Lamarck, *Hist. Nat. Anim. Sans Verteb.* VI, p. 299.

1917. *Meretrix meretrix* var. *castanea*, Horuell, *Rec. Ind. Mus.* XIII, p. 161, pl. iv, fig. 12.

1932. *Meretrix meretrix* var. *castanea*, Prashad, *Siboga Exped. Monogr. Pelecypoda*, LIIIC, p. 215.

1937. *Meretrix castanea*, Lamy et Fischer-Piette, *Bull. Mus. Hist. Nat.* (2)IX (2), p. 157.

This variety is represented in the collection by only two shells which are of uniform chestnut colour, with the vulva distinctly much darker than the rest of the body.

Distribution.—Bombay, Madras, Tuticorin, Tambraparni delta, Malabar, Trincomalee, Tampalakam, Hinzé Basin, Arakan, Tavoy Coast, Singapore, Lombok and the Philippines.

[1] There was one specimen of *Dosinia excisa* Phil. also in the collection, but this has unfortunately been lost in the Varuna flood. This species is very common in Madras and Bombay.

Subfamily *VENERINAE.*

Genus **Gafrarium** Röding, 1798.

Subgenus **Gafrarium** S. S.

Gafrarium divaricatum (Dillwyn, 1817).

1817. *Venus divaricata, Dillwyn, Descr. Cat. Rec. Shells,* 1, p. 200.

1939. *Gafrarium (Gafrarium) divaricatum,* Adam and Leloup, *Mem. Mus. Roy. Hist. Nat. Belg.* II, Fasc. 20, p. 82, pl. v, fig. 4.

1942. *Gafrarium divaricatum,* White, *Proc. Malac. Soc. London,* XXV(2), p. 72.

The single shell in the collection can easily be recognized by its strong divaricate plications on the surface. The dark-brown streaks and spots are not very prominent.

Distribution.—This is the most common species of the genus and its range extends from the Red Sea and Persian Gulf to the Philippines and Japan.

Genus **Katelysia** Römer, 1857.

Subgenus **Eumarcia** Iredale, 1924.

Katelysia opima (Gmelin, 1790).

1782. *Venus pinguis,* Chemnitz, *Conch. Cab.* VI, p. 355, pl. xxxiv, figs. 355-357.

1790. *Venus opima, V. triradiata* and *V. nebulosa,* Gmelin, *Syst. Nat.* ed. XIII, p. 3279, nos. 44-46.

1939. *Katelysia (Eumarcia) opima,* Adam and Leloup, *Mém. Mus. Roy. Hist. Nat. Belg.* II, Fasc. 20, p. 86.

1939. *Marcia (Hemitapes) opima,* Lamy and Fischer-Piette, *Bull. Nat. Hist. Nat.* (2) XI (2), p. 258.

1941. *Catelysia opima,* Gravely, *Bull. Mad. Govt. Mus.* (*N.S.*), V(1), pp. 49, 51, 52, 55, 81, fig. 201.

A single specimen with a turgid shell of fulvous cream colour represents *K. opima* in the collection. A detailed synonymy of this species is given by Adam and Leloup in the paper already referred to.

Distribution.—This backwater clam is extremely common in Bombay, but has also been recorded from Madras, Tranquebar, Pamban, Pulicat Lake, Dutch Bay, Ceylon, Chilka Lake, Arakan, Maungmagan and Sumatra.

Subgenus **Hemitapes** Römer, 1864.

Katelysia marmorata (Lamarck, 1835).

1835. *Venus marmorata,* Lamarck, *Hist. Nat. Anim. Sans Verteb.* VI, p. 361.

1872. *Tapes (Hemitapes) marmorata, T. variabilis* and *T. laterisulca,* Römer, *Monogr. Venus,* II, p. 104, pl. xxxiv, fig. 3a-c, p. 106, pl. xxxvi, fig. 1a-c, p. 107, pl. xxxvi, fig. 2a-e.

1931. *Katelysia marmorata,* Winckworth, *Proc. Malac. Soc. London,* XIX(4), p. 189.

1941. *Paphia marmorata,* Gravely, *Bull. Mad. Govt. Mus.* (*N.S.*), V(1), p. 52.

Three specimens of this extremely common backwater species have concentrically grooved shells, each being ornamented with three broad dark-brown longitudinal bands.

Distribution.—This form is known from various localities from Karachi to the Philippines.

Genus **Paphia** Röding, 1798.

Section **Protapes** Dall, 1902.

Paphia gallus (Gmelin, 1790).

1790. *Venus gallus*, Gmelin, *Syst. Nat.* ed. XIII, p. 3277, No. 37.

1932. *Paphia (Protapes) gallus*, Prashad, *Siboga Exped. Monogr. Pelecypoda*, LIIIC, p. 233.

1941. *Paphia malabarica*, Gravely, *Bull. Mad. Govt. Mus.* (*N.S.*), V(1), p. 52, fig. 20n.

P. gallus is a greatly variable marine form and is represented in the collection by only one young specimen. The shell is devoid of any longitudinal rays on the surface, but has a somewhat flexuous posterior side. For a detailed synonymy Prashad's paper may be consulted.

Distribution.—Widely distributed throughout the Indo-Pacific.

Paphia cor (Sowerby, 1853).

1853. *Venus cor*, Sowerby, *Thes. Conch.* II(14), p. 727, pl. clx, fig. 184.

1872. *Tapes (Hemitapes) cor*, Römer, *Monogr. Venus*, II, p. 103, pl. xl, fig. 4a-b.

1893. *Venus (Chione) cor*, Melvill and Abercrombie, *Mém. Manchest. Lit. and Phil. Soc.* (4)VII, p. 46.

P. cor is represented in the collection by only two yellowish shells of trapeziformly globose shape, which are more or less rusted and sculptured with numerous small irregular undulating concentric ridges.

Distribution.—Originally described from the River Indus, Karachi but subsequently recorded from Bombay, Cutch, Kathiwar and South India.

Section **Paratapes** Stoliczka, 1871.

Paphia textile (Gmelin, 1790).

1790. *Venus textile*, Gmelin, *Syst. Nat.* ed. XIII, p. 3280, No. 51.

1935. *Paphia (Paratapes) textile*, Thiele, *Handb. der Syst. Weichtierk.* II, p. 893.

1942. *Paphia textile*, Crichton, *Journ. Bomb. Nat. Hist. Soc.* XLII, p. 331.

I assign to this species two young specimens only which have smooth and yellowish shells entirely devoid of the characteristic textile paintings. Prashad (*loc. cit.*, pp. 239, 240) has given a detailed list of synonymy of this species.

Distribution.—This is a very common Indo-Pacific form and its range extends as far as the Red Sea.

Genus **Venerupis** Lamarck, 1818.

Subgenus **Venerupis** S. S.

Venerupis dashamii sp. nov.

(Plate III, figs. 6, 7.)

Shell triangularly-ovate, solid, more or less regular, aequilateral, pale creamy, inflated, nicely sculptured with fine equidistant radial riblets, crossed by distant crenulated concentric laminae which are broad, fluted and slightly obliquely angular posteriorly, from the middle downwards the laminae are much more close; anterior side bluntly rostrated, posterior side very broad and rounded; umbones situated almost in the middle of the shell, slightly prominent, anterior margin slopingly straight, posterior margin slightly raised and arched, ventral margin convex, but curving a little immediately beyond the middle line, gradually becomes narrow upwards so as to form the blunt rostrum in front; anterior muscular impression shallow, elongately-oval, pointed in front and larger than the posterior one which is slightly smaller and deeper, but more or less oval; the lunule is sinuous posteriorly. The animal is of chocolate-brown colour. The shell measures 29 mm. in length, 23 mm. in height and 18 mm. in thickness.

Type-locality.—The single specimen in the collection was collected by Professor P. R. Awati from the Coromandel Coast of India, Madras.

Holotype.—Reg. No. M15940/2 Zool. Surv. Ind.

Remarks.—*Venerupis dashamii* can readily be distinguished from all other species of the genus by its broad and rounded posterior end and bluntly rostrated anterior end. In the nature of the laminae this species somewhat approaches *V. vertumnalium* Melvill (1918)[1] from Karachi which has wrongly been described as *Cypricardia*.

Family DONACIDAE.

Genus **Donax** Linnaeus, 1758.

Subgenus **Hecuba** Schumacher, 1817.

Donax scortum (Linnaeus, 1758).

1758. *Venus scortum*, Linné, *Syst. Nat.* ed. X, p. 686, No. 103.

1939. *Donax* (*Hecuba*) *scortum*, Adam and Leloup, *Mém. Mus. Roy. Hist. Nat. Belg.* II, Fasc. 20, pp. 90, 91.

This widely-distributed Indo-Pacific form has a single shell in the collection which appears to be quite typical of the species.

Family PHOLADIDAE.

Subfamily *MARTESIINAE*.

Genus **Martesia** (Leach) Blainville, 1825.

Section **Martesia** S. S.

Martesia striata (Linnaeus, 1758).

1758. *Pholas striata*, Linné, *Syst. Nat.* ed. X, p. 669, No. 12.

1909. *Pholas* (*Martesia*) *striata*, Lynge, *D. Kgl. Dansk. Vidensk. Selsk. Shr. Nat.-Math.* (7)V, pp. 187, 188.

[1] Melvill, J.C. *Ann. & Mag. Nat. Hist.* (9) 1, p. 157, pl. v, fig. 34 (1918).

1936. *Martesia striata*, Calman and Crawford, *Brit. Mus.* (*Nat. Hist.*) *Econ. Ser.* X, pp. 1-38.

This well-known boring mollusc is represented in the collection by one typical specimen only.

It is by far the most widely distributed species of the genus and its range extends to Europe, Africa, America, India, Ceylon, Burma, Malay Archipelago, Siam, Annam, the Philippines, China, Japan and Polynesia.

Martesia multistriata (Sowerby, 1849).

1849. *Pholas multistriata*, Sowerby, *Thes. Conch.* II(10), p. 494, pl. civ, figs. 35, 36.

1932. *Martesia multistriata*, Prashad, *Siboga Exped. Monogr. Pelecypoda*, LIIIC, p. 318.

1938. *Martesia multistriata*, Suvatti, *Moll. of Siam, Bangkok*, p. 71.

The single shell of *M. multistriata* in the collection has exceedingly fine striae on its umbonal part.

Distribution.—Majunga, Ankify (Decary), Gwadur, Cutch, Kathiawar, Hinzé Basin, Byikhwaaw Bay, Macassar, Mekong, Gulf of Siam, Annam, Turtle's Island, N. Coast of Australia. It does not appear to have been recorded so far from the Coromandel Coast.

Suborder ANOMALODESMATA.

Family MYOCHAMIDAE.

Genus **Myodora** Gray, 1840.

Myodora quadrata Smith, 1899.

1899. *Myodora quadrata*, Smith, *Ann. and Mag. Nat. Hist.* (7) IV, p. 250.

1901. *Myodora quadrata*, Smith, *Illustr. Zool.* "*Investigator*", pl. xiii, figs. 5, 5a.

1932. *Myodora quadrata*, Prashad, *Siboga Exped. Monogr. Pelecypoda*, LIIIC, p. 322.

1936. *Myodora quadrata*, Lamy, *Journ. de Conchyliol.* LXXIX(3), p. 256.

1940. *Myodora quadrata*, Winckworth, *Proc. Malac. Soc. London*, XXIV(1), p. 28.

Seven right valves, of which only two are complete and the rest partly broken, and two broken pieces of a left valve represent the species *quadrata* in the collection. The concentric sulcations are stronger in the former than in the latter. It is closely allied to *M. weberi* Prashad.

Distribution.—So far known from off the Travancore Coast, Dares-Salam and off the Andaman Islands, but not from the Coromandel Coast.

Class CEPHALOPODA.

Subclass DIBRANCHIA.

Order OCTOPODA.

Family OCTOPODIDAE.

Subfamily *OCTOPODINAE.*

Genus **Octopus** Lamarck, 1798.

Subgenus **Octopus** S. S.

Octopus cyanea Gray, 1849.

1849. *Octopus cyanea*, Gray, *Cat. Moll. Brit. Mus.* Part 1, p. 15.

1885. *Octopus marmoratus*, Hoyle, *Ann. and Mag. Nat. Hist.* (5)XV, pp. 227, 228.

1929. *Octopus (Octopus) cyanea*, Robson, *A Monograph of the Recent Cephalopoda*, Part 1, pp. 94-98.

Of the two specimens of this greatly variable species, one is quite young. Robson has given a detailed list of records of distribution of this common species.

Order DECAPODA.

Family SEPIIDAE.

Genus **Sepiella** (Gray) Steenstrup, 1880.

Sepiella inermis Férussac et d' Orbigny, 1839.

1839. *Sepiella inermis*, Fér. et d'Orbig., *Hist. Nat. gen. et part Les Cephalopodes Acetabuliferes vir. et foss.*, p. 286.

1916. *Sepiella inermis*, Massy, *Rec. Ind. Mus.* XII, p. 231-237, pl. xxiii, fig. 6 (radula), pl. xxiv, figs. 1-8 (shells), 9 (mandibles).

1939. *Sepiella inermis*, Adam, *Siboga Exped. Cephalopoda*, LVb, pp. 93-98, Text-figs. 1-5, pl. iv, figs. 5, 6.

1941. *Sepiella inermis*, Gravely, *Bull. Mad. Govt. Mus.* (*N.S.*), V(1), p. 69, fig. 25c.

Two specimens in the collection belong to this species. Adam has recently discussed the chief diagnostic features of this species.

Distribution.—*S. inermis* is a very common species of the Indo-Malayan Region, but its range seems to extend through East Indies to Japan also.