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MITRES OF INDIAN WATERS,

(Mollusca, Gastropoda : Family Mitridae.)

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(Plates I—III.)

INTRODUCTION.

A detailed review of the literature on Mitridae shows that Indian Mitres have so far been treated only casually along with other marine molluscs by several workers, namely, von Frauenfeld¹, Nevill², Smith³, Thurston⁴, Melvill and Abercrombie⁵, Melvill and Sykes⁶, Melvill and Standen⁷, Preston⁸, Melvill⁹, Burton¹⁰, Crichton¹¹, Gravely¹², Hornell¹³, Patil¹⁴ and Satyamurti¹⁵. But no separate account dealing with the Indian Mitridae has hitherto been published in line with the regional studies as attempted by Garrett (Mitridae of Rarotonga and Polynesia)¹⁶, Dautzenberg and Bouge (Mitridae of New Caledonia)¹⁷, Dautzenberg (Mitridae of Netherland East Indies)¹⁸, Allan (Mitres of Australia)¹⁹ and Laseron (Mitras of New South Wales)²⁰. The latter type of work is essentially needed for workers in this country. Such a work would be still more useful, if necessary details relating to the number of species and varieties inhabiting the area, such as, their up-to-date nomenclature and synonymy, classification, distinctive features of diagnosis and affinity, type-locality and range of distribution, etc., are also included; this has been attempted in the present paper.

¹von Frauenfeld, G. R. *Beiträge zur Fauna der Nicobaren*, III, pp. 859, 860 (1896).

²Nevill, G. & H. *Journ. As. Soc. Bengal*, XLIV, pp. 98-100 (1875).

³Smith, E. A. *Proc. Zool. Soc. London*, pp. 813-816 (1878); *Faun. & Geogr. Mald. and Laccad. Archipelagoes*, II, pp. 591, 604, 605 (1903).

⁴Thurston, E. *Mad. Govt. Mus. Bull.* No. 1, p. 123 (1895).

⁵Melvill, J. C. and Abercrombie, A. *Mem. and Proc. Manchest. Lit. & Phil. Soc.* (4) VII, p. 28 (1893).

⁶Melvill, J. C. and Sykes, E. R. *Proc. Malac. Soc. London*, II, pp. 166-168 (1897); *ibid.* III, pp. 40, 41 (1898), pp. 222-225 (1899).

⁷Melvill, J. C. and Standen, R. *Journ. of Conch.* IX, p. 39 (1898).

⁸Preston, H. B. *Rec. Ind. Mus.* II, pp. 193, 194 (1908).

⁹Melvill, J. C. *Trans. Linn. Soc. London, Ser. II, Zool.-XIII*, pp. 109-112 (1928).

¹⁰Burton, R. W. *Journ. Bomb. Nat. Hist. Soc.* XLI, p. 552 (1941).

¹¹Crichton, M. D. *Journ. Bomb. Nat. Hist. Soc.* XLII, pp. 334, 337 (1941).

¹²Gravely, F. H. *Mad. Govt. Mus. Bull. N. S.*, V (2), pp. 63-65, 100 (1942).

¹³Hornell, J. *Indian Molluscs*, pp. 27, 28 (1951).

¹⁴Patil, A. M. *Journ. Bomb. Nat. Hist. Soc.* L, p. 552 (1952).

¹⁵Satyamurti, S. T. *Bull. Mad. Govt. Mus. N. S.*, 1(2), Pt. 6, p. 194 (1952).

¹⁶Garrett, A. *Proc. Zool. Soc. London*, pp. 839-843 (1872); *Journ. of Conch.* III, pp. 1-73 (1880).

¹⁷Dautzenberg, Ph. and Bouge, L. J. *Journ. de Conchyliol.* LXVII, pp. 83-259 (1923).

¹⁸Dautzenberg, Ph. *Mém. Mus. Roy. Hist. Nat. Belg. Hors Ser.*, II, Fasc. 17, pp. 41-288 (1935).

¹⁹Allan, J. *Austr. Mus. Mag.* VII (1), pp. 13-16 (1939).

²⁰Laseron, C. F. *Rec. Austr. Mus.* XXII (4), pp. 335-343 (1951).

The Mitres were first grouped with the Volutes by Linnaeus¹. But it was Lamarck² who after a critical study found them to differ markedly from the latter in having their shells generally much smaller in size and fusiform in shape, with the spire more elongated (the tip of which is never papillary) and the columellar plaits gradually becoming smaller below in contrast to those of the genus *Voluta*. These characters formed the basis for the erection of the new genus *Mitra* by him for their reception, with *Voluta episcopalis* Linn. as its genotype. Subsequent researches carried out in the field in the course of some 150 years have added much towards our knowledge in the way of establishing not only a separate family Mitridae for Mitres, but also three subfamilies and several well-defined groups for better understanding and arrangements of the varied forms of animals now included in the family. As a result, the genus *Mitra* which previously embraced all the species of the family is now found to be represented by a few forms only, of which *Mitra mitra*, *M. papalis* and *M. pontificalis* appear more well-known.

The animals of this family are known to live under various ecological conditions, *i.e.* some are strictly reef-dwellers and hide themselves in holes and crevices under sea-weeds or under stones and blocks of dead corals, while some burrow themselves in sand or sandy-mud at various depths. It is said that forms with long, slender and ribbed shells can move more freely and briskly over the sands than those with heavier shells and the covering of sandy-mud thus formed on their surface serves as a sort of camouflage against the invaders. Some even prefer the stony ground, where they may lie concealed under lumps of dead corals during the day time and come out in the night for prey and, consequently, become nocturnal in their habits. In this respect the notes by Garrett (1880) on the collection he made in the Polynesian Islands are specially interesting and useful. Some of the forms have the peculiar habits of emitting, when irritated, a purple fluid having a nauseous odour possibly for the purpose of defence. The shells in this group appear to vary considerably in size ranging, says Allan (1950)³, "from an inch or even less to at least 6 inches"

Johnston⁴ appears to be the first to have recognized the importance of opercular characters in the determination and arrangements of the genera and families of Mollusca. He stated that most of the larger species of Mitres and Olives do not possess an operculum, while the smaller species are furnished with rather larger opercula. H. and A. Adams⁵ also expressed a somewhat similar opinion: "Some of the larger species of Mitridae have no operculum, but it is often present, though small, on the foot of the smaller species"

Attempts towards elucidating the peculiarities in the radular teeth of Mitridae and their value in the classification of the group were made by Gray⁶, MacDonald⁷, Troschel⁸, Cooke⁹, Peile¹⁰, and Thiele¹¹.

¹Linnaeus, C. *Syst. Nat.* ed. X, pp. 731-733 (1758).

²Lamarck, J. B. P. A. *Prodr. Nouv. Classif. Coq.*, p. 70 (1799).

³Allan, J. *Australian Shells*, p. 178 (1950).

⁴Johnston, G. *Medical Repository*, 1821; *Nat. Hist. Moll. Anim.*, p. 455 (1850).

⁵Adams, H. & A. *Gen. Rec. Moll.* 1, p. 168 (1853).

⁶Gray, J. E. *Ann. & Mag. Nat. Hist.* (2) XII, pp. 129, 130 (1853).

⁷MacDonald, J. D. *Ann. & Mag. Nat. Hist.* (2) XIX, p. 403 (1857); *ibid.* (4) III, p. 116 (1869).

⁸Troschel, F. H. *Das Gebiss der Schnecken*, II, pp. 68, 69, pl. vi (1868).

⁹Cooke, A. H. *Proc. Zool. Soc. London*, II, pp. 405-422, Text-figs. 1-18 (1919).

¹⁰Peile, A. J. *Proc. Malac. Soc. London*, XV, pp. 93, 94 (1922); *ibid.* XXII, pp. 141-144 (1936).

¹¹Thiele, J. *Handb. der Syst. Weichtierk.* 1, pp. 337-341, Text-figs. 393-395, 397-399, 402, 404 (1929).

That the Mitres bear close affinity with the Cowries is evident from the fact that they occur along with the latter (though scarcely with the Volutes-Reeve¹) mostly in warm and shallow waters of the tropics near submerged rocks and coral reefs and present remarkable style of colouration and sculpture on the surface of their turreted shells. Moreover, the presence of a long retractile proboscis also indicates their carnivorous habits similar to those of the Cowries and Tonnas (Steadman and Cotton²). Some of the smaller species of Mitres also closely resemble those of Pyrenidae (=Columbellidae) in form and colouration of their shells, and this may be the reason why Lamarck even unhesitatingly placed a few of them into the genus *Columbella*. But the presence of strong and regular plications on their inner lip or columella easily separates them from the Columbellids which possess only plait-like denticulations.

Like Cowries, Mitres are also known to be exceedingly rare in the European Seas. In this connection the opinion expressed by Swainson³ appears interesting: "This scarcity of Mitres certainly does not originate from the difficulty of gaining access to their haunts; for, although some are known to live at great depths, yet both MM. Stuchbury and Cuming inform us that they generally found these shell-fish in shallow water, near coral reefs. Hence we conjecture that their chief metropolis must be the great Pacific Ocean, where, among the countless numbers of existing islands, and the coral foundations of others, the number of species now unknown may be nearly equal to those already described" Reeve concluded: "The Philippine Islands are probably the richest spot in the world for Mitres, as Mr. Cuming during his four years sojourn in that locality collected between two or three hundred species of that genus" A somewhat similar statement was also made by H. & A. Adams: "The Philippine Archipelago, and other groups of islands, seem principally to harbour these animals, few species being found on the shores of continents" But as far as is known from the available records, the highest number of Mitres so far reported from within the limits of the Indian waters is found in the Andaman Islands (slightly more than hundred species only), while in other parts of Indian waters they are very poorly represented (Melvill and Abercrombie, Patil, Satyamurti). Hornell says: "Unfortunately the fine species of Mitres are very rare in Indian waters" Garrett collected nearly two hundred species from the Polynesian Islands, while Viader⁴ listed a slightly smaller number from Mauritius. Allan figured 38 species from Australia, while Dautzenberg recorded some 60 from the Netherland East Indies. From the above it is clear that Philippines harbour the highest number of species and then come Polynesia, Mauritius, Andamans, etc., in the order of the population of Mitres in the most extensive marine conchological province—Indo-Pacific. Tryon⁵ says: "Bathymetrically they range from low water to eighty fathoms, the smaller species being usually found along shore lines" But so far as the geological record is concerned, they are known to occur in nearly all the Tertiary beds (Sowerby⁶). Cooke says (p. 419): "The Mitridae represent an ancient group of Molluscs" He further adds in

¹Reeve, L. *Elements of Conchology*, 1, pp. 47, 48 (1860).

²Steadman, W. R. and Cotton, B. C. *South Austr. Nat.* XXII(2), p. 17 (1943).

³Swainson, W. *A Treatise on Malacology*, p. 128 (1840).

⁴Viader, R. *Maur. Inst. Bull.* 1(2), pp. 17-23 (1937).

⁵Tryon, G. W. *Man. Conch.* IV, p. 107 (1882).

⁶Sowerby, J. *Gen. Rec. and Foss. Shells*, Part 31 (1828).

the foot-note : “ Mr. R. B. Newton informs me that Bellardi enumerates nearly 200 species of Mitridae from the Upper Tertiaries of Italy alone and that the genus dates back to Cretaceous rocks ” Stoliczka¹ has recorded a few forms of Mitres from the Cretaceous bed of Southern India. Hertlein and Emerson² state that the long pelagic larval stage of *Mitra* like that of *Conus* and *Cypraea*, affords the most successful means of its dispersal across a great expanse of deep water.

Regarding the system of classification, Thiele's work cited above has been followed, though it needs slight modifications in some cases in the light of recent researches.

The materials used in this study are from the unnamed spirit collection of the Zoological Survey of India. This collection was made mainly from the Indian waters mostly by the R. I. M. S. ‘ *Investigator* ’ and partly by the staff of the Zoological Survey of India. Unfortunately in most cases exact locality data, date of collection, etc., are not recorded. The identification of some of the specimens proved rather difficult owing to the fact that the named dry collection of Survey was severely damaged by the Varuna flood of 1943 at Banaras and could not be fully utilized for comparison and study. Doubtful shells were, therefore, sent to the British Museum (Nat. Hist.), London, and the South Australian Museum, Sydney, for opinion.

The collection before me comprises 25 species and one new variety representing in all 8 different genera arranged under three subfamilies. Each form has been illustrated with photographs so as to avoid difficulty in identification. Structural peculiarities observed in the course of examining the shells have been noted in detail and the distribution in many cases has been extended beyond the known range. Further, juvenile shells in some cases have been found to exhibit such remarkable features as have not been recorded previously.

I express my grateful thanks to Dr. W. J. Rees, D. Sc., British Museum (Nat. Hist.), London, and Joyce Allan, F. R. Z. S., South Australian Museum, Sydney, for their great help in the identification of the doubtful specimens. Dr. Bains Prashad, the distinguished Malacologist of India, has been very kind enough to go through the manuscript and offer me his valuable comments and criticisms, for which I am greatly indebted to him. I extend my cordial thanks to Dr. S. L. Hora, Director, Zoological Survey of India, for the encouragements and facilities he has so kindly given me throughout the work. Sri S. C. Mondal, artist and photographer of this Survey, has taken with care photographs of all the shells used in this study, and for this I offer him my best thanks.

¹Stoliczka, F. *Cretaceous Fauna of Southern India*, II, pp. 101-104 (1868).

²Hertlein, L. G. and Emerson, W. K. *Trans. San Diego Soc. Nat. Hist. California*, XI (13), p. 353 (1953).

SYSTEMATIC ARRANGEMENT.

	Page.
Family MITRIDAE	
1. Subfamily VEXILLINAE.	
Genus VEXILLUM	6
Species :— <i>V. deshayesi</i> (Reeve)	7
Genus COSTELLARIA	9
Species :— <i>C. acuminata</i> (Gmelin)	10
<i>C. sculptilis</i> (Reeve)	
var. <i>interviewi</i> nov.	12
<i>C. obeliscus</i> (Reeve)	13
2. Subfamily MITRINAE.	
Genus CHRYSAME	16
Species :— <i>C. cucumerina</i> (Lamarck)	17
<i>C. chrysalis</i> (Reeve)	20
<i>C. tabanula</i> (Lamarck)	22
<i>C. buryi</i> (Melvill and Sykes)	23
<i>C. aurantia</i> (Gmelin)	24
<i>C. rüppelli</i> (Reeve)	27
Genus SCABRICULA	28
Species :— <i>S. pretiosa</i> (Reeve)	29
Genus CANCELLA	31
Species :— <i>C. isabella</i> (Swainson)	32
<i>C. circula</i> (Kiener)	34
<i>C. interlirata</i> (Reeve)	36
<i>C. rufilirata</i> (Adams and Reeve)	38
Genus MITRA	39
Species :— <i>M. mitra</i> (Linn.)	40
Genus VICIMITRA	45
Species :— <i>V. prosphora</i> Iredale	46
Genus STRIGATELLA	47
Species :— <i>S. litterata</i> (Lamarck)	48
<i>S. columbellaeformis</i> (Kiener)	52
<i>S. acuminata</i> (Swainson)	54
<i>S. scutulata</i> (Schröter)	56
<i>S. amphorella</i> (Lamarck)	59
<i>S. paupercula</i> (Linnaeus)	61
<i>S. virgata</i> (Reeve)	64
<i>S. astricta</i> (Reeve)	67
3. Subfamily CYLINDROMITRINAE.	
Genus CYLINDROMITRA	68
Species :— <i>C. dactylus</i> (Linnaeus)	70

Family MITRIDAE.

Subfamily VEXILLINÆ.

Genus **Vexillum** (Bolten) Röding, 1798.Type. *Voluta plicaria* Linnaeus, 1758.

1753. *Turricula Auriculata*, Klein (*in part*), *Tent. Method. Ostrac.*, p. 74.
 1798. *Vexillum*, Röding, *Mus. Boltinianum*, p. 138.
 1824. *Vulpecula*, Blainville, *Dict. des Sci. Nat.* XXXI, p. 106.
 1840. *Tiara*, Swainson, *A Treatise on Malacology*, p. 319.
 1849. *Turricula*, Hermannsen, *Index Gen. Malacoz.* II, p. 651.
 1852. *Turricula*, Mörch, *Cat. Conchyl. Yoldi*, 1, p. 83.
 1853. *Turricula*, H. & A. Adams, *Gen. Rec. Moll.* 1, p. 715.
 1859. *Turricula*, Chenu, *Man. de Conch.* 1, p. 194.
 1878. *Turricula*, Kobelt, *Illustr. Conchyl.* 1, p. 67.
 1882. *Turricula*, Tryon, *Man. Conch.* IV, pp. 109, 246.
 1883. *Turricula*, Tryon, *Struct. & Syst. Conch.*, p. 171.
 1884. *Turricula*, Fisher, *Man. de Conch.*, p. 613.
 1888. *Turricula*, Paetel, *Cat. Conchyl.—Samml.* 1, p. 172.
 1899. *Turricula*, Cossmann, *Ess. Paleoconch. Comp.* III, p. 162.
 1906. *Vexillum*, Dall, *Journ. of Conch.* XI, p. 296.
 1911. *Turricula*, Schepman, *Prosobr. Siboga.—Exped. Monogr.* IV, p. 279.
 1919. *Vexillum*, Cooke, *Proc. Zool. Soc. London*, II, pp. 405, 417, 418.
 1920. *Vexillum*, Tomlin, *Journ. of Conch.* XVI(4), p. 127.
 1922. *Vexillum*, Peile, *Proc. Malac. Soc. London*, XV, pp. 93, 94.
 1924. *Vulpecula*, Fulton, *A Cat. of Shells of Rec. Moll.*, p. 20.
 1925. *Vexillum*, Oostingh, *Rept. on a Coll. of Shells from Obi and Halmahera (Moluccas)*, p. 165.
 1928. *Vexillum*, Woodring, *Miocene Mollusks from Bowden, Jamaica*, II, p. 244.
 1929. *Vexillum*, Thiele, *Handb. der Syst. Weichtierk.* 1, p. 338.
 1931. *Vexillum*, Oostingh, *Archiv f. Molluskenk.* LXVIII, p. 211.
 1934. *Vexillum*, Hirase, *A Coll. of Jap. Shells*, p. 71.
 1935. *Turricula*, Dautzenberg, *Mém. Mus. Roy. Hist. Nat. Belg. Hors Ser.*, II, Fasc. 17, p. 119.
 1936. *Vexillum*, Peile, *Proc. Malac. Soc. London*, XXII, p. 143.
 1936. *Vexillum*, Winckworth, *Proc. Malac. Soc. London*, XXII, p. 20.
 1938. *Vexillum*, Adamand Leloup, *Mém. Mus. Roy. Hist. Nat. Belg. Hors Ser.*, II, Fasc. 19, p. 191.
 1939. *Vexillum*, Allan, *Austr. Mus. Mag.* VII(1), p. 14.
 1942. *Vexillum*, Yen, *Proc. Malac. Soc. London*, XXIV, p. 239.
 1950. *Vexillum*, Allan, *Australian Shells*, p. 179.
 1952. *Vexillum*, Glibert, *Mém. Inst. Roy. Sci. Nat. Belg. Ser. 2, Fasc.* 46, p. 360.
 1953. *Vexillum*, Olsson, Harbison, Fargo and Pilsbry, *Acad. Nat. Sci. Phil. Monogr.* No. 8, p. 191.
 1953. *Vexillum*, Solem, *Field. Zool.* XXXIV, No. 22, p. 325.

Vexillum was instituted as a genus by Röding. It appears that most of the recent authors are inclined to retain it in preference to *Turricula* Klein, though the older authors did the reverse. In this respect I agree with the view of the former. *Vexillum* is charac-

terized by some remarkable features which formed the basis for the erection of the new subfamily Vexillinae by Thiele. Winckworth also lends strong support to this view as will be known from his remarks : “ *Vexillum* is so distinct as a genus from *Mitra* that Thiele placed them in separate subfamilies” *Vulpecula* Blainville and *Tiara* Swainson are considered as synonyms of *Vexillum*.

The authors also seem to differ regarding the selection of type-species of this genus, *i.e.*, some favouring *Vexillum plicatum* as cited by Röding, while others *Voluta plicaria* Linnaeus. The former could be accepted as the type as suggested by some authors, if it had not subsequently been treated as a synonym of the latter. This may possibly be the reason why Dall, Thiele and Glibert have preferred *V plicaria* Linn. to be the type of *Vexillum*.

Characters.—Shell medium, solid, fusiform, with the spire generally elevated and acuminate; whorls many as in *Costellaria*, but strongly longitudinally plicately ribbed ribs rather distant, usually angled at the upper part (the angles sometimes appearing nodulously swollen), sometimes terminating a little above the sutures (which are rather impressed) with smooth margin below and the interspaces between them quite smooth, though not cancellated as in *Costellaria*; revolving striae appearing strong or as flat bands throughout, but sometimes found confined to the base and upper part of the shell; columella three to five-plaited; outer lip internally striated, but striations sometimes appearing obsolete.

The peculiarities in the radular teeth of *Vexillum* have been demonstrated by Tryon, Thiele, Peile and Cooke in the papers cited above.

This genus is represented in the collection by the only species *deshayesi*.

***Vexillum deshayesi* (Reeve, 1884).**

(Plate I, fig. 1.)

- 1844. *Mitra deshayesii*, Reeve, *Proc. Zool. Soc. London*, No. CXII, p. 182.
- 1844. *Mitra deshayesii*, Reeve, *Conch. Icon.* II, pl. xxii, fig. 170.
- 1845. *Mitra deshayesii*, Catlow, *Conchologist's Nomenclator*, p. 297.
- 1853. *Turricula (Costellaria) deshayesii*, H. & A. Adams, *Gen. Rec. Moll.* 1, p. 177.
- 1860. *Mitra deshayesii*, Reeve, *Elements of Conchology*, I, p. 49.
- 1874. *Turricula (Costellaria) deshayesii* (in part), Jickeli, *Jahrb. Deuts. Malak. Gesell.* 1, p. 41.
- 1874. *Turricula (Costellaria) deshayesii*, Dunker, *Cat. Mus. Godeffroy*, V, p. 119.
- 1874. *Mitra deshayesii*, Sowerby, *Thesaurus*, IV, p. 35, pl. 361, fig. 155.
- 1876. *Mitra (Turricula) deshayesii*, Smith, *Journ. Linn. Soc. London, Zool.* XII, pp. 549, 550.
- 1878. *Mitra (Costellaria) deshayesii*, Smith, *Proc. Zool. Soc. London*, p. 815.
- 1880. *Turricula deshayesii*, Garrett, *Journ. of Conch.* III, p. 53.
- 1880. *Mitra deshayesi*, von Martens, in *Möbius's Beiträge zur Meeresfauna der Insel Mauritius und der Seychellen*, p. 254.
- 1882. *Turricula (Costellaria) deshayesii* (in part), Tryon, *Man. Conch.* IV, pp. 176, 177, pl. lii, p. 502.
- 1883. *Mitra (Costellaria) deshayesii*, Paetel, *Cat. Conchyl.—Samml.*, p. 27.
- 1888. *Mitra (Costellaria) deshayesi*, Paetel, *Cat. Conchyl.—Samml.* 1, p. 177.
- 1895. *Mitra (Costellaria) deshayesi*, Melvill and Standen, *Journ. of Conch.* VIII, p. 101.

1903. *Mitra deshayesi*, Smith, *Faun. and Geogr. Mald. and Laccad. Archipelagoes*, II, pp. 591, 605.
1903. *Mitra (Costellaria) deshayesi*, Sturany, *Denkschr. d. Kais. Akad. d. Wiss. Math.-Naturw. Classe*, LXXIII, p. 38.
1904. *Turricula deshayesi*, Hidalgo, *Cat. Moll. Test. Filipinas*, p. 76.
1909. *Mitra deshayesi*, Hedley, *Rept. Austr. Assoc. Adv. Sci.*, p. 366.
1912. *Mitra deshayesi*, Smith, *Nautilus*, XXVI, p. 77.
1923. *Mitra (Costellaria) deshayesi*, Dautzenberg and Bouge, *Journ. de Conchyliol.* LXVII, pp. 199, 217.
1924. *Mitra (Costellaria) deshayesi*, Fulton, *A Cat. of Shells of Rec. Moll.*, p. 21.
1929. *Mitra (Costellaria) deshayesi*, Dautzenberg, *Faun. des. Col. Franc.* III, p. 190.
1932. *Mitra (Costellaria) deshayesi*, Dautzenberg, *Journ. de Conchyliol.* LXXVI, p. 29.
1937. *Mitra deshayesi*, Viader, *Maur. Inst. Bull.* 1(2), p. 19.
1953. *Vexillum (Costellaria) deshayesi*, Solem, *Field. Zool.* XXXIV, No. 22, p. 225.

Reeve gave the specific name *deshayesi* after the distinguished Malacologist, M. Deshayes, in whose collection he found two specimens, out of four, forming this extremely interesting species, the other two being from the collection of Thomas Norris. Tryon, like Jickeli, wrongly included some forms in its synonymy.

The inclusion of the species *deshayesi* in the genus *Mitra* or *Costellaria* as suggested by the authors shows that its true systematic position has not been ascertained so far. At first I was also inclined to put it under *Costellaria*. But after carefully examining the shell I found that it bears certain interesting features so characteristic of the genus *Vexillum*, though not of *Costellaria*. So, these provided a strong ground for relegating it to *Vexillum* rather than to *Costellaria*.

Characters.—This elegant species is chiefly characterized by well-defined nodules on the angles formed at the upper part of the whorls of its somewhat fusiform shell, but smooth beneath. The longitudinal plications are strong, rather distant and terminate a little above the sutures and the interspaces between them are quite smooth. The colour is livid green. But one more striking feature is that the nodules on the angles are nicely tipped with orange-scarlet looking somewhat-like rows of streaks, which run down being interrupted in the middle. Smith (1878) is said to have been told by Capt. Worthington Wilmer (who collected living specimens of *deshayesi* at Port Blair, Andamans) that the orange-scarlet markings fade considerably after death, and in one of the specimens he found the mouth purplish black within, with a single white zone. Besides these, the base of the bodywhorl in this species is contracted and encircled with some grooves. The spire is elevated and longer than the aperture (which is narrow). There are four columellar plaits.

Smith says (1876) that the specimen he obtained at San Christoval was broadly black-banded below the orange tips of ribs in the upper whorls, while the bodywhorl was blackish-brown interrupted by three yellowish zones. He further adds that the whorls beneath the orange-tipped nodules were longitudinally broadly ribbed, and not smooth as mentioned by Reeve. This character is not found in the specimen at my disposal.

Locality.—Andamans—1.

The single specimen appears to agree closely with Reeve's description and figure, save that the colouration is somewhat sky-blue and the inside of the aperture more or less white. The shell measures 17 mm. in length and 5.5 mm. in diameter, with the spire 10 mm. in length and aperture 7 mm. There are nine whorls, of which the uppermost three only appearing closely longitudinally ribbed. The outer lip is quite thin and simple.

Distribution.—*Costellaria deshayesi* (Reeve) is a pretty species which was originally described from an unknown habitat. But subsequently it has been known to occur in the Red Sea, Gulf of Aden, Mauritius, Madagascar (Andranomaimbe, Ankoriko, Diego-Suarez, Bay of Tsimipaika, Bay of Befotaka, Tulear), Kolumadulu Atoll, N. Male Atoll, Comoro, Andamans, New Caledonia, Lifu, Philippines (Samar), Rua-Sura, Solomon Islands and Vavau-Tonga.

Genus **Costellaria** Swainson, 1840.

Neotype. *Mitra semifasciata* Lamarck, 1811.

1840. *Costellaria*, Swainson, *A Treatise on Malacology*, pp. 130, 320.
 1846. *Costellaria*, Hermannsen, *Index Gen. Malacoz.* 1, p. 312.
 1847. *Costellaria*, Gray, *Proc. Zool. Soc. London*, Pt. XV, p. 142.
 1852. *Costellaria*, Mörch, *Cat. Conchyl. Yoldi*, 1, p. 84.
 1953. *Costellaria*, H. & A. Adams, *Gen. Rec. Moll.* 1, p. 176.
 1859. *Costellaria*, Chenu, *Man. de Conch.* 1, p. 194.
 1869. *Costellaria*, von Frauenfeld, *Beiträge zur Fauna der Nicobaren*, III, p. 860.
 1869. *Costellaria*, MacDonald, *Ann. and Mag. Nat. Hist.* (4) III, p. 116, pl. xiii, fig. 17 (dentition).
 1878. *Costellaria*, Kobelt, *Illustr. Conchyl.* 1, p. 67.
 1880. *Costellaria*, Garrett, *Journ. of Conch.* III, p. 73.
 1882. *Costellaria*, Tryon, *Man. Conch.* IV, pp. 164, 169.
 1883. *Costellaria*, Paetel, *Cat. Conchyl.*—*Samml.*, p. 26.
 1884. *Costellaria*, Fischer, *Man. de Conch.*, p. 613.
 1888. *Costellaria*, Paetel, *Cat. Conchyl.*—*Samml.* 1, p. 172.
 1889. *Costellaria*, Tate, *Trans. and Proc. Roy. Soc. South Australia*, XI, p. 135.
 1879. *Costellaria*, Melvill and Sykes, *Proc. Malac. Soc. London*, II, p. 167.
 1898. *Costellaria*, Melvill and Sykes, *Proc. Malac. Soc. London*, III, p. 40.
 1899. *Costellaria*, Cossmann, *Ess. Paléoconch. Comp.* III, p. 164.
 1911. *Costellaria*, Schepman, *Prosobr. Siboga-Exped. Monogr.* IV, p. 282.
 1924. *Costellaria*, Fulton, *A Cat. of Shells of Rec. Moll.*, p. 20.
 1925. *Costellaria*, Oostingh, *Rept. on a Coll. of Rec. Shells from Obi and Halmahera (Moluccas)*, p. 168.
 1928. *Costellaria*, Melvill, *Proc. Malac. Soc. London*, XVIII, p. 108.
 1928. *Costellaria*, Woodring, *Miocene Mollusks from Bowden, Jamaica*, II, p. 244.
 1929. *Costellaria*, Dautzenberg, *Faun. des Col. Franc.* III, p. 189.
 1929. *Costellaria*, Thiele, *Handb. der Syst. Weichtierk.* 1, p. 338.
 1929. *Costellaria*, Iredale, *Mém. Queens. Mus.* IX, p. 286.
 1929. *Costellaria*, Iredale, *Austr. Zoologist, Sydney*, V, Pt. 4, p. 346.
 1931. *Costellaria*, Oostingh, *Archiv f. Molluskenk.* LXIII, p. 211.
 1935. *Costellaria*, Dautzenberg, *Mém. Mus. Roy. Hist. Nat. Belg. Hors. Ser.*, II, Fasc. 17, pp. 148, 207.

1936. *Costellaria*, Winckworth, *Proc. Malac. Soc. London*, XXII, p. 20.
 1939. *Costellaria*, Allan, *Austr. Mus. Mag.* VII (1), p. 16.
 1953. *Costellaria*, Solem, *Field. Zool.* XXXIV, No. 22, p. 325.

Swainson first introduced *Costellaria* as a subgenus of *Tiara* for accommodating certain species of Mitres which he found to differ essentially from those of *Tiara* proper. But subsequently it has been variously treated by the authors, *i.e.*, some subordinating it to *Mitra* proper, some to *Turricula* Klein, some to *Vexillum* Röding and some ranking it as a distinct genus—a position which it rightly deserves. Similarly, the opinion also seems to vary regarding the selection of its type-species. Swainson considered his own species, *Tiara rigida*, as the type. But as later that species was found identical with Lamarck's *Mitra semifasciata*, Cossmann and Fischer selected the latter as its neotype, while Tryon preferred Gmelin's *Voluta exasperata*.

Characters.—Shell small, acuminate-fusiform, many-whorled and adorned on the surface with narrow close rather oblique longitudinal ribs or costae (hence the generic name *Costellaria* possibly given to it) —the interstices of which are impressly cancellated. Besides these, the spire is longer than the aperture (which is striated internally) and the bodywhorl slightly ventricose in the middle, but abruptly contracted below. The ribs extend as far as the sutures which are rather impressed. The columella bears four plaits.

The animals of this group are known to inhabit sandy areas. A critical account of their dentition is published by MacDonald in the paper cited above.

Only two species and one new variety represent this genus in the collection.

***Costellaria acuminata* (Gmelin, 1790).**

Type-locality.—Tranquebar.

(Plate I, fig. 2.)

1780. *Turricula acuminata fenestrata tranquebarica*, Chemnitz, *Conch. Cab.* IV, p. 233, pl. cl, figs. 1403, 1404.
 1790. *Voluta acuminata*, Gmelin, *Syst. Nat.* ed. XIII, p. 3454.
 1817. *Voluta acuminata*, Dillwyn, *Descr. Cat. Rec. Shells*, 1, pp. 539, 540.
 1838. *Mitra rosea*, Kiener, *Icon. Coq. Viv.* IV, pp. 83, 84, pl. xxiii, fig. 73.
 1839. *Mitra acuminata*, Anton, *Verz. Conchyl.*, p. 67.
 1840. *Mitra acuminata*, Küster, in *Martini and Chemnitz's Syst. Conch.*—*Cab.* V, *Abth.* 2, pp. 113, 114, pl. xii, figs. 18, 19.
 1844. *Mitra crebrilirata*, Reeve, *Proc. Zool. Soc. London*, No. XCLII, p. 174.
 1844. *Mitra crebrilirata*, Reeve, *Conch. Icon.* II, pl. xiii, fig. 92.
 1852. *Callithea acuminata*, Mörch, *Cat. Conchyl. Yoldi*, 1, p. 82.
 1853. *Mitra (Callithea) acuminata* and *M. (Ca.) crebrilirata*, H. & A. Adams, *Gen. Rec. Moll.* 1, p. 178.
 1854. *Mitra crebrilirata*, Gray, *Proc. Zool. Soc. London*, Pt. XXII, p. 135.
 1856. *Mitra acuminata*, Wood, *Index Testaceol.* (ed. Hanley), p. 103, pl. xx, fig. 88.
 1860. *Mitra crebrilirata*, Reeve, *Elements of Conchology*, 1, p. 49.
 1860. *Mitra crebrilirata*, Tennent, *Ceylon*, I, p. 242,

1860. *Mitra crebrilirata*, Theobald, *Cat. Rec. Shells in Mus. As. Soc. Bengal*, p. 29.
1867. *Mitra crebrilirata*, Mitchell, *Cat. Moll. Coll. Govt. Central Mus. Madras*, p. 11.
1869. *Callithea crebrilirata*, von Frauenfeld, *Beiträge zur Fauna der Nicobaren*, III, p. 860.
1874. *Turricula (Callithea) crebrilirata*, Dunker, *Cat. Mus. Godeffroy*, V, p. 120.
1874. *Mitra crebrilirata*, Sowerby, *Thesaurus*, IV, p. 31, pl. 361, figs. 151, 152.
1880. *Turricula crebrilirata*, von Martens, in Möbius's *Beiträge zur Meeresfauna der Insel Mauritius und der Seychellen*, p. 254.
1880. *Turricula crebrilirata*, Garrett, *Journ. of Conch.* III, p. 41.
1882. *Turricula (Costellaria) crebrilirata*, Tryon, *Man. Conch.* IV, p. 178, pl. liii, fig. 521.
1883. *Mitra (Callithea) crebrilirata*, Paetel, *Cat. Conchyl.—Samml.*, p. 27.
1888. *Mitra (Costellaria) crebrilirata*, Paetel, *Cat. Conchyl.—Samml.* I, p. 176.
1891. *Mitra (Costellaria) crebrilirata*, Fischer, *Bull. Soc. Autun.* IV, p. 139.
1894. *Mitra crebrilirata*, Brancsik, *Contr. Faun. Moll. Insulae Papua*, p. 214.
1897. *Mitra (Costellaria) crebrilirata*, Melvill and Sykes, *Proc. Malac. Soc. London*, II, p. 225.
1898. *Mitra (Costellaria) crebrilirata*, Melvill and Standen, *Journ. of Conch.* IX, p. 39.
1899. *Mitra crebrilirata*, Melvill and Sykes, *Proc. Malac. Soc. London*, III, p. 225.
1901. *Mitra (Costellaria) crebrilirata*, Melvill and Standen, *Proc. Zool. Soc. London*, II, p. 419.
1904. *Turricula crebrilirata*, Hidalgo, *Cat. Moll. Test. Filipinas*, p. 76.
1911. *Turricula crebrilirata*, Schepman, *Prosobr.-Siboga. Exped. Monogr.* IV, p. 286.
1919. *Mitra (Costellaria) crebrilirata*, Iwakawa, *Cat. Jap. Moll. Nat. Hist. Dept. Tokyo Imp. Mus.*, p. 145.
1923. *Mitra (Costellaria) crebrilirata*, Dautzenberg and Bouge, *Journ. de Conchyliol.* LXVII, pp. 196, 197.
1924. *Mitra (Costellaria) crebrilirata*, Fulton, *A Cat. of Shells of Rec. Moll.*, p. 24.
1926. *Turricula crebrilirata*, Faustino, *Summary Phil. Mar. and Freshw. Moll.*, p. 288.
1936. *Vexillum acuminatum*, Winckworth, *Proc. Malac. Soc. London*, XXII, p. 20.
1937. *Mitra crebrilirata*, Viader, *Maur. Inst. Bull.* 1(2), p. 19.
1938. *Mitra (Costellaria) crebrilirata*, Suvatti, *Moll. of Siam*, p. 37.
1942. *Mitra acuminata*, Gravely, *Bull. Mad. Govt. Mus. N. S.*, V(2), pp. 65, 66, 100, fig. 12b.

Gmelin's *acuminata*, commonly called the "Sharp-pointed Mitre" and Reeve's *crebrilirata*, the "Close-ribbed Mitre", are undoubtedly one and the same species, though some authors (Mörch, H. and A. Adams) erroneously consider them as distinct. Although the species has become more well-known under the name of *crebrilirata*, the rules of priority in nomenclature certainly necessitate the restoration of Gmelin's name *acuminata*. Of course, the latter may be confounded with Swainson's species *acuminata* (1824) of the genus *Strigatella*, but a careful study of their essential features would enable one to separate them easily. Winckworth has, no doubt, rightly pointed out that both are quite distinct and placed Swainson's *acuminata* under the genus *Strigatella*, but his relegation of Gmelin's *acuminata* into the genus *Vexillum* appears rather unsatisfactory. Reeve hesitated to treat his new species *crebrilirata* as distinct from *Mitra polita*, to which, he says, it bears the same relationship as the ribbed does to the smooth variety of *Mitra ebenus*. But it was Tryon who finally confirmed the two as distinct. Kiener's *M. rosea* (not of Duclos) is regarded by some authors as a synonym of *crebrilirata*. But Adams's *layardi* which Tryon and Faustino consider as identical with the latter is interpreted by Melvill and Sykes as well as Schepman as nearly allied to it.

The systematic position of *acuminata* also appears uncertain owing to its inclusion in different genera, namely, *Mitra*, *Callithea*, *Turricula* and *Vexillum*. But the nature of ribbings and other important characters of its shell easily permit of its inclusion in *Costellaria*. Winckworth holds the view (which Peile has also supported) that the latter is congeneric with *Vexillum*, but this has not been supported by all workers.

Characters.—This species can readily be recognized by its elongately fusiform shell having elevated and acuminate spire, produced and contracted bodywhorl and beautiful sculpture consisting of narrow, close, regular longitudinal ribs or costae—the interstices of which are impressly cancellated with revolving striae. The colour is greatly variable, *i.e.*, it may be chestnut or olive to olive-brown or pale ashy brown or ochraceous to leaden grey. Each whorl is slightly angled above and marked with two spiral pale yellow bands, of which the prominent one lies in the middle (excepting the case of bodywhorl where it is placed a bit upward) and the other above it just beneath the suture which is rather impressed. But in some cases either one or both (very rarely) may be obsolete. The aperture is narrow and striated internally. The columella is four-plaited and the outer lip quite plain and simple. The epidermis is quite rough and dark-brown and its removal can only bring into view the true sculpture and colouration of the shell. In some cases there may be black encrustations covering the epidermis either partially or wholly. Peile has studied the peculiarities of its radular teeth.

Locality.—Madras-4.

The specimens in the collection appear quite typical of the species and agree with Reeve's fig. 92, Kiener's fig. 73 and Gravelly's fig. 12b. One of the shells appears encrustated with black at the upper part and another at the end of the bodywhorl. The largest specimen measures 31 mm. in length and 9.5 mm. in diameter, with its spire 17.5 mm. in length and aperture 13 mm. It has ten whorls and four columellar folds. But there is another bigger shell in the named dry collection from Andamans measuring 37 mm. in length and 12 mm. in diameter, with its spire 20 mm. in length and aperture 17 mm.

Distribution.—*Costellaria acuminata* (Gmelin) was originally described from Tranquebar and this may possibly be the reason why Chemnitz used the word 'tranquebarica' in connection with its nomenclature. But it has since been recorded from the Persian Gulf, Gulf of Oman, Muscat, Mauritius, Ceylon, Karikal, Coromandel Coast of India, Andamans, Nicobars, Malay Archipelago, Java, Gulf of Siam, Annam, Kampot, Fiji, Cebu in Philippines, New Caledonia, Lifu, Papua, Japan and Kioa in Viti Islands. Winckworth says that it is the commonest Mitrid of the Madras coast.

***Costellaria sculptilis* (Reeve, 1844).**

var. **interviewi** nov.

Type-locality.—8 miles west of Interview Island, Andamans.

(Plate I, fig. 3.)

The single specimen in the collection before me may at a cursory glance appear like that of Reeve's *Mitra sculptilis*. But when critically examined, it is found to show some

novelty in its shell-characters which may claim for it at least a new varietal rank, if not specific. So, I propose for it the new name *interviewi*.

Joyce Allan, Curator of shells, Australian Museum, to whom this doubtful shell was sent for opinion, writes: "This corresponds with specimens in the Australian Museum collection identified as *Mitra (Costellaria) layardi* A. Adams from 5-7 fathoms, Andaman Is. The shell also approaches somewhat our specimens of *crebrilirata* Reeve" But I fail to understand how she could arrive at such a conclusion, as the peculiarities presented by its shell regarding form, colouration and sculpture appear to agree hardly with those of *layardi*. The only form which it appears to approach more closely (if not exactly identical with it) is Reeve's *sculptilis*. I have reproduced here (fig. 3a) Hedley's fig. 1 in pl. vii. (1908)¹ of *Mitra delicata* A. Adams (1851)² which he considers as synonymous with *sculptilis* so as to show the essential points of difference between it and the new var. *interviewi*. Reeve's figure of *sculptilis* is not at all satisfactory.

The interesting points in which the new variety differs from the *forma typica* are:— (i) shell slightly more slenderly-fusiform, with the bodywhorl less ventricose but more produced and contracted below and recurved at the end; (ii) colour whitish throughout, but in the fresh condition it was slightly tinted with yellow which has now faded owing to long preservation in spirit; (iii) outer lip long, simple and not so curved in the middle and consequently the aperture appearing more narrow and slightly more channelled below; (iv) longitudinal ridges less flexuous, less sharp and less in number.

The shell is small, quite handsome and acuminately-turreted, though not very thick. The latticed sculpture, so characteristic of *sculptilis*, appears quite prominent. It has only seven whorls, but there might be one or two more which appear to have become broken towards the apex. The columella is somewhat straight and five-plaited and extends slightly beyond the aperture as in *sculptilis*. The shell measures 22 mm. in length and 6.5 mm. in diameter, with the spire 12.5 mm. in length and aperture 9 mm.

16232

Holotype.—No. M —, Zool. Surv. India.

2

Remarks.—The new var. *interviewi* appears to differ from the *forma typica* in the important characters of its shell as mentioned above. But it somewhat approaches Adams's *Mitra scitula* (p. 138) figured by Schepman (*op. cit.*, p. 285, pl. xxii, No. 8) in form, colouration and sculpture.

***Costellaria obeliscus* (Reeve, 1844).**

Type-locality.—Bais, island of Negros, Philippines (found among coarse sand and stones at a depth of seven fathoms).

(Plate I, fig. 4.)

1844. *Mitra obeliscus*, Reeve, *Proc. Zool. Soc. London*, No. CXLII, p. 175.

1844. *Mitra obeliscus*, Reeve, *Conch. Icon.* II, pl. xv, fig. 167.

1845. *Mitra obeliscus*, Catlow, *Conchologist's Nomenclator*, p. 301.

¹. Hedley, C. *Proc. Linn. Soc. N. S. Wales*, XXXIII, p. 484, pl. vii, fig. 1 (1908).

². Adams, A. *Proc. Zool. Soc. London*, XIX, p. 137 (1851).

1850. *Mitra obeliscus*, Jay, *Cat. of Shells*, p. 379.
1853. *Turricula (Callithea) obeliscus*, H. & A. Adams, *Gen. Rec. Moll.* I, p. 178.
1860. *Mitra obeliscus*, Reeve, *Elements of Conchology*, I, p. 50.
1874. *Mitra obeliscus*, Sowerby, *Thesaurus*, IV, p. 36, pl. ix (360), figs. 126, 127.
1875. *Mitra obeliscus*, Nevill, *Journ. As. Soc. Bengal*, XLIV, p. 99.
1876. *Mitra (Turricula) obeliscus*, Smith, *Journ. Linn. Soc. London, Zool.* XII, p. 549.
1876. *Callithea oblescus*, Brazier, *Proc. Linn. Soc. N. S. Wales*, I, p. 214.
1877. *Mitra obeliscus*, Liénard, *Cat. Moll. Maurice*, p. 28.
1878. *Mitra (Callithea) obeliscus*, Smith, *Proc. Zool. Soc. London*, p. 815.
1880. *Turricula obeliscus*, von Martens, *Moll. Maskar. u. Seychellen*, p. 78.
1880. *Turricula obeliscus*, von Martens, in *Möbius's Beiträge zur Meeresfauna der Insel Mauritius und der Seychellen*, p. 254.
1880. *Turricula obeliscus*, Garrett, *Journ. of Conch.* III, pp. 46, 54.
1882. *Turricula (Costellaria) obeliscus*, Tryon, *Man. Conch.* IV, p. 179, pl. liii, fig. 535.
1883. *Mitra (Callithea) obeliscus*, Paetel, *Cat. Conchyl.-Samml.*, p. 29.
1885. *Mitra obeliscus*, Cooke, *Ann. and Mag. Nat. Hist.* (5) XV, p. 335.
1886. *Mitra obeliscus*, Cooke, *Ann. and Mag. Nat. Hist.* (5) XVIII, p. 382.
1886. *Mitra (Callithea) obeliscus*, Watson, *Voy. H. M. S. "Challenger"*, *Zool. Gastropoda*, XV, pp. 245, 252.
1888. *Mitra (Costellaria) obeliscus*, Paetel, *Cat. Conchyl.-Samml.* I, p. 183.
1898. *Mitra (Costellaria) obeliscus*, Melvill and Sykes, *Proc. Malac. Soc. London*, III, p. 40.
1901. *Mitra (Costellaria) obeliscus*, Melvill and Standen, *Proc. Zool. Soc. London*, II, p. 422.
1902. *Mitra obeliscus*, Shopland, *Proc. Malac. Soc. London*, V, p. 173.
1903. *Mitra obeliscus*, Smith, *Proc. Malac. Soc. London*, V, p. 367.
1904. *Turricula obeliscus*, Hidalgo, *Cat. Moll. Test. Filipinas*, p. 73.
1908. *Turricula obeliscus*, Horst and Schepman, *Cat. Sist. Moll. Mus. Hist. Nat. Pays-Bas*, p. 81.
1909. *Mitra obeliscus*, Hedley, *Rept. Austr. Assoc. Adv. Sci.*, p. 366.
1911. *Turricula (Costellaria) obeliscus*, Schepman, *Prosobr. Siboga-Exped. Monogr.* IV, p. 287.
1913. *Mitra obeliscus*, Hedley, *Proc. Linn. Soc. N. S. Wales*, XXXVIII, p. 315.
1923. *Mitra (Costellaria) obeliscus*, Dautzenberg and Bouge, *Journ. de Conchyliol.* LXVII, p. 212.
1924. *Mitra (Costellaria) obeliscus*, Fulton, *A Cat. of Shells of Rec. Moll.*, p. 21.
1928. *Mitra (Costellaria) obeliscus*, Melvill, *Proc. Malac. Soc. London*, XVIII, p. 108.
1928. *Turricula obeliscus*, Faustino, *Summary Phil. Mar. and Freshw. Moll.*, p. 293.
1929. *Mitra (Costellaria) obeliscus*, Dautzenberg, *Faun. des Col. Franc.* III, p. 190.
1930. *Vexillum (Uromitra) obeliscus*, Cox, *Proc. Malac. Soc. London*, XIX, p. 78.
1935. *Turricula (Costellaria) obeliscus*, Dautzenberg, *Mém. Mus. Roy. Hist. Nat. Belg. Hors Ser.*, II, Fasc. 17, pp. 154, 155, 195, 207.
1937. *Mitra obeliscus*, Viader, *Maur. Inst. Bull.* I(2), p. 21.
1953. *Vexillum (Costellaria) obeliscus*, Solem, *Field. Zool.* XXXIV, No. 22, p. 225.

Obeliscus may be a distinct species, but its relegation to different genera, namely, *Mitra*, *Turricula* and *Callithea*, has led to some confusion in literature about its exact systematic position. That it can rightly claim its position into the genus *Costellaria* is evident from the nature of ribbings and other important characters of its shell

Characters.—The shell is small, acuminate-turreted, many-whorled—whorls rather contiguous, convex and marked with narrow, close-set, regular, flexuous longitudinal ribs having their interstices impressly cancellated. The colour may be chestnut-brown or yellowish-brown, but each whorl is encircled with a pair of conspicuous white bands a little above the suture, excepting the bodywhorl where there is a faint narrow additional band also lying a little below towards the base. But this may or may not be present in all cases, though Smith (1878) says that he found it more conspicuous than usual. The sutures are rather deep and the base of the bodywhorl is abruptly contracted and recurved in a twisted manner. The spire is sharp and much longer than the aperture which is slightly channelled below. The outer lip is thin, crenulated and contracted below. There are four plaits in the columella.

Nevill described and figured one new var. *andamanica* (1875, p. 99, pl. viii, Nos. 19, 20) from Andamans. The remark made by Tryon that *obeliscus* is a non-angulated form of *Turricula cruentata* Chemn. does not hold good. Because non-angulation of the whorls is not a very important feature on which so much stress should be given while ascertaining the exact identity or relationship of any form. A careful examination of the salient features of the two forms leaves little doubt of their being treated as distinct species. Of course, it may be said that *Mitra (Turricula) cruentata* var. *proxima* Nevill (p. 98) from Andaman Island figured by Tryon in his pl. II, No. 464, approximates more nearly to *obeliscus* regarding form and colouration of its shell. Dautzenberg and Bouge consider Jousseau's *Mitra euthymiana* MSS. as identical with *obeliscus*. Garrett (1880, p. 46) says that his new species *Turricula flexicostata* from Paumotus and Viti Islands is most nearly allied to it. Cox has pointed out the affinity of *obeliscus* with his fossil species, *Vexillum (Uromitra) macfadyeni* from the Reef Limestone of Kamaran Island, Red Sea (pl. 8A), somewhat in its shouldered whorls, longer and narrower anterior canal and sculpture.

It is necessary to point out here that the shell figured by Iredale (1929, p. 346, pl. xxxviii, No. 18) to represent a new genus and species of Mitre, *Mitropifex quasillus*, from the Sydney Harbour, N. S. Wales, appears to be very closely allied both in form and sculpture to *Costellaria obeliscus* and, as such, the erection of a separate genus for it of the family Tonnidae can hardly be justified.

Reeve while describing *obeliscus* from Bais stated: "found among coarse sand and stones at the depth of seven fathoms" But Brazier's observations have added a little more as would be evident from his remarks: "Cape York, North Australia, at 11 fathoms on sandy mud bottom; Darnley Island, Torres Strait, at 20-30 fathoms, mud bottom" The latter has wrongly spelt the specific name as 'oblescus'.

Locality.—Andamans—1.

There is only one specimen in the collection which corresponds to Reeve's description and figure of the species. It measures 19 mm. in length and 7 mm. in diameter, with its spire 11 mm. in length and aperture 7.5 mm. There are ten whorls and four columellar plaits. But the colour appears slightly faded possibly due to long preservation in spirit.

Distribution.—After its original record from Bais, island of Negros in Philippines, the range of *Costellaria obeliscus* (Reeve) has been further extended to the Gulf of Suez, Aden

East of River Hab abutting on Karachi to Panjim, Ratnagiri, Mauritius, Diego-Suarez, Durban, Andamans, Amboina, Bay of Pidjot in Lombok, Bay of Bima, Lirung in Salibabu Island, between Loslos and Broken-Islands on west coast of Salawatti, Halmahera, East of Dangar Besar in Saleh-bay, Queensland, Cape York in North Australia, Darnley Island in Torres Strait, Levuka in Fiji, Philippines (Sibuyan, Samar, Magallanes), Sulu Archipelago, Japan, Solomon and Viti Islands. Melvill and Sykes state: " It ranges throughout Polynesia ". But Garrett says that he found dead shells of this species only at Kioa in Viti Islands.

Subfamily *MITRINÆ*.

Genus **Chrysame** H. and A. Adams, 1853.

Neotype. Mitra cucumerina Lamarck, 1811.

1853. *Chrysame*, H. & A. Adams, *Gen. Rec. Moll.* I, p. 171.
 1859. *Chrysame*, Chenu, *Man. de Conch.* I, p. 193.
 1878. *Chrysame*, Kobelt, *Illustr. Conchyl.* I, p. 66.
 1880. *Chrysame*, Garrett, *Journ. of Conch.* III, p. 73.
 1882. *Chrysame*, Tryon, *Man. Conch.* IV, p. 143.
 1883. *Chrysame*, Paetel, *Cat. Conchyl.-Samml.*, p. 26.
 1884. *Chrysame*, Fischer, *Man. de Conch.*, p. 611.
 1888. *Chrysame*, Paetel, *Cat. Conchyl.-Samml.* I, p. 172.
 1899. *Chrysame*, Cossmann, *Ess. Paleoconch. Comp.* III, pp. 150, 153.
 1911. *Chrysame*, Schepman, *Prosobr. Siboga-Exped. Monogr.* IV, p. 275.
 1924. *Chrysame*, Fulton, *A Cat. of Shells of Rec. Moll.*, p. 20.
 1929. *Chrysame*, Thiele, *Handb. der Syst. Weichtierk.* I, p. 339.
 1929. *Chrysame*, Dautzenberg, *Faun. des Col. Franc.* III, p. 193.
 1929. *Chrysame*, Iredale, *Mem. Queens. Mus.* IX, p. 286.
 1929. *Chrysame*, Iredale, *Austr. Zoologist, Sydney*, V, Pt. 4, p. 343.
 1935. *Chrysame*, Dautzenberg, *Mém. Mus. Roy. Hist. Nat. Belg. Hors Ser.*, II, *Fasc.* 17, pp. 85, 86, 206.
 1938. *Chrysane*, Suvatti, *Moll. of Siam*, p. 37.
 1939. *Chrysame*, Allan, *Austr. Mus. Mag.* VII (1), p. 15.
 1942. *Chrysame*, Yen, *Proc. Malac. Soc. London*, XXIV, p. 236.
 1950. *Chrysame*, Allan, *Australian Shells*, p. 181.
 1953. *Chrysame*, Solem, *Field. Zool.* XXXIV, No. 22, p. 325.

H. and A. Adams who introduced *Chrysame* as a subgenus of *Mitra* did not designate any type-species. Although Lamarck's *Mitra coronata* has been considered as its neotype by many authors, it does not agree fully with the essential features of *Chrysame* as originally mentioned by Adams—" shell ovate ; spire as long as the aperture ; whorls with transverse elevated ribs " In case of *M. coronata* the shell is ovate-fusiform, spire larger than the aperture and the transverse ribs more or less flat instead of elevated. So, a critical study of the characters of both *coronata* and *cucumerina* may lead one to think that the latter would be more suitable for selection as the neotype of *Chrysame* than the former. This may possibly be the reason why Kobelt was also inclined towards selecting it as the type. Suvatti has wrongly spelt the generic name as ' *Chrysane* '.

Characters.—Shell small, thick, greatly variable in shape, *i.e.*, may be ovate to ovate-oblong or ovate-fusiform or oblong-ovate ; spire as long as the aperture, but may be shorter or longer rarely ; whorls encircled with elevated keel-like or flattened or rounded ribs, the interstices of which may be marked with fine longitudinal striae or with punctured dots ; columella bearing three to five plaits, outer lip crenulated. Animals of this group are said to be reef-dwellers.

There are only six species in the collection which represent this genus, namely, *cucumerina*, *chrysalis*, *tabanula*, *buryi*, *rüppelli* and *aurantia*.

Chrysame cucumerina (Lamarck, 1811).

(Plate I, fig. 5.)

1780. *Turricula globosa*, etc., Chemnitz, *Conch.-Cab.* IV, p. 232, pl. cl, figs. 1398, 1399.
 1811. *Mitra cucumerina*, Lamarck, *Ann. du Mus.* XVII, p. 218.
 1817. *Voluta ferrugata* (Solander MSS.), Dillwyn, *Descr. Cat. Rec. Shells*, I, p. 535.
 1822. *Mitra cucumerina*, Lamarck, *Anim. sans Vêrteb.* VII, p. 317.
 1824. *Mitra cucumerina*, Blainville, *Dict. des Sci. Nat.* XXXI, p. 286.
 1825. *Voluta ferrugata*, Wood, *Index Testaceol.*, p. 95, pl. xx, fig. 77.
 1825. *Mitra cucumerina*, Sowerby, *Cat. Tankerv.*, p. 78.
 1830. *Mitra cucumerina*, Deshayes, in *Bruguïère's Ency. Meth. Vers.* II, p. 461, pl. colxxxv, fig. 1.
 1830. *Mitra cucumerina*, Menke, *Synop. Meth. Moll.*, p. 85.
 1838. *Mitra cucumerina*, Kiener, *Icon. Coq. Viv.* IV, p. 62, pl. ix, fig. 24, 24.
 1839. *Mitra cucumerina*, Küster, in *Martini and Chemnitz's Syst. Conch.-Cab.* V, *Abth.* 2, pp. 65, 66, pl. xii, figs. 10, 11.
 1840. *Mitra cucumerina*, Dufo, *Ann. Sci. Nat.* (2) XIV, p. 182.
 1844. *Mitra cucumerina*, Reeve, *Proc. Zool. Soc. London*, No. CXLII, pp. 184, 186.
 1844. *Mitra cucumerina*, Reeve, *Conch. Icon.* IV, pl. xxv, fig. 201.
 1844. *Mitra cucumerina*, Lamarck, *Anim. sans Verteb.* (ed. Deshayes), X, p. 332.
 1845. *Mitra cucumerina*, Catlow, *Conchologist's Nomenclator*, p. 297.
 1850. *Mitra cucumerina*, Jay, *Cat. of Shells*, p. 377.
 1852. *Mitreola cucumerina*, Mörch, *Cat. Conchyl. Yoldi*, I, p. 83.
 1853. *Mitra cucumerina*, Gray, *Ann. and Mag. Nat. Hist.* (2) XII, p. 129.
 1853. *Mitra (Chrysame) cucumerina*, H. and A. Adams, *Gen. Rec. Moll.* I, p. 171.
 1855. *Mitra cucumerina*, Berge, *Conchylienbuch*, p. 252.
 1856. *Mitra ferrugata*, Wood, *Index Testaceol.* (ed. Hanley), p. 102, pl. xx, fig. 77.
 1860. *Mitra cucumerina*, Reeve, *Elements of Conchology*, I, p. 49.
 1863. *Mitra cucumerina*, Deshayes, *Cat. Moll. Reunion*, p. 132.
 1865. *Mitra cucumerina*, Dunker, *Cat. Moll. Godeffroy*, II, p. 21.
 1866. *Mitra cucumerina*, Dunker, *Cat. Moll. Godeffroy*, III, p. 32.
 1867. *Mitra cucumerina*, Mitchell, *Cat. Moll. Coll. Govt. Central Mus. Madras*, p. 1i.
 1868. *Mitra cucumerina*, Pease, *Amer. Journ. Conch.* IV, pp. 121, 122.
 1869. *Mitra cucumerina*, Dunker, *Cat. Moll. Godeffroy*, IV, p. 83.
 1872. *Mitra cucumerina*, Garrett, *Proc. Zool. Soc. London*, p. 841.
 1874. *Mitra cucumerina*, Sowerby, *Thesaurus*, IV, p. 12, pl. xvi (367), figs. 275, 277.
 1874. *Mitra (Chrysame) cucumerina*, Dunker, *Cat. Moll. Godeffroy*, V, p. 118.

1877. *Mitra cucumerina*, Lienard, *Cat. Moll. Maurice*, p. 17.
1878. *Mitra (Chrysame) cucumerina*, Kobelt, *Illustr. Conchyl.* I, p. 66, pl. xxiv, fig. 19.
1880. *Mitra cucumerina*, Garrett, *Journ. of Conch.* III, pp. 13-15.
1880. *Mitra (Chrysame) cucumerina*, von Martens, in *Möbius's Beiträge zur Meeresfauna der Insel Mauritius und der Seychellen*, pp. 251, 252.
1882. *Mitra (Chrysame) cucumerina*, Tryon, *Man. Conch.* IV, pp. 143, 144, pl. xlii, figs. 227, 228.
1883. *Mitra (Chrysame) cucumerina*, Paetel, *Cat. Conchyl.-Samml.*, p. 27.
1885. *Mitra cucumerina*, Cooke, *Ann. and Mag. Nat. Hist.* (5) XV, p. 335.
1886. *Mitra cucumerina*, Cooke, *Ann. and Mag. Nat. Hist.* (5) XVIII, p. 384.
1887. *Mitra (Chrysame) cucumerina*, von Martens, *Linn. Soc. Journ. Zool.* XXI, p. 184.
1888. *Mitra (Cancilla) cucumerina*, Paetel, *Cat. Conchyl.-Samml.* I, p. 176.
1890. *Mitra (Chrysame) cucumerina*, Römer, *Cat. Conchyl. Samml. des Nat. Hist. Mus. Wiesbaden*, p. 39.
1899. *Mitra cucumerina*, Hedley, *Mem. Austr. Mus.* (3) VII, pp. 465, 525.
1902. *Mitra cucumerina*, Shopland, *Proc. Malac. Soc. London*, V, p. 173.
1903. *Mitra (Chrysame) cucumerina*, Smith, *Faun. and Geogr. Mald. and Laccad. Archipelagoes*, II, pp. 591, 604.
1904. *Mitra cucumerina*, Hidalgo, *Cat. Moll. Test. Filipinas*, p. 61.
1907. *Mitra (Cancilla) cucumerina*, Couturier, *Journ. de Conchyliol.* LV, p. 133.
1907. *Mitra cucumerina*, Hedley, *Proc. Linn. Soc. N. S. Wales*, XXXII, p. 485.
1908. *Mitra (Chrysame) cucumerina*, Horst and Schepman, *Cat. Sist. Moll. Mus. Hist. Nat Pays-Bas*, p. 75.
1909. *Mitra (Chrysame) cucumerina*, Hedley, *Rept. Austr. Assoc. Adv. Sci.*, p. 366.
1909. *Mitra (Chrysame) cucumerina*, Melvill, *Trans. Linn. Soc. London, Zool.* (2) XIII, p. 110.
1911. *Mitra (Chrysame) cucumerina*, Schepman, *Prosobr. Siboga-Exped. Monogr.* IV, p. 275.
1919. *Mitra cucumerina*, Cooke, *Proc. Zool. Soc. London*, p. 407.
1923. *Mitra (Chrysame) cucumerina*, Dautzenberg and Bouge, *Journ. de Conchyliol.* LXVII, pp. 114, 115, 118, 119, 122, 132.
1923. *Mitra (Chrysame) cucumerina*, Dautzenberg, *Journ. de Conchyliol.* LXVIII, p. 32.
1924. *Mitra (Cancilla) cucumerina*, Fulton, *A Cat. of Shells of Rec. Moll.*, p. 21.
1928. *Mitra cucumerina*, Faustino, *Summary Phil. Mar. and Freshw. Moll.*, p. 278.
1929. *Mitra (Chrysame) cucumerina*, Dautzenberg, *Faun. des Col. Franc.* III, pp. 183, 184.
1932. *Mitra (Chrysame) cucumerina*, Dautzenberg, *Journ. de Conchyliol.* LXXVI, p. 28.
1933. *Mitra (Chrysame) cucumerina*, Dautzenberg and Bouge, *Journ. de Conchyliol.* LXXVIII, p. 163.
1935. *Mitra (Chrysame) cucumerina*, Dautzenberg, *Mém. Mus. Roy. Hist. Nat. Belg. Hors Ser.*, II, Fasc. 17, pp. 89-91, 206.
1937. *Mitra cucumerina*, Peile, *Proc. Malac. Soc. London*, XXII, p. 181.
1937. *Mitra cucumerina*, Viader, *Maur. Inst. Bull.* 1(2), p. 19.
1939. *Chrysame cucumerina*, Allan, *Austr. Mus. Mag.* VII(1), p. 16, fig. 2 (middle row).
1943. *Mitra cucumerina*, Gravely, *Bull. Mad. Govt. Mus. N.S.*, V(2), pp. 64, 100.
1950. *Chrysame cucumerina*, Allan, *Australian Shells*, pp. 180, 181, Text-fig. 40 (No. 10).

The specific name 'cucumerina' is known to have been derived from an observation made by Pliny that the animal smells like a cucumber, though not swells like a cucumber as stated by Allan (1950, p. 181). *Mitra fraga* of Quoy and Gaimard may be identical with *M. peregra* of Reeve figured in pl. xxiv, No. 186, but that of Dautzenberg and Bouge (1923,

pl. ii, fig. 1) seems to be an abnormal specimen of *cucumerina*. Chemnitz's *Turricula globosa* which Mörch hesitatingly placed under *Mitreola* has been rightly treated by Pease and Dautzenberg as a synonym of this species. The attempt made by Dillwyn and Wood to revive Solander's unpublished manuscript name *ferrugata* for the species seems to have received no support from others. Reeve includes Klein's *Cucumis striatus* in the synonymy of *cucumerina*.

Despite the distinct *Chrysame*-like features present in its shell-characters, it is difficult to understand what led Paetel, Couturier and Fulton to place *cucumerina* under the genus *Cancilla* and Mörch under *Mitreola*. Moreover, Peile, Cooke and some other workers did not also hesitate to place it under the genus *Mitra* proper.

Characters.—This is a very ancient, common and variable species. The shell is ovate (about an inch or slightly more in length), solid, quite ventricose in the middle but attenuated towards the extremities. The colour is usually orange-red, but may also be reddish-brown in some cases. The surface is adorned with strong, elevated, keel-like revolving ridges, with distinct grooves in the interspaces. There is also a well-defined, more or less interrupted band (consisting of two to four rows of yellow or white spots) which runs from the uppermost part of the margin of the inner lip and terminates on the dorsal margin of the outer lip covering two to four revolving ridges of the bodywhorl. Besides this, blotches of white are also found here and there on the surface. The spire is usually shorter than the aperture. The columella is four-plaited and the outer lip strongly crenulated throughout. Garrett mentions that he found nearly uniform white shells of this form at Paumotus, while Pease says that he collected a uniform dark-red variety at Ralick Island.

The young shells of this species may sometimes be mistaken for *Chrysame tabanula* owing to the remarkable similarity displayed by their keel-like spiral ridges. They may also somewhat approach those of *Chr. chrysalis* in having their spires more conically acuminate. But a careful examination reveals that the sutures in *cucumerina* are not so pronounced and the outer lip not so peculiarly contracted as in the latter.

The animals are whitish and marked with creamy-yellow spots. They are known to live at low tide on reefs. The peculiarities in the radular teeth of this well-known form have been studied by Gray, Cooke and Peile.

Localities.—Indian Seas—1 ; Lagoon Reef, Addu Atoll, Maldive Islands—1 (Dr. R. B. S. Sewell).

The specimens, though young, appear to be more or less typical in form, colouration and sculpture of their shells. They measure 16.5 mm. in length and 9 mm. in diameter, with the spire 6.5 mm. in length and aperture 10 mm. and 15 mm. in length and 8 mm. in diameter, with the spire 6 mm. in length and aperture 9 mm. respectively. Besides these, I have also examined a good series of shells found in our named dry collection bearing the locality-label "Indian Seas". The largest one in that lot measures 28 mm. in length and 15 mm. in diameter, with the spire 11.5 mm. in length and aperture 16 mm.

Distribution.—*Chrysame cucumerina* (Lamarck) has so far been known to occur in the Gulf of Suez, Gulf of Aden, Mauritius, Madagascar, Reunion, Amirantes, Seychelles, Mascarene, Coetivy and Praslin Islands, Kolumadulu Atoll, Fadifolu Atoll, Minikoi and Hulule

Islands, Ceylon, Madras, Nicobars, Owen I., King Island Bay, Pins I., Lifu, Fiji, Queensland, New Caledonia, Moluccas, Philippines (Luzon, Cebu, Luban, Laylay, Marinduque, Tinago, Lugbon, Balabac) ; East side of Pajunga-island, Sawan, Sian-island, Kur-island Reef, Annaa, Society, Samoa, Viti, Tahiti, Marutea, Hao, Rikitea, Teone-Kura, Rarotonga, Gilberts, Cooks, Sandwich, Carolines, Makatea, Raiaroa, Aratika, Moorea, Tuamutu and Hawaii. Garrett says that he found plenty of specimens of this species in all the Polynesian Islands excepting Marquesas. The locality Addu Atoll, Maldives, is a new record.

Chrysame chrysalis (Reeve, 1844).

(Plate I, figs. 6, 6a-f.)

1844. *Mitra chrysalis*, Reeve, *Proc. Zool. Soc. London*, No. CXLII, pp. 185, 186.
 1844. *Mitra chrysalis*, Reeve, *Conch. Icon.* II, pl. xxv, fig. 200.
 1845. *Mitra chrysalis*, Catlow, *Conchologist's Nomenclator*, p. 296.
 1850. *Mitra chrysalis*, Jay, *Cat. of Shells*, p. 377.
 1853. *Strigatella chrysalis*, H. and A. Adams, *Gen. Rec. Moll.* 1, p. 174.
 1853. *Mitra caledonica*, Recluz, *Journ. de Conchyliol.* IV, p. 248, pl. vii, fig. 7.
 1874. *Mitra chrysalis*, Sowerby, *Thesaurus*, IV, p. 19, pl. 372, fig. 437.
 1880. *Mitra chrysalis*, Garrett, *Journ. of Conch.* III, pp. 3, 13.
 1882. *Mitra (Chrysame) chrysalis*, Tryon, *Man. Conch.* IV, p. 144, p. xiii, fig. 233.
 1833. *Mitra (Strigatella) chrysalis*, Paetel, *Cat. Conchyl.-Samml.*, p. 27.
 1888. *Mitra (Chrysame) chrysalis*, Paetel, *Cat. Conchyl.-Samml.* 1, p. 175.
 1897. *Mitra (Chrysame) caledonica*, Melvill and Standen, *Journ. of Conch.* VIII, p. 405.
 1899. *Mitra chrysalis*, Hedley, *Mem. Austr. Mus.* III (7), pp. 467, 525.
 1904. *Mitra chrysalis*, Hidalgo, *Cat. Moll. Test. Filipinas*, p. 16.
 1907. *Mitra (Chrysame) chrysalis*, Couturier, *Journ. de Conchyliol.* LV, p. 135.
 1919. *Mitra (Chrysame) chrysalis*, Iwakawa, *Cat. Jap. Moll. Nat. Hist. Dept. Tokyo Imp. Mus.* p. 143.
 1923. *Mitra (Chrysame) chrysalis*, Dautzenberg and Bouge, *Journ. de Conchyliol.* LXVII, pp. 114, 115, 131.
 1924. *Mitra (Chrysame) chrysalis*, Fulton, *A Cat. of Shells of Rec. Moll.*, p. 21.
 1928. *Mitra chrysalis*, Faustino, *Summary Phil. Mar. and Freshw. Moll.*, p. 277.
 1929. *Mitra (Chrysame) chrysalis*, Dautzenberg, *Faun. des Col. Franc.* III, pp. 183, 184.
 1932. *Mitra (Chrysame) chrysalis*, Dautzenberg, *Journ. de Conchyliol.* LXXIV, p. 28.
 1933. *Mitra (Chrysame) chrysalis*, Dautzenberg and Bouge, *Journ. de Conchyliol.* LXXVII, p. 158.
 1934. *Mitra (Chrysame) chrysalis*, Hirase, *A Coll. of Jap. Shells*, p. 70, pl. ci, fig. 2.
 1937. *Mitra chrysalis*, Viader, *Maur. Inst. Bull.* 1(2), p. 18.
 1937. *Mitra chrysalis*, Asano, *Venus*, VII (1), p. 33.

Reeve's *Mitra chrysalis* or "Grub Mitre", as it has been commonly called, was described on specimens from an unknown locality. The similarity as existing between this species and *Chr. cucumerina* is so close regarding shell-characters that it is sometimes difficult to separate one from the other. But the smaller size, less robust form, lighter colour, lack of white spots here and there on the surface (excepting rare cases only) and peculiarly contracted and thickened outer lip of *chrysalis* provide sufficient characters for its separation from *cucumerina*. Moreover, the white band on its bodywhorl appears less conspicuous or even obsolete (mostly in adult shells).

H. and A. Adams and Paetel erroneously placed this species under the genus *Strigatella* and thereby introduced some confusion about its exact systematic position. Recluz's *Mitra caledonica* is considered by Dautzenberg and Bouge as its synonym.

Localities.—Andamans—36; Under coral slabs, east of Guitar Island, Middle Andaman—3 (22.iii.34. Dr. H. S. Rao); Sta. 655: Reef on north side of Fuladu Island, Goifurfehendu Atoll—1 (20.xii.23. 'Investigator'); Sta. 658: North side of Rutland Island (from coral and mud flats)—4 (21.i.24. 'Investigator'); Sta. 700: Nancouri Harbour (amongst stones and submerged coral reefs), Nicobars—2 (11.i.26. 'Investigator').

The collection before me comprises a fairly good series of specimens representing different stages of growth of *chrysalis*. The largest shell is from the Fuladu Island (fig. 6f) measuring 14.5 mm. in length and 8 mm. in diameter, with its spire 6 mm. in length and aperture 8.5 mm., while the smallest one is from Andamans measuring only 5.5 mm. in length and 2.5 mm. in diameter, with its spire 3 mm. in length and aperture 2.5 mm. The shells are ovate, slightly yellowish-brown in colour and marked with less conspicuous white bands in the middle of the bodywhorl, which in the young ones appear more broad and extend much lower down, though in the adult may be obsolete. But the peculiarity presented by the spire may be worth-recording here, *i.e.*, in the young condition it is found to be attenuated, delicate and sharp (figs. 6, 6a-c), but as the growth proceeds it gradually increases in thickness and eventually becomes stout and blunt (figs. 6d-f). Moreover, it may either equal or slightly exceed the aperture in length in the young condition, but is generally smaller than the latter in the adult. Besides these, the columellar folds also appear to increase in number with age from three to four. The outer lip is quite thin, simple and curved in the young, but becomes thickened and peculiarly contracted in the middle in the adult. White encrustations may also occur here and there on the surface as shown in figs. 6e, 6f. These features do not appear to have been recorded before in this species. There is also another beautiful series in our named dry collection from Andamans showing similar interesting variations in shape, size, colouration and other characters.

The animals of this species, like those of *cucumerina*, are known to live under corals at low tide.

Distribution.—The range of *Chrysame chrysalis* (Reeve) does not appear to be so wide as that of *cucumerina*. But it has been recorded from Mauritius, Madagascar, New Zealand, New Caledonia, New Hebrides, Carolines, Lifu, Philippines, Marutea, Viti, Tonga, Tahiti, Samoa, Gilberts, Kingsmill, Funafuti, Pins I., Loo-Choo, Oho-Shima, Vavau and Buin.

Chrysame tabanula (Lamarck, 1811).*Type-locality*.—Indian Ocean.

(Plate I, fig. 7.)

1811. *Mitra tabanula*, Lamarck, *Ann. du Mus.* XVII, p. 222.
1822. *Mitra tabanula*, Lamarck, *Anim. sans Verteb.* VII, p. 323.
1824. *Mitra tabanula*, Blainville, *Dict. des Sci. Nat.* XXXI, p. 289.
1833. *Mitra tabanula*, Quoy and Gaimard, *Voy. "Astrolabe"*, *Zool.* II, p. 852, pl. xlv, figs. 10-12.
1838. *Mitra tabanula*, Kiener, *Icon. Coq. Viv.* IV, p. 60, pl. ix, fig. 27.
1840. *Mitra tabanula*, Küster, in *Martini and Chemnitz's Syst. Conch. Cab.*—V, *Abth.* 2, pp. 108-109, pl. xvii, figs. 9-11.
1844. *Mitra tabanula*, Lamarck, *Anim. sans Verteb.* (ed. Deshayes), X, p. 341.
1845. *Mitra tabanula*, Reeve, *Conch. Icon.* II, pl. xxxix, fig. 332.
1845. *Mitra tabanula*, Catlow, *Conchologist's Nomenclator*, p. 303.
1850. *Mitra tabanula*, Jay, *Cat. of Shells*, p. 381.
1853. *Mitra (Chrysame) tabanula*, H. and A. Adams, *Gen. Rec. Moll.* 1, p. 171.
1860. *Mitra tabanula*, Reeve, *Elements of Conchology*, 1, p. 51.
1874. *Mitra tabanula*, Sowerby, *Thesaurus*, IV, p. 12, pl. xvi, figs. 280, 281.
1876. *Chrysame tabanula*, Brazier, *Proc. Linn. Soc. N. S. Wales*, 1, p. 209.
1877. *Mitra tabanula*, Liénard, *Cat. Moll. Maurice*, p. 21.
1878. *Mitra (Chrysame) tabanula*, Smith, *Proc. Zool. Soc. London*, p. 814.
1880. *Mitra tabanula*, Garrett, *Journ. of Conch.* III, p. 28.
1880. *Mitra tabanula*, von Martens, in *Möbius's Beiträge zur Meeresfauna der Insel Mauritius und der Seychellen*, p. 252.
1882. *Mitra (Chrysame) tabanula* (in part), Tryon, *Man. Conch.* IV, p. 146, pl. xlii, fig. 243.
1883. *Mitra (Chrysame) tabanula*, Paetel, *Cat. Conchyl.—Samml.*, p. 29.
1885. *Mitra (Chrysame) tabanula*, Ward, *Moll. Cat.*, p. 19.
1888. *Mitra (Chrysame) tabanula*, Paetel, *Cat. Conchyl.—Samml.* 1, p. 188.
1897. *Mitra (Chrysame) tabanula*, Melvill and Standen, *Journ. of Conch.* VIII, p. 405.
1899. *Mitra tabanula*, Melvill and Sykes, *Proc. Malac. Soc. London*, III, p. 223.
1903. *Mitra tabanula*, Shopland, *Proc. Malac. Soc. London*, V, p. 173.
1904. *Mitra tabanula*, Hidalgo, *Cat. Moll. Test. Filipinas*, p. 66.
1909. *Mitra (Chrysame) tabanula*, Lamy, *Mem. Soc. Zool. France*, XXII, p. 304.
1909. *Mitra tabanula*, Hedley, *Rept. Austr. Assoc. Adv. Sci.*, p. 366.
1923. *Mitra (Chrysame) tabanula*, Dautzenberg and Bouge, *Journ. de Conchyliol.* LXVII, pp. 130-132.
1924. *Mitra (Chrysame) tabanula*, Fulton, *A Cat. of Shells of Rec. Moll.*, p. 22.
1928. *Mitra tabanula*, Faustino, *Summary Phil. Mar. and Freshw. Moll.*, p. 283.
1929. *Mitra (Chrysame) tabanula*, Dautzenberg, *Faun. des. Col. Franc.* III, p. 184.
1932. *Mitra (Chrysame) tabanula*, Dautzenberg, *Journ. de Conchyliol.* LXXVI, p. 281.
1935. *Mitra (Chrysame) tabanula*, Dautzenberg, *Mém. Mus. Roy. Hist. Nat. Belg. Hors Ser.*, II, Fasc. 17, pp. 93-95, 206.
1937. *Mitra tabanula*, Viader, *Maur. Inst. Bull.* 1(2), p. 22.

The systematic position of *tabanula* was quite uncertain till 1853, when H. and A. Adams rightly placed it under *Chrysame*. But notwithstanding this, many authors did not hesitate to relegate it to the genus *Mitra*.

Tryon appears to have wrongly placed into the synonymy of this species certain forms, namely, *Mitra pediculus* Lam., *M. minor* Sowb., *M. rotundilirata* Rv. and *M. caledonica* Pet. But, as has rightly been pointed out by Dautzenberg and Melvill and Sykes, they are quite distinct from *tabanula*. It is difficult to understand what led Sturany (*op. cit.*, 1903, pp. 37, 64) to follow Tryon in that respect. Moreover, the remark made by the latter : “ *M. caledonica*, Petit (fig. 247), can scarcely be distinguished from the short form of *tabanula*, such as *M. pediculus*, Lam. ” also appears quite unsatisfactory. Of course, it may be said that of all the above-mentioned forms *pediculus* comes nearer to *tabanula*.

Chrysame tabanula or the little “ Ox-Fly Mitre ”, as it has been usually known, is represented in the collection before me by a single specimen from Andamans. It measures 11 mm. in length and 5 mm. in diameter, with the spire 5 mm. in length and aperture 6 mm. The shell is ovate-oblong, brownish-red (though not uniform deep-brown as stated by Smith, 1878, in case of an example from Andamans) and provided with a distinct band in the middle of the bodywhorl which consists of three rows of interrupted whitish spots and four such rows at its lower end. Besides these, there is also a fine row at the base of the penultimate whorl and another at the base of the whorl next to that. So, altogether nine rows of whitish spots are found on the surface arranged as 4+3+1+1 from below upwards, of which those in the middle of the bodywhorl appearing more conspicuous. It also bears the characteristic elevated keel-like transverse ridges on its surface, the interstices of which are clearly marked with fine longitudinal striae. The columella has four plaits, though not three as mentioned by Smith. The outer lip is crenulated throughout. There are six whorls.

The zonal arrangements of the whitish spots as mentioned above have not been recorded before in this species, but the specimens in our named dry collection are found to bear this interesting feature. In other respects also the shell in question appears to agree closely with those in our dry collection. The largest specimen in that lot is from Mauritius, which measures 20 mm. in length and 9 mm. in diameter, with its spire 10 mm. in length and aperture 10 mm.

Distribution.—*Chrysame tabanula* (Lamarck) is not a very widely distributed species. It has so far been known to occur in Aden, Mauritius, Madagascar, Ceylon, Andamans, Nicobars, Malay Archipelago, Amboina, Vanikoro Island, Queensland, New Caledonia, Pins I., Lifu, Philippines (Luzon, Cebu, Luban, Marinduque, Mindanao, Balabac, Jinituan), Rua-Sura, Solomon and Viti Islands.

***Chrysame buryi* (Melvill and Sykes, 1899).**

Type-locality.—Andamans.

(Plate I, figs. 8, 8a.)

1899. *Mitra (Chrysame) buryi*, Melvill and Sykes, *Proc. Malac. Soc. London*, III, pp. 222, 223, Text.-fig. 1.

Buryi is an extremely rare and interesting species which was first described and figured by Melvill and Sykes on specimens from Andamans, but without any mention of the exact locality, date of collection, etc.

Characters.—This species can readily be recognized by its small, thick, ovate-oblong and dark or blackish-brown shell nicely encircled throughout with solid, close-set, somewhat regular round lirae, of which the two contiguous and just below the sutures appearing more prominent and acute than the rest. The apex is obtuse and frequently eroded, especially in the adult. The aperture is oblong and narrow and the columella bears two to three plaits. The outer lip is somewhat contracted at the upper part, slightly effuse below and crenulated within. The whorls may be seven or eight, but due to erosion the number may be reduced in the adult.

Localities.—Port Blair Harbour (amongst stones at low tide)—3 (8.i.26. 'Investigator'); Port Blair, Andamans—2 (March, 1952. Dr. H. C. Ray).

The juvenile specimen in the collection (fig. 8a) appears quite peculiar as regards form and characters of its shell. It is ovately-acuminate, with the spire much attenuated and delicate and the outer lip more curved—all these giving it a somewhat Pagoda-like appearance. There are seven whorls and two columellar folds. Its length is slightly more than 5 mm., while the diameter is 2.5 mm., spire 3 mm. and aperture 2.5 mm. But the adult shell (fig. 8) is ovate-oblong with the spire strong, stout and blunt. The outer lip is contracted at the upper part and thereby making the aperture narrow and oblong. Here the number of whorls is six (the top being eroded) and that of columellar folds three. It measures 15.5 mm. in length and 7 mm. in diameter, with the spire 7 mm. in length and aperture 8.5 mm. So, it is quite evident from the above facts that some remarkable changes take place in the shell-characters of this extremely rare species in the course of its development from the young to the adult state. But unfortunately these have not hitherto been recorded by anybody. There is also a fairly good series of specimens in our unnamed dry collection bearing the locality-label 'Andamans' which show similar interesting variations in their shell-characters.

Buryi, when young, may show some affinity with *chrysalis* regarding the form and character of its spire, but differs from that in the adult in having a small ovate-oblong shell lacking in white band in the middle of the bodywhorl and also in other important details. It also appears to approach somewhat closely Schepman's *Columbella (Conoidea) perplexa* from North of Salomakiee—(Damar)—island figured in pl. xx, No. 12 (*op. cit.*, 1911, p. 337), both in form and colouration of its shell.

Distribution.—Since its original record from Andamans *Chrysame buryi* (Melv. and Syk.) does not appear to have been reported from anywhere else.

Chrysame aurantia (Gmelin, 1790).

(Plate I, figs. 9, 9a.)

1780. *Turricula arausiaca*, etc., Chemnitz, *Conch.-Cab.* IV, p. 231, pl. cl, figs. 1393, 1394.
 1790. *Voluta aurantia*, Gmelin, *Syst. Nat.* ed. XIII, p. 3454.
 1798. *Mitra minuta*, Röding, *Mus. Bolt.*, p. 137.

1811. *Mitra aurantiaca*, Lamarck, *Ann. du Mus.* XVII, p. 214.
1817. *Voluta aurantia*, Dillwyn, *Descr. Cat. Rec. Shells*, 1, pp. 552, 553.
1822. *Mitra aurantiaca* and *M. peronii*, Lamarck, *Anim. sans Verteb.* VII, pp. 316, 322.
1823. *Voluta aurantia*, Mawe, *Syst. of Conch.*, p. 108.
1824. *Mitra aurantiaca* and *M. peronii*, Blainvillè, *Dict. des Sci. Nat.* XXXI, pp. 485, 488.
1825. *Mitra aurantiaca*, Sowerby, *Cat. Tankerv.*, p. 78.
1830. *Mitra aurantiaca* and *M. peronii*, Deshayes, in *Bruguiere's Ency. Meth. Vers.* II, pp. 451, 464, pl. ccclxxv, fig. 5.
1831. *Mitra aurantiaca*, Guerin, *Mag. de Zool.* 1, pl. vi.
1836. *Mitra aurentia*, Bosc, *Hist. Nat. des Coq.* V, p. 42.
1838. *Mitra peronii* and *M. aurantiaca*, Kiener, *Icon. Coq. Viv.* IV, pp. 58, 59, pl. xxviii, figs. 58, 59a-b.
1844. *Mitra aurantiaca*, Lamarck, *Anim. sans Verteb.* (ed. Deshayes), X, p. 330.
1844. *Mitra aurantia*, Reeve, *Conch. Icon.* II, pl. xxiii, fig. 182a-b.
1845. *Mitra aurantia*, Catlow, *Conchologist's Nomenclator*, p. 295.
1850. *Mitra aurantia*, Jay, *Cat. of Shells*, p. 376.
1853. *Mitreola ? aurantia*, Mörch, *Cat. Conchyl. Yoldi*, 1, p. 83.
1853. *Mitra (Chrysame) aurantiaca* and *M. (Chr.) peronii*, H. & A. Adams, *Gen. Rec. Moll.* 1, p. 171.
1856. *Mitra aurantia*, Wood, *Index Testaceol.* (ed. Hanley), p. 105, pl. xx, fig. 120.
1860. *Mitra aurantia*, Reeve, *Elements of Conchology*, 1, p. 49.
1869. *Chrysame aurantia*, von Frauenfeld, *Beiträge zur Fauna der Nicobaren*, III, pp. 860, 892.
1873. *Mitra aurantiaca*, Hutton, *Cat. Mar. Moll. New Zealand*, p. 19.
1874. *Mitra aurantia*, Sowerby, *Thesaurus*, IV, p. 20, pl. xv, figs. 250, 251, 260.
1876. *Turricula aurantia*, Brazier, *Proc. Linn. Soc. N.S. Wales*, 1, p. 212.
1877. *Mitra aurantia*, Liénard, *Cat. Moll. Maurice*, p. 16.
1878. *Mitra (Chrysame) aurantia*, Kobelt, *Illustr. Conchyl.* 1, p. 66.
1880. *Mitra (Chrysame) aurantia*, von Martens, in *Möbius's Beiträge zur Meeresfauna der Insel Mauritius und der Seychellen*, p. 252.
1880. *Turricula aurantia*, Garrett, *Journ. of Conch.* III, p. 36.
1882. *Mitra (Chrysame) aurantia* (in part), Tryon, *Man. Conch.* IV, p. 147, pl. xliii, figs. 255, 256.
1883. *Mitra (Chrysame) aurantia* var. *peroni*, Paetel, *Cat. Conchyl.—Samml.*, p. 27.
1888. *Mitra (Chrysame) aurantia* var. *peroni*, Paetel, *Cat. Conchyl.—Samml.* 1, p. 173.
1891. *Mitra aurantia*, Fischer, *Bull. Soc. Autun*, IV, p. 138.
1899. *Mitra aurantia*, Melvill and Sykes, *Proc. Malac. Soc. London*, III, p. 223.
1902. *Mitra aurantia*, Shopland, *Proc. Malac. Soc. London*, V, p. 173.
1904. *Mitra aurantia*, Hidalgo, *Cat. Moll. Test. Filipinas*, p. 60.
1906. *Mitra peronii*, Sherborn and Sykes, *Rept. of Bolten's "Mus. Bolt."*, p. 137.
1908. *Mitra (Chrysame) aurantia*, Horst and Schepman, *Cat. Sist. Moll. Mus. Nat. Hist. Pays-Bas*, p. 75.
1909. *Mitra aurantia*, Hedley, *Rept. Austr. Assoc. Adv. Sci.*, p. 366.
1915. *Mitra peronii*, Dall, *Index to Mus. Bolt.*, p. 37.
1924. *Mitra (Chrysame) aurantia* and *M. (Chr.) peroni*, Fulton, *A Cat. of Shells of Rec. Moll.*, pp. 20, 21.
1928. *Mitra aurantia*, Faustino, *Summary Phil. Mar. and Freshw. Moll.*, p. 276.
1930. *Mitra (Chrysame) aurantia*, Oostingh, *Misc. Zool. Sumatrana*, XLIX, p. 6.
1931. *Mitra (Chrysame) aurantia*, Oostingh, *Archiv f. Molluskenk.* LXIII, p. 210.

1934. *Mitra (Chrysame) aurantia*, Hirase, *A Coll. of Jap. Shells*, p. 70, pl. ci, fig. 5.
 1935. *Mitra (Chrysame) aurantia*, Dautzenberg, *Mém. Mus. Roy. Hist. Nat. Belg. Hors. Ser.*, II, Fasc. 17, pp. 86, 87, 206.
 1937. *Mitra aurantia*, Viader, *Maur. Inst. Bull.* 1(2), p. 18.
 1953. *Scabricula (Chrysame) aurantia*, Solem, *Field. Zool.* XXXIV, No. 22, p. 225.

Gmelin's name *aurantia* possibly owes its origin to the bright orange-red colour of the shell. Lamarck's species *aurantiaca* and *peronii* have been treated by some authors as distinct (Blainville, Deshayes, Kiener, H. & A. Adams) and by some as identical with *aurantia* (Reeve Catlow, von Martens, Dautzenberg, Viader). Some even have gone a step further to combine *peronii* with the latter as a variety. But Reeve while including both in the synonymy of *aurantia* rightly remarked: "I think with M. Deshayes that Lamarck's *Mitra Peronii* is merely a 'double employi' of this species" But Garrett (1880, p. 36) made a curious remark: "The genus *Turricula* being now most generally accepted, Swainson's name *aurantia* should be restored, as Gmelin's *aurantia* is embraced in the genus *Mitra* as restricted." Anton (*op. cit.*, p. 67) did not even care to merge Gmelin's *aurantia* with Lamarck's *Mitra limbifera*—an entirely different species belonging to the genus *Strigatella*. Similarly, Tryon made a wrong attempt to synonymize Reeve's *Mitra nanus* figured in pl. xliii, No. 257, with *aurantia*. Röding's *M. minuta* is considered by some authors (Wood, Dautzenberg, Sherborn and Sykes) to be a synonym of the latter. Bosc wrongly spells the specific name as '*aurentia*' The inclusion of the species in the genera *Mitra*, *Mitreola* and *Turricula* as attempted by some authors appears rather undesirable.

Characters.—This species has a thick, oblong-fusiform shell of bright orange-red to chestnut or chocolate-brown colour, encircled with regular prominent ribs (though not always and everywhere of the same size) and one conspicuous white or yellow band (may also be slightly faded in some cases) at the upper part of each whorl. The spire is acuminate (but the apex may be mostly eroded in the adult) and the sutures are much impressed. The whorls are shouldered at the upper part (more so in the adult—fig. 9), and the bodywhorl is peculiarly contracted at the base. The aperture is long and narrow. There are four plaits in the columella. The outer lip has a shallow notch at the upper part and is nicely crenulated throughout. Reeve says: "The best illustration hitherto published of *Mitra aurantia* is that by M. Deshayes, in the *Mag. de Zool.*, pl. vi, 1831"

Localities.—Sta. 699: Port Blair Harbour (amongst stones at low tide), Andamans—1(8.i.26. '*Investigator*'); Andamans—1.

Of the two specimens, one appears adult and the other young. The large and adult shell is from Port Blair Harbour (fig. 9) measuring 23 mm. in length and 11 mm. in diameter, with the spire 9 mm. in length and aperture 13.5 mm. The colour is chocolate-brown, but a pale yellow band is present both in the penultimate and bodywhorl. The apex is much eroded and, consequently, the number of whorls is found to be reduced to four only. The transverse ridges are quite regular and white encrustations are found here and there on the surface. The outer lip is elevated at the upper part, but slightly compressed below resulting in a long and narrow aperture. The columella bears four plaits. But in the small and young shell (Fig. 9) from Andamans the colour appears slightly deeper on the bodywhorl

and the yellow band more paler. The number of whorls is six. The outer lip is not elevated at the upper part and it is uniformly curved and crenulated throughout. The whorls are also not so shouldered.

Distribution.—*Chrysame aurantia* (Gmelin) is a greatly variable species. It has been known to occur in the Gulf of Aden, Mauritius, Ceylon, Andamans, Nicobars, Pulau Berhala and Lampoenga in Sumatra, Java, Amboina, Timor, Queensland, New Zealand, Fiji, Philippines (Luzon, Laylay, Burias, Marinduque, Mindanao, Paragua, Zamboanga, Balabac), Lifu, Solomon Islands, Gulf of Siam and Japan. In February, 1953, I collected one typical example of this species on the sandy beach at Lamba on the coast of the Arabian Sea near Porbander in Kathiawar. This appears to be a new record. Besides this, there are some shells in our named dry collection from Singapore; neither Tomlin nor Dautzenberg recorded the species from this locality.

***Chrysame rüppelli* (Reeve, 1844)**

Type-locality.—Red Sea.

(Plate I, fig. 10.)

1844. *Mitra rüppellii*, Reeve, *Proc. Zool. Soc. London*, No. CXLII, p. 183.
 1844. *Mitra rüppellii*, Reeve, *Conch. Icon.* II, pl. xxiii, fig. 179.
 1845. *Mitra rüppellii*, Catlow, *Conchologist's Nomenclator*, p. 302.
 1854. *Mitra (Chrysame) rüppellii*, H. & A. Adams, *Gen. Rec. Moll.* I, 171.
 1860. *Mitra rüppellii*, Reeve, *Elements of Conchology*, 1, p. 51.
 1869. *Mitra rüppellii*, Issel, *Mal. Mar. Rosso, Pisa*, pp. 118, 263.
 1871. *Mitra (Chrysame) planilirata*, MacAndrew, *Ann. & Mag. Nat. Hist.* (4) VI, p. 436.
 1874. *Mitra (Chrysame) rüppellii*, Jickeli, *Jahrb. Deuts. Malak. Gesell.* 1, pp. 28, 29.
 1878. *Mitra (Chrysame) rüppellii*, Kobelt, *Illustr. Conchyl.* 1, p. 66.
 1882. *Mitra rüppellii*, Tryon, *Man. Conch.* IV, p. 146, pl. xliii, fig. 251.
 1883. *Mitra (Chrysame) rüppellii*, Paetel, *Cat. Conchyl.-Samml.*, p. 29.
 1885. *Mitra planilirata*, Cooke, *Ann. & Mag. Nat. Hist.* (5) XV, p. 335.
 1888. *Mitra (Chrysame) rüppellii*, Paetel, *Cat. Conchyl.—Samml.* 1, p. 186.
 1897. *Mitra (Chrysame) rüppelli*, Melvill and Standen, *Journ. of Conch.* VIII, p. 405.
 1900. *Mitra (Chrysame) rüppellii*, Newton, *Geol. Mag. (N.S.)*, (IV) VII, p. 511.
 1902. *Mitra rüppellii*, Shopland, *Proc. Malac. Soc. London*, V, p. 173.
 1903. *Mitra (Chrysame) rüppellii*, Sturany, *Denkschr. d. Kais. Akad. d. Wiss. Math. Naturw. Classe*, LXXIII, pp. 37, 64.
 1911. *Mitra rüppellii*, Schepman, *Prosobr. Siboga-Exped. Monogr.* IV, p. 275.
 1919. *Strigatella planilirata*, Cooke, *Proc. Zool. Soc. London*, II, p. 411.
 1924. *Mitra (Chrysame) rüppelli*, Fulton, *A Cat. of Shells of Rec. Moll.*, p. 22.

Reeve described and figured two different species of *Mitres* under the names *solandri* (after Dr. Solander) and *rüppellii* (after von Rüppell). The former was from an unknown locality, while the latter from the Red Sea. These two forms appear to have been greatly confused by the subsequent workers, *i.e.*, some considering them both as quite distinct and some trying to include the former in the synonymy of the latter or of *Mitra hanleyi*

Sowerby from the Red Sea. Tryon in connection with *M. solandri* writes: "a dark shell of this stage is *M. Rüppelli*, Reeve (fig. 251)" Melvill and Standen consider the latter as allied to *solandri*, though not exactly identical with it. Reeve's *M. planilirata* is, no doubt, synonymous with *rüppelli*, but his *rotundilirata* (the 'Round-ridged Mitre') certainly differs from the latter in having the interstices of its ridges crossed with raised striae.

Characters.—Shell small, fusiform, slightly contracted towards the base and encircled throughout with strong, somewhat rounded and broad ridges of more or less unequal sizes, with somewhat wide and smooth interstices between them unlike *rotundilirata*. The colour is chestnut-brown. The spire is acuminate and the columella bears four plaits.

Locality.—Andamans—1.

The specimen before me, though young, appears to agree with *rüppelli* in form and character of the transverse ridges and the interstices between them. The chestnut-brown colour is greatly faded due to long preservation in spirit. The presence of only three plaits on the columella may possibly be due to its young age. The shell measures 9 mm. in length and 3.5 mm. in diameter, with its spire 5 mm. in length and aperture 4 mm.

Distribution.—From its original locality 'Red Sea' the range of *Chrysame rüppelli* (Reeve) appears to have extended to the Gulf of Suez, Gulf of Akaba, Gulf of Aden, Ceylon, Nicobars and Malay Archipelago, though not further eastwards in the Pacific. Newton has included this species in his list of the Pleistocene Mollusca from the Raised Beach Deposits of the Red Sea.

Genus **Scabricula** Swainson, 1840.

Type. *Voluta scabriuscula* Linnaeus.

- 1840. *Scabricola*, Swainson, *A Treatise on Malacology*, pp. 130, 131, 319.
- 1843. *Scabricula*, Sowerby, *Man. Conch.* 2nd ed., p. 251.
- 1847. *Scabricola*, Gray, *Proc. Zool. Soc. London*, Pt. XV, p. 141.
- 1849. *Scabricula*, Hermannsen, *Index Gen. Malacoz.* II, p. 417.
- 1852. *Scabricola*, Mörch, *Cat. Conchyl. Yoldi*, 1, p. 81.
- 1853. *Scabricola*, H. & A. Adams, *Gen. Rec. Moll.* 1, p. 170.
- 1859. *Scabricula*, Chenu, *Man. de Conch.* 1, p. 193.
- 1868. *Scabricola*, Stoliczka, *Cretaceous Fauna of Southern India*, II, p. 101.
- 1869. *Scabricola*, von Frauenfeld, *Beiträge zur Fauna der Nicobaren*, III, p. 860.
- 1876. *Scabricola*, Brazier, *Proc. Linn. Soc. N. S. Wales*, 1, p. 208.
- 1878. *Scabricola*, Kobelt, *Illustr. Conchyl.* 1, p. 65.
- 1880. *Scabricula*, Garrett, *Journ. of Conch.* III, p. 73.
- 1882. *Scabricola*, Tryon, *Man. Conch.* IV, p. 132.
- 1883. *Scabricula*, Paetel, *Cat. Conchyl.-Samml.*, p. 26.
- 1884. *Scabricula*, Fischer, *Man. de Conch.*, p. 611.
- 1887. *Scabricola*, Brazier, *Proc. Linn. Soc. N. S. Wales*, (2) II, p. 997.
- 1888. *Scabricula*, Paetel, *Cat. Conchyl.-Samml.* 1, p. 17?
- 1890. *Scabricula*, Römer, *Cat. Conchyl.-Samml. Nat. Hist. Mus. Wiesbaden*, p. 39.
- 1899. *Scabricula*, Cossmann, *Ess. Paleoconch. Comp.* III, pp. 150-153.
- 1901. *Scabricola*, Melvill and Standen, *Proc. Zool. Soc. London*, II, p. 419.

1911. *Scabricula*, Schepman, *Prosobr. Siboga-Exped. Monogr. IV*, p. 271.
 1915. *Scabricola*, Dall, *A -Monogr. Moll. Faun. Orth. Pugnax Zone of Olig. Tampa, Florida*, p. 60.
 1919. *Scabricola*, Iwakawa, *Cat. Jap. Moll. Nat. Hist. Dept. Tokyo Imp. Mus.*, p. 142.
 1923. *Scabricola*, Dautzenberg and Bouge, *Journ. de Conchyliol.* LXVII, p. 100.
 1924. *Scabricula*, Fulton, *A Cat. of Shells of Rec. Moll.*, p. 20.
 1929. *Scabricola*, Iredale, *Mem. Queens. Mus.* IX, p. 286.
 1929. *Scabricola*, Dautzenberg, *Faun. des Col. Franc.* III, p. 181.
 1929. *Scabricula*, Thiele, *Handb. der Syst. Weichtierk.* 1, p. 339.
 1934. *Scabricola*, Hirase, *A Coll. of Jap. Shells*, p. 70.
 1935. *Scabricula*, Dautzenberg, *Mém. Mus. Roy. Hist. Nat. Belg. Hors Ser.*, II, *Fasc.* 17, pp. 79, 206.
 1939. *Scabricola*, Allan, *Austr. Mus. Mag.* VII(1), pp. 14, 15.
 1942. *Scabricula*, Yen, *Proc. Malac. Soc. London*, XXIV, p. 236.
 1950. *Scabricola*, Allan, *Australian Shells*, p. 179.
 1952. *Scabricula*, Glibert, *Mém. Inst. Roy. Sci. Nat. Belg.*, Ser. 2, *Fasc.* 46, p. 362.
 1953. *Scabricula*, Solem, *Field. Zool.* XXXIV, No. 22, p. 225.

Swainson first introduced *Scabricola* as a subgenus of *Mitra*. Sowerby emended it to *Scabricula*. But some authors (Gray, Hermannsen, Frauenfeld, Dall, Yen, Allan) have rightly given it a distinct generic rank. Linnaeus's *Voluta scabriuscula* is considered to be the type-species of this genus. Gray has wrongly spelt it as '*Scabicola*'

Characters.—This genus is chiefly characterized by the surface of its fusiform or pyramidal shell being scabrous or granulated throughout—the granules formed by the transverse elevated ridges and longitudinal striae. Besides this, the sutures are non-cornated and impressed. The outer lip is crenated throughout.

S. pretiosa is the only species in the collection which represents this genus.

***Scabricula pretiosa* (Reeve, 1844).**

(Plate I, fig. 11.)

1844. *Mitra pretiosa*, Reeve, *Proc. Zool. Soc. London*, No. CXLII, pp. 176, 177.
 1844. *Mitra pretiosa*, Reeve, *Conch. Icon.* II, pl. xvi, fig. 116.
 1845. *Mitra pretiosa*, Catlow, *Conchologist's Nomenclator*, p. 301.
 1860. *Mitra pretiosa*, Reeve, *Elements of Conchology*, 1, p. 50.
 1871. *Mitra (Scabricola) pretiosa*, M'Andrew, *Ann. & Mag. Nat. Hist.* (4) VI, p. 436.
 1874. *Mitra (Scabricola) pretiosa*, Jickeli, *Jahrb. Deuts. Malak. Gesell.* 1, p. 23, pl. ii, fig. 2.
 1875. *Mitra (Scabricola) pretiosa*, Nevill, *Journ. As. Soc. Bengal*, XLIV, p. 100.
 1882. *Mitra pretiosa*, Tryon, *Man. Conch.* IV, p. 135, pl. xxxix, fig. 164.
 1883. *Mitra (Scabricola) pretiosa*, Paetel, *Cat. Conchyl.-Samml.*, p. 29.
 1885. *Mitra pretiosa*, Cooke, *Ann. & Mag. Nat. Hist.* (5) XV, p. 334.
 1886. *Mitra pretiosa*, Cooke, *Ann. & Mag. Nat. Hist.* (5) XVIII, p. 382.
 1888. *Mitra (Scabricola) pretiosa*, Paetel, *Cat. Conchyl.-Samml.* 1, p. 185.
 1896. *Mitra pretiosa-antoniae*, Shopland, *Journ. Bomb. Nat. Hist. Soc.* X, p. 221.

1879. *Mitra pretiosa*, Sowerby, *Marine Shells of S. Africa*, p. 9.
 1901. *Mitra (Scabricola) pretiosa*, Melvill and Standen, *Proc. Zool. Soc. London*, II, p. 410.
 1902. *Mitra pretiosa*, Shopland, *Proc. Malac. Soc. London*, V, p. 173.
 1903. *Mitra (Scabricola) pretiosa*, Sturany, *Denkschr. d. Kais. Akad. d. Wiss. Math.-Naturw. Classe*, LXXIII, pp. 37, 64.
 1904. *Mitra pretiosa*, Hidalgo, *Cat. Moll. Test. Filipinas*, p. 65.
 1915. *Mitra pretiosa*, Bartsch, *Smiths. Inst. U. S. Nat. Mus. Bull.* XCI, p. 243.
 1919. *Mitra pretiosa*, Cooke, *Proc. Zool. Soc. London*, II, p. 414, Text-fig. 12 (radular teeth).
 1923. *Mitra (Scabricola) clathrus* var. *pretiosa*, Dautzenberg and Bouge, *Journ. de Conchyliol.* LXVII, p. 102.
 1924. *Mitra (Scabricola) pretiosa*, Fulton, *A Cat. of Shells of Rec. Moll.*, p. 21.
 1928. *Mitra (Scabricola) pretiosa*, Melvill, *Proc. Malac. Soc. London*, XVIII, p. 108.
 1928. *Mitra pretiosa*, Faustino, *Summary Phil. Mar. and Freshw. Moll.*, p. 282.
 1929. *Mitra (Scabricola) pretiosa*, Dautzenberg, *Faun. des. Col. Franc.* III, p. 181.
 1932. *Mitra (Scabricola) pretiosa*, Dautzenberg, *Journ. de Conchyliol.* LXXVI, p. 27.
 1937. *Mitra clathrus* var. *pretiosa*, Viader, *Maur. Inst. Bull.* 1(2), p. 21.

Reeve's *Mitra pretiosa* described from an unknown habitat was wrongly interpreted by Tryon as "a young shell of *M. crenifera* Lamarck" Dautzenberg, firstly, tried (in collaboration with Bouge) to unite it with *M. clathrus* (= *crenifera* Lam.) as a variety (a view which Viader has also followed), but later on he, like other workers, recognized it as specifically distinct. Adams's *Mitra antoniae* is treated by Nevill as a synonym of *pretiosa* and by Melvill and Standen as probably a variety of the same. But Shopland's view of continuing the two names to designate a single species under the name of *pretiosa-antoniae* can hardly be accepted as correct.

Characters.—The beautiful style of colour paintings, such as, belts and dots of reddish-brown, and the peculiar sculpture on the slender fusiformly-acuminate shell consisting of fine transverse ribs having their interstices marked with close longitudinal impressed grooves possibly earned for this species the popular name "Precious Mitre" Besides these, the spire is longer than the aperture and the base of the bodywhorl much contracted. The sutures are rather deep. The columella is four plaited and the outer lip crenulated throughout.

Reeve says: "The painting of this shell reminds one of *M. crenifera*; the sculpture is however of a quite different pattern." Cooke has furnished an interesting account of the radular teeth of this species.

Locality.—Andamans—1.

The single specimen in the collection, though small and slightly more slender, appears to agree perfectly with the description of the typical form, save that the reddish-brown dots are faintly visible here and there on the spiral ribs only. The shell measures 18.5 mm. in length and 6 mm. in diameter, with the spire 10 mm. in length and aperture 8 mm. There are eight whorls and four columellar plaits.

Distribution.—Though described from an unknown habitat, the range of the pretty species *Scabricola pretiosa* (Reeve) has subsequently been known to extend in the Red Sea, Gulf of Suez, Gulf of Aden, Shaik Shuaib I. and Henjam I. in the Persian Gulf, Baluchistan,

Mauritius, Madagascar, Natal, Annesley Bay, New Caledonia, Lifu, Philippines and Japan Nevill says that this species was obtained plentifully by Mr. W. T. Blanford in the Gulf of Oman on the coast of Persia. There are also some specimens in our named dry collection from Andamans which appears to be a new record.

Genus **Cancilla** Swainson, 1840.

Genotype. *Tiara isabella* Swainson, 1831.

1840. *Cancilla*, Swainson, *A Treatise on Malacology*, pp. 130, 320.
 1846. *Cancilla*, Hermannsen, *Index Gen. Malacoz.* 1, p. 166.
 1847. *Cancilla*, Gray, *Proc. Zool. Soc. London*, Pt. XV, p. 142.
 1852. *Cancilla*, Mörch, *Cat. Conchyl. Yoldi*, I, p. 82.
 1853. *Cancilla*, H. & A. Adams, *Gen. Rec. Moll.* 1, p. 170.
 1859. *Cancilla*, Chenu, *Man. de Conch.* 1, p. 193.
 1876. *Cancilla*, Brazier, *Proc. Linn. Soc. N. S. Wales*, 1, p. 268.
 1878. *Cancilla*, Kobelt, *Illustr. Conchyl.* 1, p. 65.
 1880. *Cancilla*, Garrett, *Journ. of Conch.* III, p. 73.
 1882. *Cancilla*, Tryon, *Man. Conch.* IV, p. 138.
 1883. *Cancilla*, Paetel, *Cat. Conchyl.-Samml.*, p. 26.
 1884. *Cancilla*, Fischer, *Man. de Conch.*, p. 611.
 1888. *Cancilla*, Paetel, *Cat. Conchyl.-Samml.* 1, p. 172.
 1889. *Cancilla*, Tate, *Trans. and Proc. Roy. Soc. South Australia*, XI, p. 135.
 1890. *Cancilla*, Römer, *Cat. Conchyl.-Samml. Nat. Hist. Mus. Wiesbaden*, p. 39.
 1899. *Cancilla*, Cossmann, *Ess. Paleconch. Comp.* III, p. 157.
 1915. *Cancilla*, Dall, *A Monogr. Moll. Faun. Orth. Pugnax zone of Olig. of Tampa, Florida*, p. 60.
 1924. *Cancilla*, Fulton, *A Cat. of Shells of Rec. Moll.*, p. 20.
 1929. *Cancilla*, Thiele, *Handb. der Syst. Weichtierk.* 1, p. 339.
 1929. *Cancilla*, Dautzenberg, *Faun. des Col. Franc.* III, p. 182.
 1935. *Cancilla*, Dautzenberg, *Mém. Mus. Roy. Hist. Nat. Belg. Hors Ser.*, II, Fasc. 17, pp. 95, 206.
 1936. *Cancilla*, Peile, *Proc. Malac. Soc. London*, XXII, p. 143.
 1952. *Cancilla*, Glibert, *Mém. Inst. Roy. Sci. Nat. Belg.* II, No. 121, p. 116.
 1953. *Cancilla*, Olsson, Harbison, Fargo and Pilsbry, *Acad. Nat. Sci. Phil. Monogr.* No. 8, p. 190.
 1953. *Cancilla*, Solem, *Field. Zool.* XXXIV, No. 22, p. 225.

Cancilla was first introduced by Swainson, in 1840, as a section of *Tiara*. But it was Hermannsen who raised it to the rank of a distinct genus. Most of the subsequent workers tried to subordinate it to *Mitra* proper, while a few only treated it as distinct. Peile has given good reasons based on his anatomical study to justify its separate rank: "*Cancilla* Swainson should be given generic rank on account of the peculiar radula, which as Cooke points out is intermediate in form between those of *Mitra* and *Vexillum*" This undoubtedly strengthens Hermannsen's view of treating it as distinct.

The opinions also seem to differ regarding the selection of its type-species. Swainson while characterizing *Cancilla* (1840) mentioned, firstly, the name of *Mitra isabella* and, secondly, that of *M. sulcata* which he figured (No. 84b) as an example. Even previous to that, while trying to designate both the species (1831) he first described and figured *isabella* to present the group *Tiara* and then *sulcata*. This evidently shows that *isabella* should be

the type of *Cancilla*, though not *sulcata*, and Gray, Fischer, Kobelt and Ladd have also supported this view. Chenu, Cossmann and Tryon, on the other hand, did not agree and proposed *Voluta filaris* to be its neotype. But Thiele and Glibert seem to be inclined towards restoration of Swainson's *sulcata* in suppression of both *isabella* and *filaris*. Recently Olsson, Harbison, Fargo and Pilsbry in the paper cited above have selected Swainson's *Mitra sulcata* as the type of their new subgenus *Subcancilla* proposed for some forms of American Mitres previously relegated to *Tiara*. This makes it possible for *isabella* to stand safely as the type-species of *Cancilla*.

Characters.—The presence of linear, elevated, close-set or distant keel-like revolving ribs on the surface of its fusiform shell marks a distinctive feature in this genus. The prominent cancellation in the interstices between the ribs formed by the fine longitudinal striae is also another remarkable character to which the generic name *Cancilla* possibly owes its origin. The granules may be formed at the point of crossing of the longitudinals and spirals. The spire is elevated and sharply-acuminated. The columella bears four to six very oblique plaits. The base of the bodywhorl is somewhat contracted.

There are only four species in the collection which belong to this genus.

***Cancilla isabella* (Swainson, 1831)**

Type-locality.—New Holland ?

Type. In Manchester Museum.

(Plate II, fig. 1.)

- 1831. *Tiara isabella*, Swainson, *Zool. Illustr.* (2) II, pl. v, fig. 1, 1.
- 1838. *Mitra isabella*, Kiener, *Icon. Coq. Viv.* I, pp. 39, 40, pl. iv, fig. 43, 43.
- 1839. *Mitra isabella*, Küster, in *Martini and Chemnitz's Syst. Conch.-Cab.* V, *Abth.* 2, pp. 61, 62, pl. xi, figs. 12, 13.
- 1840. *Tiara (Cancilla) isabella*, Swainson, *A Treatise on Malacology*, pp. 130, 320.
- 1844. *Mitra isabella*, Lamarck, *Anim. sans Verteb.* (ed. Deshayes), X, p. 343.
- 1844. *Mitra isabella*, Reeve, *Conch. Icon.* II, pl. vi, fig. 3E.
- 1845. *Mitra isabella*, Catlow, *Conchologist's Nomenclator*, p. 299.
- 1846. *Cancilla isabella*, Hermannsen, *Index Gen. Malacoz.* 1, p. 166.
- 1847. *Cancellia isabella*, Gray, *Proc. Zool. Soc. London*, Pt. XV, p. 142.
- 1850. *Mitra isabella*, Jay, *Cat. of Shells*, p. 378.
- 1852. *Cancilla isabella*, Mörch, *Cat. Conchyl. Yoldi*, 1, p. 82.
- 1853. *Mitra (Cancilla) isabella*, H. & A. Adams, *Gen. Rec. Moll.* 1, p. 171.
- 1855. *Mitra isabella*, Berge, *Conchylienbuch*, p. 249, pl. xlii, p. 14.
- 1860. *Mitra isabella*, Reeve, *Elements of Conchology*, 1, p. 50.
- 1860. *Mitra isabella*, Theobald, *Cat. Rec. Shells in the Mus. As. Soc. Bengal*, p. 28.
- 1878. *Mitra (Cancilla) isabella*, Kobelt, *Illustr. Conchyl.* 1, p. 65, pl. xxiv, p. 2.
- 1882. *Mitra (Scabricola) isabella*, Tryon, *Man. Conch.* IV, p. 137, pl. xl, figs. 168, 169.
- 1883. *Mitra (Cancilla) isabella*, Paetel, *Cat. Conchyl.-Samml.*, p. 28.
- 1884. *Cancellia isabella*, Fischer, *Man. de Conch.*, p. 611.
- 1888. *Mitra (Cancilla) isabella*, Paetel, *Cat. Conchyl.-Samml.* 1, p. 181.

1904. *Mitra isabella*, Hidalgo, *Cat. Moll. Test. Filipinas*, p. 67.
 1919. *Mitra (Scabricola) isabella*, Iwakawa, *Czt. Jap. Moll. Nat. Hist. Dept. Tokyo Imp. Mus.*, p. 143.
 1924. *Mitra (Scabricula) isabella*, Fulton, *A Cat. of Shells of Rec. Moll.*, p. 21.
 1928. *Tiara isabella*, Woodring, *Miocene Mollusks from Bowden, Jamaica*, p. 242.
 1934. *Mitra (Tiara) isabella*, Ladd, *B. P. Bishop Mus. Bull.* No. 119, p. 226.
 1935. *Mitra (Cancilla) isabella*, Dautzenberg, *Mém. Mus. Roy. Hist. Nat. Belg. Hors Ser.*, II, Fasc. 17, p. 95.
 1942. *Scabricula isabella*, Yen, *Proc. Malac. Soc. London*, XXIV, p. 396.
 1953. *Cancilla isabella*, Olsson, Harbison, Fargo and Pilsbry, *Acad. Nat. Sci. Phil. Monogr.* No. 8, p. 190.

The type-locality of *isabella* is not definitely known. But Swainson says that the shell on which he based his description and figure of the species was obtained from the Bligh Sale for 31·3s., where it is said to have come from New Holland. He further adds that the type is deposited in the Manchester Museum.

Characters.—This 'Fawn-coloured Mitre', as it has been commonly called, is remarkable for its large elongately-fusiform shell (though not so large as that of *Mitra mitra*) of light orange-bay or fawn colour, having an elevated and sharply-acuminated spire and the surface beautifully sculptured throughout with numerous slender, close-set, elevated revolving ribs and fine longitudinal striae—the latter forming distinct cancellations in the interstices between the former and also fine granules at the point of their crossing. The entire structure appears more prominent in the young shells than in the adult and somewhat resembles that of *Mitra (Tiara) nasongoensis* Ladd (pl. xl, fig. 8) from Fiji. The bodywhorl is produced, contracted below (more in the young) and slightly recurved at the end. Similarly the whorls appear more ventricose and the sutures more deep in the young shells. The columella is straight and bears five very oblique plaits. The outer lip is simple and slightly crenated throughout in the adult, but in the young it appears somewhat different as stated below. The aperture is long, narrow and slightly channelled below.

That the shells of this interesting species may suffer from accidental fracture during their life time and the same could be mended by the animals themselves was first observed by Reeve (1844). Subsequently, Theobald also found similar marks of damage, but only on the 6th whorl and near the mouth of the specimen he examined. The largest shell in our named dry collection labelled 'China' is found to be damaged on the 6th, 8th and 9th whorls (the total number of whorls being ten). It measures 83 mm. in length and 23 mm. in diameter, with its spire 41 mm. in length and aperture 43 mm.

The remarks made by Swainson on the habits of the animal appear interesting: "This animal, like other carnivorous marine forms, seeks to prey and habitually resides in deep recesses of the ocean."

Locality.—Maungmagan, Lower Burma-1.

The single specimen before me, though quite young (measuring only 26 mm. in length and 8 mm. in diameter, with its spire 14 mm. in length—the apex being slightly broken, and aperture 12 mm.) appears to present certain very interesting features in its shell-characters

which may be worth-mentioning here. The shell is slenderly-fusiform, deep-sutured with the whorls more convex (though only 8 in number) and the revolving ribs less in number (though more strong and prominent)—17 on the bodywhorl and 5 on each of the upper whorls and the granules borne by them looking somewhat-like beads, base more contracted and recurved at the end, columella four-plaited and outer lip somewhat straight in the middle and slightly obtusely angled both up and down. So, it is evident from these facts that the shell-characters may vary greatly in this species with the growth of the animal.

The shell somewhat approaches Cox's fossil species, *Vexillum (Uromitra) macfadyeni* from the Limestone of Kamaran Island, Red Sea (see the reference cited in connection with *Costellaria obeliscus*), in its general appearance. But it agrees closely with Kobelt's fig. 2 and Tryon's fig. 169 in its essential characters (more so with the latter regarding body-whorl and outer lip), though showing some peculiarities as mentioned above.

Distribution.—*Cancilla isabella* (Swianson) which is a very rare species was so long known to be confined only to the east of the Indo-Pacific, *i.e.*, ranging from the China Sea to Japan and Mindanao in the Philippines. It does not even appear to have been reported from Australia, Polynesia and the East Indies. Its occurrence in Maungmagan, Lower Burma, is therefore quite unique and extends the range for the first time not only in the Indian waters, but also southwestwardly beyond the Philippines.

Cancilla circula (Kiener, 1838).

(Plate II, fig. 2.)

1838. *Mitra circuta*, Kiener, *Icon. Coq. Viv.* IV, p. 21, pl. v, fig. 13.
 1839. *Mitra circula*, Küster, in *Martini and Chemnitz's Syst. Conch.-Cab.* V, *Abth.* 2, pp. 62, 63, pl. xii, figs. 3, 4.
 1839. *Mitra circulus*, Anton, *Verz. Conchyl.*, p. 67.
 1844. *Mitra circulata*, Reeve, *Conch. Icon.* II, pl. xi, fig. 77.
 1845. *Mitra circulata*, Catlow, *Conchologist's Nomenclator*, p. 296.
 1850. *Mitra circula*, Jay, *Cat. of Shells*, p. 377.
 1853. *Mitra (Cancilla) circulata*, H. & A. Adams, *Gen. Rec. Moll.* 1, p. 171.
 1860. *Mitra circulata*, Reeve, *Elements of Conchology*, 1, p. 49.
 1874. *Mitra circula*, Sowerby, *Thesaurus*, IV, pl. vii, figs. 86, 87.
 1876. *Cancilla circulata*, Brazier, *Proc. Linn. Soc. N. S. Wales*, 1, p. 208.
 1878. *Mitra (Cancilla) circula*, Kobelt, *Illustr. Conchyl.* 1, p. 65.
 1880. *Mitra (Cancilla) circulata*, von Martens, in *Möbius's Beiträge zur Meeresfauna der Insel Mauritius und der Seychellen*, p. 251.
 1880. *Mitra circulata*, Garrett, *Journ. of Conch.* III, p. 71.
 1882. *Mitra (Cancilla) filaris* var. *circulata*, Tryon, *Man. Conch.* IV, p. 138, pl. xl, fig. 176.
 1883. *Mitra (Cancilla) circulata*, Paetel, *Cat. Conchyl.-Samml.*, p. 27.
 1887. *Mitra (Cancilla) circulata*, von Martens, *Linn. Soc. Journ. Zool.* XXI, p. 183.
 1888. *Mitra (Cancilla) circulata*, Paetel, *Cat. Conchyl.-Samml.* I, p. 175.
 1890. *Mitra (Cancilla) circulata*, Römer, *Cat. Conchyl.-Samml. Nat. Hist. Mus. Wiesbaden*, p. 39.
 1896. *Mitra circulata*, Shopland, *Journ. Bomb. Nat. Hist. Soc.* X, p. 221.
 1897. *Mitra circulata*, Sowerby, *Murine Shells of S. Africa*, pp. 8, 9.
 1898. *Mitra (Cancilla) circulata*, Melvill and Sykes, *Proc. Malac. Soc. London*, III, p. 40.

1901. *Mitra (Cancilla) circulata*, Melvill and Standen, *Proc. Zool. Soc. London*, II, p. 419.
 1902. *Mitra circulata*, Shopland, *Proc. Malac. Soc. London*, V, p. 173.
 1904. *Mitra circulata*, Hidalgo, *Cat. Moll. Test. Filipinas*, p. 61.
 1907. *Mitra (Cancilla) circulata*, Couturier, *Journ. de Conchyliol.* LV, p. 133.
 1915. *Mitra circula*, Bartsch, *Smiths. Inst. U. S. Nat. Mus. Bull.* XCI, p. 243.
 1919. *Mitra circula*, Cooke, *Proc. Zool. Soc. London*, II, pp. 415, 417.
 1924. *Mitra (Cancilla) circulata*, Fulton, *A Cat. of Shells of Rec. Moll.*, p. 20.
 1928. *Mitra circulata*, Faustino, *Summary Phil. Mar. and Freshw. Moll.*, p. 277.
 1929. *Mitra (Cancilla) circula*, Dautzenberg, *Faun. des Col. Franc.* III, p. 182.
 1932. *Mitra (Cancilla) circula*, Dautzenberg, *Journ. de Conchyliol.* LXXVI, p. 27.
 1933. *Mitra (Cancilla) circula*, Dautzenberg and Bouge, *Journ. de Conchyliol.* LXXVII, pp. 159, 160.
 1936. *Cancilla circula*, Peile, *Proc. Malac. Soc. London*, XXII, p. 143, Text-fig. 9 (radular teeth).
 1937. *Mitra circulata*, Viader, *Maur. Inst. Bull.* 1 (2), p. 18.
 1942. *Mitra circula*, Gravely, *Bull. Mad. Govt. Mus. N. S.*, V (2), pp. 65, 66.
 1952. *Mitra circula*, Satyamurti, *Bull. Mad. Govt. Mus. N. S.*, 1 (2), Pt. 6, pp. 194, 195, pl. xviii, fig. 8.

Kiener's original name *circula* for the species was emended to *circulata* by Reeve (1844), but that change has not been accepted by all workers. *Circula*, though a well-defined pretty form, appears to have been erroneously combined by Tryon with *Cancilla filaris* as a variety. Cooke's critical study of the radular teeth, no doubt, gave a clear indication of its systematic position as intermediate between *Mitra* and *Vexillum*, but Brazier and Peile rightly assigned it to the genus *Cancilla* proper. Anton has wrongly spelt it as 'circulus'

Characters.—This species has a small acuminate-fusiform turreted shell of brown colour encircled throughout with strong sharp elevated and somewhat distant ridges wanting in granules and marked with a fine ridge in between each pair. Each whorl has four ridges, of which the median two appearing more prominent. But the bodywhorl has numerous ridges and the interstices between all of them are distinctly cancellated with fine longitudinal striae not crossing the spirals. Similar fine striae are also found in the upper whorls. The base is contracted and slightly recurved. The columella is somewhat straight and bears four plaits (may be three in the young shell). The outer lip is simple and crenulated throughout.

The peculiarities in the radular teeth of this species have been studied by Cooke and Peile. Its shell, says Gravely, may attain the height of nearly 2 inches. It may be closely allied to *C. filaris* (Linn.), but the difference is also quite marked, *i.e.*, in case of *circula* the bodywhorl is more elongate, but less contracted below, the sutures less impressed, the aperture more long and narrow, and the outer lip not contracted in the middle. Woodring's *Mitra (Tiara rhadina* from Jamaica¹ may approximate nearly to *circula* in the general appearance of its shell, but differs from it in many essential details. Sowerby (1897, p. 9) doubts whether *Mitra rufescens* A. Adams could be specifically distinct from *circula*.

Brazier states that he collected animals of this species at 5 to 30 fathoms of water on sandy or sandy-mud bottom in the Darnley Island, Torres Strait, while Melvill and Standen found them on sandy-mud and stony bottom round the coast of Baluchistan.

¹ Woodring, W. P. *Miocene Moll. Bowden, Jamaica*, p. 243, pl. xiv, fig. 14 (1928).

Locality.—Andamans-1.

The specimen in the collection, though quite young, corresponds to the description of the typical form. The spire is slightly broken and the penultimate whorl appears to have been bored by some worm just above the aperture. The columella bears only three plaits. The aperture is long, narrow and greatly exceeds the spire in length. The outer lip is crenulated throughout.

Distribution.—*Cancilla circula* (Kiener) was originally described from an unknown locality. But subsequently it has been known to occur in the Persian Gulf, Gulf of Oman, Mekran Coast, Gulf of Aden, Mauritius, Madagascar, Durban, Trincomali, Madras, Andamans, Nicobars, Malay Archipelago, King Island bay, Singapore, Darnley Island in Torres Strait, Philippines (Burias, Cebu), Marutea and Viti Islands. Recently Satyamurti has reported it from the Krusadai Island, Gulf of Manaar. But he adds that its occurrence in Pamban needs confirmation. The available records of distribution of the species show that it is more common on the western part of the Indo-Pacific than on the east.

Cancilla interlirata (Reeve, 1844).

Type-locality.—Island of Masbate, Philippines (found in sandy-mud at the depth of 4 fathoms).

(Plate II, fig. 3.)

1844. *Mitra interlirata*, Reeve, *Proc. Zool. Soc. London*, No. CXLII, pp. 172, 182.
 1844. *Mitra interlirata*, Reeve, *Conch. Icon.* II, pl. x, fig. 70.
 1845. *Mitra interlirata*, Catlow, *Conchologist's Nomenclator*, p. 299.
 1850. *Mitra interlirata*, Adams and Reeve, *Zool. Voy. "Samarang"*, *Moll.*, p. 28.
 1850. *Mitra interlirata*, Jay, *Cat. of Shells*, p. 378.
 1852. *Cancilla interlirata*, Mörch, *Cat. Conchyl. Yoldi*, I, p. 82.
 1853. *Mitra (Cancilla) interlirata*, H. & A. Adams, *Gen. Rec. Moll.* I, p. 171.
 1860. *Mitra interlirata*, Reeve, *Elements of Conchology*, I, p. 50.
 1868. *Mitra flammea* var. *interlirata*, Pease, *Amer. Journ. Conch.* V, p. 121.
 1871. *Mitra interlirata*, von Martens and Langkavel, *Donum Bismarck.*, p. 18.
 1874. *Mitra interlirata*, Sowerby, *Thesaurus*, IV, pl. xix, fig. 369.
 1876. *Cancilla interlirata*, Brazier, *Proc. Linn. Soc. N. S. Wales*, I, p. 209.
 1880. *Mitra (Cancilla) interlirata*, von Martens, in Möbius's *Beiträge zur Meeresfauna der Insel Mauritius und der Seychellen*, p. 251.
 1880. *Mitra interlirata*, Garrett, *Journ. of Conch.* III, pp. 10, 19.
 1882. *Mitra interlirata* (as a synonym of *M. flammea* Quoy), Tryon, *Man. Conch.* IV, p. 140, pl. xli, fig. 192.
 1883. *Mitra (Cancilla) interlirata*, Paetel, *Cat. Conchyl.-Samml.*, p. 28.
 1886. *Mitra (Cancilla) interlirata*, Watson, *Zool. Chall. Exped. Moll. Gastrop.* XV, Pt. XLII, p. 248.
 1887. *Mitra (Cancilla) interlirata*, von Martens, *Linn. Soc. Journ. Zool.* XXI, p. 184.
 1888. *Mitra (Cancilla) interlirata*, Paetel, *Cat. Conchyl.-Samml.*, I, p. 180.
 1896. *Mitra interlirata*, Shopland, *Journ. Bomb. Nat. Hist. Soc.* X, p. 221.
 1897. *Mitra interlirata*, Sowerby, *Marine Shells of S. Africa*, p. 8.
 1898. *Mitra (Cancilla) interlirata*, Melvill and Standen, *Journ. of Conch.* IX, p. 39.
 1902. *Mitra interlirata*, Shopland, *Proc. Malac. Soc. London*, V, p. 173.

1903. *Mitra (Cancilla) interlirata*, Smith, *Faun. & Geogr. Mald. and Laccad. Archipelagoes*, II, pp. 591, 604.
1903. *Mitra interlirata*, Sowerby and Fulton, *Proc. Malac. Soc. London*, V, p. 345, pl. ~~8~~ figs. 8, 9.
1904. *Mitra interlirata*, Hidalgo, *Cat. Moll. Test. Filipinas*, p. 63.
1907. *Mitra (Cancilla) interlirata*, Couturier, *Journ. de Conchyliol.* LV, p. 133.
1908. *Mitra interlirata*, Nobre, *Bull. Soc. Portug. Sci. Nat. Hist.* 1, p. 211.
1909. *Mitra interlirata*, Hedley, *Rept. Austr. Assoc. Adv. Sci.*, p. 366.
1909. *Mitra (Cancilla) interlirata*, Melvill, *Trans. Linn. Soc. London, Ser. 2, Zool.* XIII, p. 110.
1911. *Mitra (Cancilla) interlirata*, Schepman, *Prosobr. Siboga-Exped. Monogr.* IV, p. 273.
1915. *Mitra interlirata*, Bartsch, *Smiths. Inst. U. S. Nat. Mus. Bull.* XCI, p. 243.
1919. *Mitra interlirata*, Cooke, *Proc. Zool. Soc. London*, II, pp. 414, 416.
1923. *Mitra (Cancilla) interlirata*, Dautzenberg and Bouge, *Journ. de Conchyliol.* LXVII, pp. 112, 113.
1925. *Mitra (Cancilla) interlirata*, Oostingh, *Rept. on a Coll. of Rec. Shells from Obi and Halmahera (Moluccas)*, p. 164.
1928. *Mitra (Cancilla) interlirata*, Melvill, *Proc. Malac. Soc. London*, XVIII, p. 108.
1933. *Mitra (Cancilla) interlirata*, Dautzenberg and Bouge, *Journ. de Conchyliol.* LXXVII, p. 171.
1936. *Cancilla interlirata*, Peile, *Proc. Malac. Soc. London*, XXII, p. 143.
1937. *Mitra interlirata*, Viader, *Maur. Inst. Bull.* 1 (2), p. 20.
1938. *Mitra (Cancilla) interlirata*, Lamy, *Mem. l'Inst. Egypte*, XXXVII, p. 146.

While most authors regard *interlirata* as a well-defined species, it is difficult to understand what led Pease to treat it as a variety of Quoy's *Mitra flammea* (1832) or Tryon to synonymize it with the latter. Melvill and Standen remark : “ *Mitra (Cancilla) interlirata* Rv. placed by Tryon as a synonym of *M. flammea* Quoy, but sufficiently distinct in our opinion ” Dunker's *Mitra foveolata* from Japan¹ is considered by some authors to be a synonym of *interlirata*. Cooke mentions in the foot-note : “ Mr. H. C. Burnup of Durban, who sent the specimens of *interlirata* to Prof. Gwatkin, has assured me that the two species *flammigera* and *interlirata* are conchologically identical ”, but this does not appear to be correct.

Characters.—This interesting deep-water form can easily be recognized by the fine intermediate lirae lying in the interstices between the sharp raised spiral ridges of its shell and distinct cancellations formed by the longitudinal striae. Besides these, the bodywhorl is much longer than the spire, much contracted below and slightly recurved at the end. The whorls of the spire have three spiral ridges each, of which the median one is more prominent but the bodywhorl has much more. The narrow intermediate ridges may not be present in the lower part of the bodywhorl. The columella is slightly umbilicated and five-plaited, while the outer lip is simple and crenulated throughout. The aperture is long, narrow and channelled below and greatly exceeds the spire in length. The surface of the shell is painted with faint distant orange-brown spots.

A good account of the radular teeth of this species is given by Cooke and Peile in the papers cited. But Cooke has also indicated its affinity with *Mitra flammigera* and *M. variegata* regarding the important radular features, while Adams and Reeve with *flammigera* only regarding its peculiar habits. The sculpture of this species, says Reeve, also somewhat

¹ Dunker, *G. Novit. Conch. Ser. II*, p. 46, pl. xv, figs. 5, 6 (1858).

approaches that of *flammigera*. Adams and Reeve have given a short description of the animal. Sowerby and Fulton have given two figures (dorsal and ventral aspects) of a shell of *interlirata* showing how it has been completely bored by the shipworm, *Fistulana clava* Lamarck.

Locality.—Sandheads, mouth of the River Hooghly-1 (“ P. V. Lady Fraser ”).

The specimen, though rather young, appears to agree with Reeve’s description and figure of the species. It is found slightly rusted with black at the upper part, but variegated with characteristic colour pattern below. The bodywhorl bears fifteen transverse ridges, while the rest only three each as usual. The shell measures 21·5 mm. in length and 7 mm. in diameter, with its spire 9 mm. in length and aperture 12 mm. There are nine whorls and five columellar plaits. The largest shell in our named dry collection from Andamans is 37·5 mm. in length and 11 mm. in diameter, with its spire 15 mm. in length and aperture 22·5 mm.

Distribution.—Since its first record from the island of Masbate in Philippines, *Cancilla interlirata* (Reeve) has been found to be very widely distributed throughout the Indo-Pacific, having been recorded from Cebu, Levuka, Tongatabu, Australia, Raine Island in Torres Strait, Arrow Island, Madura Strait, Laiwui, Salawatti, Kei Is., Macassar, Northern Celebes, Java, Lombok, Obi, Sumbawa, Postillon-islands, Saleyer, Banka, New Caledonia, Lifu Fiji, Viti, Samoa, Sandwich, Hawaii, China, Japan, Malay Peninsula, Sullivan Island, Andamans, Nicobars, Ceylon, Madras, Tranquebar, Suvadiva Atoll, Kolumadulu Atoll, Mauritius Madagascar, Zanzibar, Bourbon, Cargados Carajos, Amirantes, Seychelles, Saya de Malha Banks, Durban, Gulf of Aden, Gulf of Suez, Gulf of Akaba, Muscat, Charbar Bay, Mekran Coast and Persia. Brazier states that during the Chivert Cape Expedition he collected specimens of this well-known form in some localities at different depths, namely, Grenville, North-East Australia on muddy bottom at 12 to 20 fathoms, Bet Island in Torres Strait on coarse sandy-mud with broken stones and corals at 11 fathoms, and Darnley Island in Torres Strait on sandy and sandy-mud bottom at 5-30 fathoms. Adams and Reeve have reported it from the China Sea at a depth of 10 fathoms. But its occurrence at Sandheads in the mouth of the River Hooghly is quite remarkable. There are two examples in our named dry collection from the Coromandel Coast of India.

***Cancilla rufilirata* (Adams and Reeve, 1850).**

Type-locality.— China Sea.

(Plate II, fig. 4.)

- 1850. *Mitra rufilirata*, Adams and Reeve, *Zool. Voy. “ Samarang ”*, *Moll.*, p. 26, pl. x, fig. 26.
- 1853. *Mitra (Cancilla) rufilirata*, H. & A. Adams, *Gen. Rec. Moll.* I, p. 171.
- 1874. *Mitra rufilirata*, Sowerby, *Thesaurus*, IV, p. 9, pl. xxv, fig. 572.
- 1882. *Mitra rufilirata* (in part), Tryon, *Man. Conch.* IV, p. 140, pl. xli, fig. 197.
- 1888. *Mitra rufilirata*, Pætel, *Cat. Conchyl.-Samml.* I, p. 186.
- 1897. *Mitra (Cancilla) rufilirata*, Melvill and Sykes, *Proc. Malac. Soc. London*, II, p. 167.
- 1911. *Mitra (Cancilla) rufilirata*, Schepman, *Prosobr. Siboga-Exped. Monogr.* IV, p. 275.

Though the species *rufilirata* appears quite distinct both in form and character of its shell, Tryon and Pætel unhesitatingly merged it with *Mitra flammea* as a synonym.

Characters.—This species is characterized by its ovately-fusiform shell having the spire sharply-acuminate and subcanaliculate and the bodywhorl much longer and narrowed gradually downwards. The surface is nicely transversely lirate—the interstices of which appearing clathrate. The presence of distinct regular lirae and the red-brown stain on them possibly earned for it the specific name *rufilirata*. Besides these, the sutures are impressed and the whorls somewhat ventricose. The aperture is long and narrow and exceeds the spire in length. The outer lip is slightly crenated, while the inner lip straight and six-plaited.

Locality.—Port Blair, Andamans-1.

The single specimen in the collection appears quite typical of the species, save that the reddish-brown band in the middle of the bodywhorl is only faintly visible. There are nine whorls, of which the upper ones bear three transverse ridges each and the bodywhorl eighteen. Smaller linear intermediate ridges are also found in the interstices. The columella is slightly umbilicated. The shell measures 25.5 mm. in length and 9 mm. in diameter, with its spire 11 mm. in length and aperture 14.5 mm.

Distribution.—*Cancilla rufilirata* (Adams and Reeve) is a species of great rarity. It has so far been known to occur only in China Sea, Andamans, Kambaragi-bay, Saleh-bay and between islands of Wowoni and Buton. Its range does not appear to extend westwardly beyond Andamans and this is the second record of the species from there.

Genus **Mitra** Lamarck, 1799.

Type. *Voluta episcopalis* Linnaeus, 1758.

- 1799. *Mitra*, Lamarck, *Prodr. Nouv. Classif. Coq.*, p. 70.
- 1848. *Mitra*, Hermannsen, *Index Gen. Malacoz.* II, p. 42.
- 1853. *Mitra*, H. & A. Adams, *Gen. Rec. Moll.* 1, p. 168.
- 1859. *Mitra*, Chenu, *Man. de Conch.* 1, p. 192.
- 1868. *Mitra*, Troschel, *Das Gebiss der Schnecken*, II, p. 67.
- 1878. *Mitra*, Kobelt, *Illustr. Conchyl.* 1, p. 64.
- 1882. *Mitra*, Tryon, *Man. Conch.* IV, pp. 108, 109.
- 1929. *Mitra*, Thiele, *Handb. der Syst. Weichtierk.* 1, p. 339.
- 1929. *Mitra*, Dautzenberg, *Faun. des Col. Franc.* III, p. 179.
- 1931. *Mitra*, Kennard, Salisbury and Woodward, *Smiths. Misc. Coll.* LXXXII, p. 33.
- 1935. *Mitra*, Dautzenberg, *Mém. Mus. Roy. Hist. Nat. Belg. Hors Ser.*, II, Fasc. 17, pp. 44, 205.
- 1939. *Mitra*, Allan, *Austr. Mus. Mag.* VII (1), p. 13.
- 1950. *Mitra*, Allan, *Australian Shells*, p. 178.
- 1952. *Mitra*, Glibert, *Mém. Inst. Roy. Sci. Nat. Belg.* II, No. 121, p. 116.
- 1952. *Mitra*, Glibert, *Mém. Inst. Roy. Sci. Nat. Belg.*, Ser. 2, Fasc. 46, p. 363.
- 1953. *Mitra*, Olsson, Harbison, Fargo and Pilsbry, *Acad. Nat. Sci. Phil. Monogr.* No. 8, p. 189.
- 1953. *Mitra*, Solem, *Field. Zool.* XXXIV, No. 22, p. 224.

Characters.—Shell generally large, thick, smooth and fusiform; spire elevated and acute and its length mostly exceeds that of the aperture; whorls may be plain or slightly tuberculated or crenated just below the sutures and bodywhorl large, somewhat ventricose; aperture large, somewhat wider below and notched in front; inner lip or columella strongly and obliquely plaited, while outer lip not thickened, but denticulated or slightly serrated.

This well-known genus is represented here by the most typical form, *Mitra mitra* (Linn.).

Mitra mitra (Linnaeus, 1758.)

(Plate II, fig. 5.)

1685. *Buccinum dentatum*, etc., Lister, *Hist. Conch.*, pl. 839, fig. 66.
 1705. *Mitra Episcopi*, Rumphius, *Amb. Rarit.-Kam.*, p. 91, pl. xxix, fig. K.
 1758. *Voluta Mitra episcopalis*, Linnaeus, *Syst. Nat.* ed. X, p. 732.
 1758. *Mitra Episcopales*, Seba, *Thesaurus*, III, p. 143, pl. li, figs. 8-12.
 1760. *Mitra episcopale*, Knorr, *Les Delices Yeux*, 1, pl. vi, fig. 2.
 1764. *Voluta Mitra*, Linnaeus, *Mus. Lud. Ulr.*, p. 547.
 1767. *Voluta Mitra episcopalis*, Linnaeus, *Syst. Nat.* ed. XII, pp. 1193, 1194.
 1770. *Voluta Mitra episcopalis*, Huddesford, in *Lister's Conch. Index*, II, pl. 839, fig. 66.
 1780. *Voluta Mitra episcopalis*, Born, *Test. Mus. Caes. Vindob.*, pp. 228, 229.
 1780. *Mitra episcopalis*, Chemnitz, *Conch.-Cab.* IV, pp. 205-209, pl. cxlvii, figs. 1360, 1360a.
 1783. *Voluta mitra episcopalis*, Schröter, *Einl.* 1, p. 230.
 1790. *Voluta episcopalis*, Gmelin, *Syst. Nat.* ed. XIII, p. 3459.
 1799. *Mitra episcopalis*, Lamarck, *Prodr. Nouv. Classif. Cog.*, p. 70.
 1810. *Mitra episcopalis*, Montfort, *Conch. Syst.* II, pp. 542, 543.
 1811. *Mitra episcopalis*, Lamarck, *Ann. du Mus.* XVII, p. 197.
 1811. *Mitra episcopalis*, Perry, *Conchology*, pl. xxxix, fig. 4.
 1817. *Voluta episcopalis*, Dillwyn, *Descr. Cat. Rec. Shells*, I, pp. 558, 559.
 1824. *Mitra episcopalis*, Blainville, *Dict. des Sci. Nat.* XXXI, p. 481.
 1825. *Mitra episcopalis*, Blainville, *Man. de Malac. et. Conchyliol.*, pl. xxviii, fig. 1.
 1825. *Mitra episcopalis*, Sowerby, *Cat. Tankerv.*, p. 77.
 1828. *Mitra episcopalis*, Sowerby, *Gen. Rec. and Foss. Shells*, 1, Pt. 31, pl. ccxlix, fig. 1.
 1830. *Mitra episcopalis*, Menke, *Syn. Meth. Moll.*, p. 84.
 1830. *Mitra episcopalis*, Deshayes, in *Bruguier's Ency. Meth. Vers.* II, p. 449, pl. cccxix, fig. 2.
 1831. *Mitra episcopalis*, Swainson, *Zool. Illustr.* (2) II, pl. iv.
 1833. *Mitra episcopalis*, Quoy and Gaimard, *Voy. "Astrolabe"*, *Moll.* II, p. 634, pl. xlv, figs. 1-7.
 1834. *Voluta episcopalis*, Donovan, *Nat. Repository*, II, pl. xxxviii.
 1836. *Mitra episcopalis*, Bosc, *Hist. Nat. des Coq.* V, pp. 28, 29, pl. xviii, figs. 2, 3.
 1838. *Mitra episcopalis*, Kiener, *Icon. Coq. Viv.* IV, p. 3, pl. i, fig. 1.
 1838. *Mitra episcopalis*, Potiez and Michaud, *Gal. des Moll.* 1, p. 498.
 1839. *Mitra episcopalis*, Anton, *Verz. Conchyl.*, p. 67.
 1839. *Mitra episcopalis*, Küster, in *Martini and Chemnitz's Syst. Conch.-Cab.* V, *Abth.* 2, pp. 34-36, pl. A, fig. 2, pl. vii, figs. 9, 10.
 1840. *Mitra (Mitra) episcopalis*, Swainson, *A Treatise on Malacology*, pp. 127, 128, 131, Text-fig. 13.
 1840. *Mitra episcopalis*, Dufo, *Ann. Sci. Nat.* (2) XIV, p. 181.
 1842. *Mitra episcopalis*, Reeve, *Conch. Syst.* II, p. 252, pl. cclxxix, fig. 1.
 1842. *Mitra episcopalis*, Gray, *Figs. of Moll. Animals*, 1, p. 15, pl. xxviii, fig. 6.
 1842. *Mitra episcopalis*, Sganzin, *Cat. Coq. aux iles de France, de Bourbon et de Madagascar*, p. 28.
 1844. *Mitra episcopalis*, Lamarck, *Anim. sans Verteb.* (ed. Deshayes), X, pp. 297, 298.
 1844. *Mitra episcopalis*, Reeve, *Conch. Icon.* II, pl. i, fig. 5.
 1845. *Mitra episcopalis*, Catlow, *Conchologist's Nomenclator*, p. 297.
 1847. *Mitra episcopalis*, Gray, *Proc. Zool. Soc. London*, Pt. XV, p. 141.
 1848. *Mitra mitra*, Hermannsen, *Index Gen. Malacoz.* II, p. 42.

1850. *Mitra episcopalis*, Adams and Reeve, *Zool. Voy. H.M.S. "Samarang"*, *Moll.*, p. 28.
1850. *Mitra episcopalis*, Johnston, *Nat. Hist. Moll. Animals*, pp. 19, 430.
1850. *Mitra episcopalis*, Jay, *Cat. of Shells*, p. 377.
1851. *Mitra episcopalis*, Woodward, *Man. of Moll.*, p. 120, pl. vii, fig. 13.
1852. *Mitra episcopalis*, Mörch, *Cat. Conchyl. Yoldi*, 1, p. 81.
1853. *Mitra episcopalis*, Gray, *Ann. & Mag. Nat. Hist.* (2) XII, p. 129.
1853. *Mitra episcopalis*, Gray, *Proc. Zool. Soc. London*, Pt. XXI, p. 36.
1853. *Mitra episcopalis*, H. & A. Adams, *Gen. Rec. Moll.* 1, p. 169.
1855. *Voluta mitra*, Hanley, *Ipsa Linn. Conchyl.*, pp. 331, 332.
1855. *Mitra episcopalis*, Berge, *Conchylienbuch*, p. 249, pl. xlv, fig. 3.
1856. *Mitra episcopalis*, Wood, *Index Testaceol.* (ed. Hanley), p. 107, pl. xxi, fig. 143.
1859. *Mitra episcopalis*, Gray, *Figs. of Moll. Animals*, IV, p. 5, pl. xxviii, fig. 6, pl. cvi, fig. 4.
1859. *Mitra episcopalis*, Chenu, *Man. de Conch.* 1, pp. 192, 193, fig. 996 (p. 193).
1860. *Mitra episcopalis*, Theobald, *Cat. Rec. Shells in Mus. As. Soc. Bengal*, p. 28.
1860. *Mitra episcopalis*, Tennent, *Ceylon*, 1, p. 242.
1860. *Mitra episcopalis*, Reeve, *Elements of Conchology*, 1, pp. 48, 49.
1863. *Mitra episcopalis*, Deshayes, *Cat. Moll. Reunion*, p. 132.
1867. *Mitra episcopalis*, Mitchell, *Cat. Moll. Coll. Govt. Central Mus. Madras*, p. 11.
1868. *Mitra episcopalis*, Troschel, *Das Gebiss der Schnecken*, II, pp. 66, 68, pl. vi, fig. 4 (radular teeth).
1869. *Mitra episcopalis*, von Frauenfeld, *Beiträge zur Fauna der Nicobaren*, III, p. 859.
1872. *Mitra episcopalis*, Garrett, *Proc. Zool. Soc. London*, p. 839.
1874. *Mitra episcopalis*, Sowerby, *Thesaurus*, IV, p. 2, pl. i, fig. 3.
1874. *Mitra episcopalis*, Dunker, *Cat. Mus. Godeffroy*, V, p. 117.
1876. *Mitra episcopalis*, Brazier, *Proc. Linn. Soc. N. S. Wales*, 1, p. 207.
1878. *Mitra (Mitra) episcopalis*, Kobelt, *Illustr. Conchyl.* 1, p. 65, pl. xxiv, fig. 1.
1879. *Mitra episcopalis*, von Martens, *Monatsb. der Konigl. Akad. der Wiss. Berlin*, p. 729.
1880. *Mitra episcopalis*, von Martens, in *Möbius's Beiträge zur Meeresfauna der Insel Mauritius und der Seychellen*, p. 249.
1880. *Mitra episcopalis*, Garrett, *Journ. of Conch.* III, p. 21.
1882. *Mitra episcopalis*, Tryon, *Man. Conch.* IV, p. 111, pl. xxxii, fig. 1.
1883. *Mitra (Mitra) episcopalis*, Paetel, *Cat. Conchyl.-Samml.*, p. 27.
1884. *Mitra episcopalis*, Fischer, *Man. de Conch.*, p. 611, pl. vii, fig. 13.
1888. *Mitra (Mitra) episcopalis*, Paetel, *Cat. Conchyl.-Samml.* 1, p. 178.
1889. *Mitra episcopalis*, Tenison-Woods, *Proc. Linn. Soc. N. S. Wales*, (2) III, p. 243.
1890. *Mitra episcopalis*, Römer, *Cat. Conchyl.-Samml. Nat. Hist. Mus. Wiesbaden*, p. 39.
1891. *Mitra episcopalis*, Fischer, *Bull. Soc. Autun*, IV, p. 138.
1895. *Mitra (Eumitra) episcopalis*, Melvill and Standen, *Journ. of Conch.* VIII, p. 99.
1896. *Mitra episcopalis*, Shopland, *Journ. Bomb. Nat. Hist. Soc.* X, p. 221.
1898. *Mitra episcopalis*, Melvill and Standen, *Journ. of Conch.* IX, p. 39.
1899. *Mitra episcopalis*, Hedley, *Mem. Austr. Mus.* III (7), pp. 464, 465.
1899. *Mitra episcopalis*, Cossmann, *Ess. Paleoconch. Comp.* III, p. 155.
1901. *Mitra episcopalis*, Vayssièrè, *Journ. de Conchyliol.* XLIX, p. 84.
1902. *Mitra episcopalis*, Shopland, *Proc. Malac. Soc. London*, V, p. 173.
1903. *Mitra episcopalis*, Smith, *Proc. Malac. Soc. London*, V, p. 366.
1903. *Mitra episcopalis*, Smith, *Faun. & Geogr. Mald. and Laccad. Archipelagoes*, II, pp. 591, 604.

1904. *Mitra episcopalis*, Hidalgo, *Cat. Moll. Test. Filipinas*, p. 62.
1906. *Voluta episcopalis*, Sherborn and Sykes, *Rept. of J. F. Bolten's Mus. Bolt.*, p. 136 (No. 1703).
1907. *Mitra mitra*, Hedley, *Proc. Linn. Soc. N. S. Wales*, XXXII, pp. 485, 507.
1908. *Mitra episcopalis*, Nobre, *Bull. Soc. Portug. Sci. Nat. Hist.* 1, p. 210.
1909. *Mitra episcopalis*, Lamy, *Mem. Soc. Zool. France*, XXII, p. 304.
1909. *Mitra mitra*, Hedley, *Rept. Austr. Assoc. Adv. Sci.*, p. 366.
1910. *Mitra mitra*, Smith, *Proc. Malac. Soc. London*, IX, p. 71.
1911. *Mitra episcopalis*, Schepman, *Prosobr. Siboga-Exped. Monogr.* IV, p. 266.
1915. *Mitra episcopalis*, Dall, *An Index to Mus. Bolt.*, p. 37.
1915. *Mitra (Papalaria) episcopalis*, Dall, *A Monogr. Moll. Fauna Orth. Pugnax Zone of Olig. of Tampa, Florida*, pp. 59, 60.
1915. *Mitra episcopalis*, Bartsch, *Smiths. Inst. U. S. Nat. Mus. Bull.* XCI, p. 243.
1916. *Mitra mitra*, Hedley, *Journ. Roy. Soc. Western Australia*, 1, p. 59.
1919. *Mitra (Papalaria) episcopalis*, Cooke, *Proc. Zool. Soc. London*, II, pp. 405, 406, 408.
1919. *Mitra episcopalis*, Iwakawa, *Cat. Jap. Moll. in Nat. Hist. Dept. Tokyo Imp. Mus.*, p. 142.
1921. *Mitra episcopalis*, Hornell, *Mad. Fish. Bull.* XIV, No. 6, p. 132.
1923. *Mitra mitra*, Dautzenberg and Bouge, *Journ. de Conchyliol.* LXVII, pp. 88, 89.
1924. *Mitra (Mitra) episcopalis*, Fulton, *A Cat. of Shells of Rec. Moll.*, p. 21.
1925. *Mitra (Mitra) episcopalis*, Oostingh, *Rept. on a Coll. Rec. Shells from Obi and Halmahera (Moluccas)*, p. 161.
1928. *Mitra episcopalis*, Faustino, *Summary Phil. Mar. and Freshw. Moll.*, p. 278.
1929. *Mitra (Mitra) episcopalis*, Thiele, *Handb. der Syst. Weichtierk.* 1, p. 340, Text-fig. 400 (shell), p. 741.
1929. *Mitra episcopalis*, Dautzenberg, *Faun. des Col. Franc.* III, p. 179.
1931. *Mitra episcopalis*, Kennard, *Salisbury and Woodward, Smiths. Misc. Coll.* LXXXII, No. 17, p. 33.
1933. *Mitra mitra-episcopalis*, Dautzenberg and Bouge, *Journ. de Conchyliol.* LXXVII, p. 177.
1934. *Mitra mitra*?, Hirase, *A Coll. of Jap. Shells*, p. 70, pl. c, fig. 13.
1935. *Mitra (Mitra) episcopalis*, Dautzenberg, *Mém. Mus. Roy. Hist. Nat. Belg. Hors Ser.*, II, Fasc. 17, pp. 44-49, 205.
1937. *Mitra mitra*, Viader, *Maur. Inst. Bull.* 1 (2), p. 19.
1937. *Mitra mitra*, Asano, *Venus*, VII (1), p. 33.
1939. *Mitra mitra*, Allan, *Austr. Mus. Mag.* VII(1), pp. 13, 14, fig. 1 (p. 14—top row).
1941. *Mitra episcopalis*, Burton, *Journ. Bomb. Nat. Hist. Soc.* XLI (3), p. 503.
1943. *Mitra episcopalis*, Roberts, *Wonders of the Sea Shells*, p. 8, pl. xiii, fig. 2.
1949. *Mitra episcopalis*, Platt, *Nat. Geogr. Mag.*, July, p. 68, pl. vii.
1950. *Mitra mitra*, Allan, *Australian Shells*, p. 178, pl. xxv, fig. 11.
1950. *Mitra episcopalis*, Abbott, *Bull. Raffles Mus. Singapore*, No. 22, p. 84.
1951. *Mitra mitra*, Hora, *Proc. Nat. Inst. Sci. Ind.* XVII, No. 6, p. 441.
1951. *Mitra episcopalis*, Hornell, *Indian Molluscs*, p. 28.
1951. *Mitra episcopalis*, Macpherson and Chapple, *Mem. Nat. Mus. Vict. Melbourne*, XVII, p. 133.
1952. *Mitra (Mitra) episcopalis*, Glibert, *Mém. Inst. Roy. Sci. Nat. Belg.* II, No. 121, p. 117.
1952. *Mitra (Mitra) episcopalis*, Glibert, *Mém. Inst. Roy. Sci. Nat. Belg.*, Ser. 2. Fasc. 46. p. 363.

1953. *Mitra episcopalis*, Olsson, Harbison, Fargo and Pilsbry, *Acad. Nat. Sci. Phil. Monogr.* No. 8, p. 189.

1953. *Mitra (Mitra) episcopalis*, Solem, *Field. Zool.* XXXIV, No. 22, p. 224.

Confusion prevails in literature as to the exact nomenclature of the Giant Mitre, *Mitra mitra*. This elegant species was first described by Linnaeus, in 1758, under the name of *Voluta Mitra episcopalis*. Six years later (1764), he changed it to *Voluta Mitra*. But it is quite strange that, again in 1767, he did not even hesitate to revert to his original name *V. M. episcopalis*, which Huddesford and a few others also followed. Many subsequent workers were even inclined towards using the name *V. episcopalis* only. This uncertain state of affairs really added more and more to the confusion and it was not until 1848, when Hermannsen rightly named it *Mitra mitra*. His conclusions appear to have been upheld by several workers, namely, Hedley, Iredale, Dautzenberg and Bouge, Hirase, Viader, Asano, Allan and Hora. This form has been commonly called the "Bishop's Mitre" or "Orange-spotted Mitre" Melvill and Standen as well as Cooke have wrongly placed it under *Eumitra* and *Papalaria* respectively.

This shell-fish appears extremely interesting not only because it is quite typical of the genus, but more so because it is the best known of all Mitres and more extensively distributed throughout the Indo-Pacific. The smallness of its locomotive disc and the ponderous nature of its large, solid and fusiform shell certainly make the animal usually more sluggish in disposition than any other members of the family. This may be the reason why Quoy and Gaimard described it as an "animale apathique" (meaning a creature of limited sensibility, whose activity is necessarily restrained by the over-balancing proportions of its shell-Reeve, 1860, p. 48).

The most striking features which may readily distinguish this mollusc from all other Mitres are :—(i) its large stoutly elongate shell of golden-yellow colour (but it may also appear white in some cases when yellowishness fades away completely either due to too much exposure or long preservation in spirit) tapering gracefully from more ventricose whorls to the apex of the spire (which is acuminate and usually exceeds the aperture in length) ; (ii) surface nicely ornamented with delicate rows of punctured dots and prominent somewhat quadrangular, bright orange-red or scarlet blotches arranged in revolving bands (hence the popular name "Orange-spotted Mitre") ; (iii) distinct denticulations on the outer lip (more at the base) ; (iv) columella furnished with four strong and oblique plaits ; (v) aperture notched in front ; (vi) an exceedingly long proboscis.

The main points of distinction between this very common form and its closest allies, such as, *Mitra papalis* (Linn.) and *M. pontificalis* Lam., are discussed by Allan in her paper cited above. The peculiarities of its radular teeth have been studied by Gray and Cooke.

This animal, says Woodward, emits, when irritated, a purple fluid having a nauseous odour. He further adds that it ranges "from low water to 15 fathoms, more rarely in 15-80 fathoms" Garrett mentions to have found these animals in all the Polynesian islands living inside the reefs on sand or sandy-mud in shallow water. Hedley also collected them in Funafuti lagoon at low water. Allan says : "they burrow in sand when not on the prowl

for food ” Regarding the size of shells in this species, Garrett adds that remarkable variation is found ranging from $2\frac{1}{2}$ to 6 inches in length. Dautzenberg (1907, pp. 177, 340) figures one example from Tahiti which he considers to be a monstrosity of *Mitra episcopalis*.

The food value of molluscs has been realized by men since very early times. The flesh of Bishop's Mitre may be good, but many hold a wrong belief about it as would be evident from Johnston's remark (p. 19) : “ in the East the fish of *Mitra episcopalis* enjoys, probably unjustly, the same reputation of being poisonous as that of the large pale Chiton of West Indies, but you must be guarded against the assertion of those who say that this mollusk wounds them who would touch it with a kind of pointed trunk : this can only be the proboscis, an instrument unfit for the purpose, but of extraordinary length, the animal being able, according to Mr. Stutchbury, to project it to the distance of five inches ”

Hedley's reference to the usefulness of its shell is also quite interesting (1899, p. 465) : “ The shell was formerly employed in the manufacture of native implements by the Funafuti people who called it “mouri ounga” Donovan says : “The inhabitants of the isle of Tanna fix the shells in the handles and use them as hatchets ” He further adds : “ Fine specimens of *Voluta episcopalis* are now held in much esteem, being considered valuable, as well on account of the beauty of the species as its increasing scarcity ” Tryon (pp. 110, 111) has tried to add more to our knowledge as would be known from his remark : “ Among the Bashu group, and more particularly on the island of Ibayat, the natives form very elegant and commodious pipes from different species of shells, the columella and septa of the convolutions being broken down, and a short ebony stem inserted into a hole at the apex of the spire. A pipe of this manufacture, in my possession, is found from the *Mitra papalis* and I have seen others made out of *Mitra episcopalis* and of *Cerithium* and *Terebra* ” But I think that its brilliantly coloured shells may also be used for various ornamental and decorative purposes like those of cowries.

Localities.—Indian Seas—1 ; Sta. 650 : North beach and inshore region of Fehendu Id.—2 (23. iii. 23. ‘ *Investigator* ’) ; Sta. 655 : Reef on North side of Fuladu Id., Goifurfehendu Atoll—1 (10. xii. 24. ‘ *Investigator* ’).

Out of four shells in the collection, one is quite large and the rest small. But all of them correspond to the description of the typical form and closely embrace Swainson's fig. in pl. iv, Kiener's fig. 1, Reeve's fig. 5, Sowerby's fig. 1, Tryon's fig. 1, Kobelt's fig. 1, Küster's fig. 2, Roberts's fig. 2, Platt's fig. 7, Thiele's fig. 400, Allan's fig. 11 and Hirase's fig. 13.

The specimen labelled ‘ Indian Seas ’ which is the largest of all measures 152 mm. in length (*i.e.*, nearly 6 inches) and 38 mm. in diameter, with its spire 84 mm. in length and aperture 68 mm. I have examined more than a dozen shells of this species (including those found in our named dry collection and also in the Invertebrate Galleries of the Indian Museum, Calcutta). The smallest one in the lot (marked ‘ Indian Seas ’) measures 57 mm. in length and 18 mm. in diameter, with its spire 28.5 mm. in length and aperture 28.5 mm.—showing thereby the equality in length between the two (spire and aperture). This condition is only rarely found in this species. But in some cases the aperture may also exceed the spire in length (only in young shells). The number of whorls in the shells is found to

vary from seven to nine. But one peculiarity observed here is that most of the adult shells bear distinct marks of damage on the whorls extending from 4th to 6th only. This evidently shows that they have met with some accidents during their life time. Generally one whorl is found to be affected, but more than one may also be possible. This interesting condition does not appear to have been recorded before in this species. But Reeve (1844) appears to be the first to call attention to such a fatality of fracture only in case of *Mitra isabella* from China and subsequently Theobald (1860) also observed the same at the 6th whorl and near the mouth of its shell.

Distribution.—Linnaeus did not mention any type-locality for *Mitra mitra*. But subsequently it has been found quite extensively distributed throughout the Indo-Pacific, having been recorded from the Gulf of Aden, Mauritius, Madagascar, Amirantes, Seychelles, Reunion, Mozambique, Agalega Is., Chagos, Zanzibar, Querimba, Natal, Durban, Maldives and Laccadives, Ceylon, Madras, Nicobars, Singapore, Java, Flores, Moluccas, Amboina, Banka, Timor, New Guinea, Lucipara-island, Nusa-Laut-island, Nalahia-bay, Ceram, Weigeae and Misool, Larentuka, Pulo Panjang, Poulo-condor, Fiji, Carolines, New Caledonia, Lifu, New Hebrides, Queensland, Western Australia, Darnley Island in Torres Strait, Solomon Islands, Philippines (Cebu, Luzon, Mindanao, Mindoro), Society, Cooks, Viti, Gilberts, Kingsmill, Loyalty, Samoa, Wallis, Paumotus, Funafuti, Tahiti, Raiatea, Tonga, Tuamutu, Hawaii, Guam, Marrianes, Rarotonga, China and Japan. During my tour in Kathiawar, Saurashtra State, in January, 1953, I found two shells of this well-known species preserved with care in the Fisheries Department at Porbander. These are said to have been collected from Lamba on the coast of the Arabian Sea—a new record, indeed. But I failed to find any in the Gulf of Kutch or anywhere in the State (from Port Okha to Bhavnagar).

Genus **Vicimitra** Iredale, 1929.

Genotype. *Mitra solida* Reeve, 1844.

- 1929. *Vicimitra*, Iredale, *Austr. Zoologist, Sydney*, V, Pt. 4, p. 240.
- 1929. *Vicimitra*, Thiele, *Handb. der Syst. Weichtierk.* 1, p. 741.
- 1939. *Vicimitra*, Allan, *Austr. Mus. Mag.* VII (1), pp. 14, 16.
- 1950. *Vicimitra*, Allan, *Australian Shells*, p. 151.
- 1951. *Vicimitra*, Laseron, *Rec. Austr. Mus.* XXII (4), pp. 335-341.

Iredale founded the genus *Vicimitra* for Reeve's *Mitra solida* on the basis of some very remarkable features as demonstrated by Cooke and Peile in the radular teeth of that species. He did not also like to retain the name *solida* and, consequently, tried to substitute it by the new name *prospora*, which Thiele appears to have wrongly spelt as ' *phosphora* ' Later on, other species (*glabra*, *exposita*, *contermina*, *cookii*, *rhodia*, *rosettae* and *australis*), previously relegated to *Mitra*, have also been placed under this new genus.

Characters.—Shell thick, somewhat ovately or elongately-fusiform, with the spire attenuated and sharp and longer than the aperture (though not in all cases) ; whorls many as in *Costellaria*, but they are smooth, polished and marked with regular concentric punctate striae : sutures pronounced ; columella three to six-plaited ; outer lip plain and simple.

V. prospora is the only species in the collection which represents this genus.

Vicimitra prosphora Iredale, 1929.*Type-locality*.—Sydney Harbour, East Australia.

(Plate II, figs. 6, 6a.)

1844. *Mitra solida*, Reeve, *Proc. Zool. Soc. London*, No. CXLII, p. 170.
 1844. *Mitra solida*, Reeve, *Conch. Icon.* II, pl. iii, fig. 18.
 1845. *Mitra solida*, Catlow, *Conchologist's Nomenclator*, p. 303.
 1853. *Mitra solida*, H. & A. Adams, *Gen. Rec. Moll.* 1, p. 169.
 1874. *Mitra solida*, Sowerby, *Thesaurus*, IV, pl. 354, fig. 30.
 1882. *Mitra solida*, Tryon, *Man. Conch.* IV, p. 120, pl. xxxv, fig. 57.
 1883. *Mitra (Mitra) solida*, Paetel, *Cat. Conchyl.-Samml.*, p. 29.
 1888. *Mitra (Mitra) solida*, Paetel, *Cat. Conchyl.-Samml.* 1, p. 187.
 1904. *Mitra solida*, Hidalgo, *Cat. Moll. Test. Filipinas*, p. 68.
 1909. *Mitra solida*, Melvill, *Trans. Linn. Soc. London*, (2) XIII, p. 110.
 1909. *Mitra solida*, Hedley, *Rept. Austr. Assoc. Adv. Sci.*, p. 366.
 1913. *Mitra solida*, Hedley, *Proc. Linn. Soc. N. S. Wales*, XXXVII, p. 313.
 1916. *Mitra solida*, Hedley, *Journ. Roy. Soc. Western Australia*, 1, p. 59.
 1922. *Mitra solida*, Peile, *Proc. Malac. Soc. London*, XV, p. 93, fig. 1 (radular teeth).
 1924. *Mitra (Mitra) solida*, Fulton, *A Cat. of Shells of Rec. Moll.*, p. 22.
 1928. *Mitra solida*, Melvill, *Proc. Malac. Soc. London*, XVIII, p. 108.
 1929. *Vicimitra prosphora*, Iredale, *Austr. Zoologist, Sydney*, V, Pt. 4, pp. 343, 346, 352, pl. xxxviii, fig. 17 (ventral view of the shell).
 1929. *Vicimitra phosphora*, Thiele, *Handb. der Syst. Weichtierk.* 1, p. 741.
 1951. *Mitra (Vicimitra) prosphora*, Laseron, *Rec. Austr. Mus.* XXII (4), pp. 335, 336, 339, 341, fig. 11 (protoconch).

Reeve's *Mitra solida* was described from an unknown locality. But Iredale's new name *prosphora* as a substitute for the same appears to be based on specimens from the Sydney Harbour in East Australia. Melvill while recording *solida* from Bombay remarked: "This is probably the species named *M. chinensis*, Gray, in the 1901 list" I also believe that Melvill and Abercrombie's *M. chinensis* from Bombay may be *solida*, as the examples before me from Bombay and Kathiawar appear quite typical of the same both in regard to form and other characters of their shells.

Characters.—This interesting species is chiefly characterized by its thick, solid, smooth, somewhat elongately-pyriform shell, having numerous whorls which are convex and separated from one another by rather pronounced sutures and marked with narrow widely spaced spiral grooves (as in *rosettae*) crossed near the sutures with fine longitudinal striae. The spire is acuminate. The colour is fulvous bay, but irregularly flaked here and there with white. Besides these, there is also a white band at the upper part of each whorl just beneath the suture. The bodywhorl is contracted below and slightly recurved at the end. There are five columellar plaits. The outer lip is quite plain and simple.

Laseron (p. 341) appears to be the first to describe and figure the protoconch of this species. He has also illustrated with figures the protoconchs of a few more forms of this group and discussed their affinities. An account of its radular teeth is given by Cooke and Pelle in the papers cited.

Localities.—Chowpathy beach, Bombay—1 (Feb., 1948. Sri Raja Gopalaiengar); Sandy beach at Lamba near Porbander, Kathiawar—1 (Jan., 1953. Dr. H. C. Ray).

Though both the shells in the collection are beach worn, they appear to agree more or less with the figure given by Iredale. The specimen from Bombay (fig. 6) is larger, but much worn and bleached and, as such, the colour is completely faded. It measures 37 mm. in length and 12.5 mm. in diameter, with its spire 18.5 mm. in length and aperture 18.5 mm. There are seven whorls and four columellar plaits. It somewhat approaches Swainson's *Mitra melaniana* (= *carbonaria*) in form. There is a distinct mark of damage only on the penultimate whorl. The punctured incised spiral lines are found to be confined to the base of the bodywhorl. The smaller shell is from the Lamba beach (fig. 6a) which measures 27 mm. in length and 11 mm. in diameter, with its spire 11 mm. in length (being slightly broken at the apex) and aperture 15.5 mm. It has only four whorls and four columellar plaits. It is somewhat shining and bears a distinct white band on each whorl. Small irregular brownish spots are also found just above the white band.

Distribution.—*Vicimitra prospora* Iredale has so far been recorded from Bombay, Karachi, Persian Gulf, Amirantes (at fathoms 34), South Africa, Sydney Harbour, Twofold Bay, Queensland, Swan River and Samar (Philippines).

Genus **Strigatella** Swainson, 1840.

Neotype. *Mitra litterata* Lamarck, 1811.

1840. *Strigatella*, Swainson, *A Treatise on Malacology*, pp. 130, 131, 310.
 1847. *Strigatella*, Gray, *Proc. Zool. Soc. London*, Pt. XV, p. 141.
 1848. *Strigatella*, Hermannsen, *Index Gen. Malacoz.* II, p. 508.
 1852. *Strigatella*, Mörch, *Cat. Conchyl. Yoldi*, 1, p. 83.
 1853. *Strigatella*, H. & A. Adams, *Gen. Rec. Moll.* 1, p. 17.
 1859. *Strigatella*, Chenu, *Man. de Conch.* 1, p. 194.
 1868. *Strigatella*, Troschel, *Das Gebiss der Schnecken*, II, pp. 67, 102.
 1869. *Strigatella*, von Frauenfeld, *Beiträge zur Fauna der Nicobaren*, III, p. 860.
 1869. *Strigatella*, MacDonald, *Ann. & Mag. Nat. Hist.* (4) III, p. 116.
 1871. *Strigatella*, M'Andrew, *Ann. & Mag. Nat. Hist.* (4) VI, p. 437.
 1874. *Strigatella*, Dunker, *Cat. Mus. Godeffroy*, V, p. 118.
 1878. *Strigatella*, Kobelt, *Illustr. Conchyl.* 1, p. 66.
 1880. *Strigatella*, Garrett, *Journ. of Conch.* III, pp. 32, 73.
 1882. *Strigatella*, Tryon, *Man. Conch.* IV, pp. 108, 153.
 1883. *Strigatella*, Paetel, *Cat. Conchyl.-Samml.*, p. 26.
 1884. *Strigatella*, Fischer, *Man. de Conch.*, p. 612.
 1888. *Strigatella*, Paetel, *Cat. Conchyl.-Samml.* 1, p. 172.
 1889. *Strigatella*, Tate, *Trans. and Proc. Roy. Soc. South Australia*, XI, p. 135.
 1890. *Strigatella*, Römer, *Cat. Conchyl.-Samml. Nat. Hist. Mus. Wiesbaden*, p. 40.
 1899. *Strigatella*, Cossman, *Ess. Paleoconch. Comp.* III, pp. 153, 158.
 1911. *Strigatella*, Schepman, *Prosobr. Siboga-Exped. Monogr.* IV, pp. 266, 277, 278.
 1915. *Strigatella*, Dall, *A Monogr. Moll. Fauna of Orth. Pugnax Zone of Olig. of Tampa, Florida*, p. 61.

1919. *Strigatella*, Cooke, *Proc. Zool. Soc. London*, II, pp. 405, 410, 420.
 1919. *Strigatella*, Iwakawa, *Cat. Jap. Moll. Nat. Hist. Dept. Tokyo Imp. Mus.*, p. 144.
 1924. *Strigatella*, Fulton, *A Cat. of Shells of Rec. Moll.*, p. 20.
 1929. *Strigatella*, Thiele, *Handb. der Syst. Weichtierk.* 1, p. 340.
 1929. *Strigatella*, Dautzenberg, *Faun. des Col. Franc.* III, p. 185.
 1929. *Strigatella*, Iredale, *Mem. Queens. Mus.* IX, p. 287.
 1935. *Strigatella*, Dautzenberg, *Mém. Mus. Roy. Hist. Nat. Belg. Hors Ser.*, II, *Fasc.* 17, pp. 100, 206.
 1936. *Strigatella*, Peile, *Proc. Malac. Soc. London*, XXII, p. 142.
 1938. *Strigatella*, Adam and Leloup, *Mém. Mus. Roy. Hist. Nat. Belg. Hors Ser.*, II, *Fasc.* 19, pp. 191, 205.
 1939. *Strigatella*, Allan, *Austr. Mus. Mag.* VII (1), p. 15.
 1950. *Strigatella*, Allan, *Australian Shells*, p. 180.
 1953. *Strigatella*, Solem, *Field. Zool.* XXXIV, No. 22, p. 225.

The genus *Strigatella* was instituted by Swainson, in 1840, with Lamarck's *Mitra zebra* as its type-species. But as the latter proved identical with Linnaeus's *Voluta paupercula* Chenu and Fischer selected Lamarck's *Mitra litterata* as the neotype of that genus and Cossmann also upheld the same conclusion. The suggestion given by some authors to subordinate *Strigatella* to *Mitra* proper is untenable, as the shell-characters are sufficiently characteristic for its treatment as a separate genus.

Characters.—This genus is characterized by the Columbella-like appearance of its shell having short and acuminate spire (rarely obtuse) and the surface marked with distinct transverse striations and beautiful longitudinal white streaks or strigations. The aperture is narrow, smooth and shining (including the lips) and usually exceeds the spire in length. The inner lip is marked with a callosity at the hinder part and bears four to six plaits, while the outer lip is usually thickened, slightly elevated at the upper part, often reflected in the middle and may be crenated at the margin.

Allan (1950, p. 181) gives an interesting note relating to the ecology of the animals of this group: "All these smallish dumpy shells of the genus *Strigatella* inhabit crevices of coral boulders and undersurface of stones, in contrast to the sand and sandy-mud living habits of the more elongate, ribbed Mitres". Garrett also states that they are reef-dwellers. A good account of their radular teeth is furnished by Troschel (pl. vi), Cooke and Schepman in the papers cited.

There are eight species in the collection which belong to this genus.

***Strigatella litterata* (Lamarck, 1811).**

Type-locality.—Indian Ocean.

Plate II, figs. 7, 7a.)

1811. *Mitra litterata*, Lamarck, *Ann. du Mus.* XVII, p. 320.
 1822. *Mitra litterata*, Lamarck, *Anim. sans Verteb.* VII, p. 321.
 1822. *Columbella bizonalis*, Lamarck, *Anim. sans Verteb.* VII, p. 294.
 1824. *Mitra litterata*, Dubois, *Lamarck's Arrang. of Test.*, p. 272.

1824. *Mitra litterata*, Blainville, *Dict. des Sci. Nat.* XXXI, p. 488.
1838. *Mitra litterata*, Kiener, *Icon. Coq. Viv.* IV, pp. 50, 51, pl. xvi, fig. 50.
1839. *Mitra litterata*, Küster, in *Martini and Chemnitz's Syst. Conch.-Cab.* V, *Abth.* 2, p. 84, pl. xv, fig. 9.
1839. *Mitra litterata*, Anton, *Verz. Conchyl.*, p. 69.
1840. *Mitra litterata*, Dufo, *Ann. Sci. Nat.* (2) XIV, p. 182.
1844. *Mitra litterata*, Reeve, *Conch. Icon.* II, pl. xx, fig. 153.
1844. *Columbella bizonalis*, Lamarck, *Anim. sans Verteb.* (ed. Deshayes), X, p. 269.
1844. *Mitra litterata*, Lamarck, *Anim. sans Verteb.* (ed. Deshayes), X, p. 339.
1845. *Mitra litterata*, Catlow, *Conchologist's Nomenclator*, p. 299.
1848. *Mitra litterata*, Krauss, *Die Sudafrik. Moll.*, p. 124.
1850. *Mitra litterata*, Jay, *Cat. of Shells*, p. 379.
1852. *Strigatella litterata*, Mörch, *Cat. Conchyl. Yoldi*, 1, p. 83.
1853. *Strigatella litterata*, H. & A. Adams, *Gen. Rec. Moll.* 1, p. 174.
1859. *Mitra (Strigatella) litterata*, Chenu, *Man. de Conch.* 1, pp. 194, 195, fig. 1000.
1860. *Mitra litterata*, Reeve, *Elements of Conchology*, 1, p. 50.
1863. *Mitra litterata*, Deshayes, *Cat. Moll. Reunion*, p. 133.
1866. *Mitra litterata*, Dunker, *Cat. Mus. Godeffroy*, III, p. 33.
1867. *Mitra litterata*, Mitchell, *Cat. Moll. Govt. Central Mus. Madras*, p. 11.
1869. *Mitra litterata*, Issel, *Mal. Mar. Rosso, Pisa*, p. 120.
1869. *Strigatella litterata*, Dunker, *Cat. Mus. Godeffroy*, IV, p. 83.
1872. *Strigatella litterata*, Garrett, *Proc. Zool. Soc. London*, p. 840.
1874. *Strigatella litterata*, Jickeli, *Jahrb. Deuts. Malak. Gesell.* 1, p. 31.
1874. *Mitra litterata*, Sowerby, *Thesaurus*, IV, p. 18, pl. cccclxxii, fig. 436.
1878. *Strigatella litterata*, Kobelt, *Illustr. Conchyl.* 1, p. 66, pl. xxiv, fig. 4.
1880. *Strigatella litterata*, Garrett, *Journ. of Conch.* III, p. 33.
1880. *Strigatella litterata*, von Martens, in *Möbius's Beiträge zur Meeresfauna der Insel Mauritius und der Seychellen*, p. 257.
1882. *Mitra (Strigatella) litterata*, Tryon, *Man. Conch.* IV, pp. 155, 156, pl. xlvi, fig. 338.
1883. *Mitra (Strigatella) litterata*, Pætel, *Cat. Conchyl.-Samml.*, p. 28.
1884. *Mitra (Strigatella) litterata*, Fischer, *Man. de Conch.*, p. 612.
1886. *Mitra litterata*, Cooke, *Ann. & Mag. Nat. Hist.* (5) XVIII, p. 384.
1888. *Mitra (Strigatella) litterata*, Paetel, *Cat. Conchyl.-Samml.* 1, p. 181.
1889. *Mitra litterata*, Hedley, *Moll. of Funafuti*, pp. 467, 525.
1891. *Mitra litterata*, Smith, *Proc. Zool. Soc. London*, p. 410.
1892. *Mitra (Strigatella) litterata*, Boettger, *Nachricht. d. d. Malak. Gesell.* XXIV, p. 163.
1894. *Strigatella litterata*, Horst and Schepman, *Cat. Sist. Moll. Mus. Nat. Hist. Pays-Bas*, p. 35.
1895. *Mitra (Strigatella) litterata*, Melvill and Standen, *Journ. of Conch.* VIII, p. 101.
1895. *Strigatella litterata*, Thurston, *Bull. Mad. Govt. Mus.* 1, p. 123.
1896. *Mitra litterata*, Shopland, *Journ. Bomb. Nat. Hist. Soc.* X, p. 221.
1897. *Mitra litterata*, Sowerby, *Marine Shells of S. Africa*, p. 8.
1898. *Mitra (Mitreola) litterata*, Melvill and Standen, *Journ. of Conch.* IX, p. 39.
1899. *Mitra (Strigatella) litterata*, Melvill and Sykes, *Proc. Malac. Soc. London*, III, p. 224.
1899. *Mitra litterata*, Hedley, *Mem. Austr. Mus.* III (7), p. 467.
1899. *Strigatella litterata*, Cossmann, *Ess. Paleoconch. Comp.* III, pp. 153, 158.
1900. *Mitra (Strigatella) litterata*, Smith, *Proc. Zool. Soc. London*, p. 118.
1901. *Mitra (Strigatella) litterata*, Melvill and Standen, *Proc. Zool. Soc. London*, II, p. 420.

1902. *Mitra litterata*, Shopland, *Proc. Malac. Soc. London*, V, p. 173.
1903. *Mitra (Strigatella) litterata*, Sturany, *Denkschr. d. Kais. Akad. d. Wiss. Math. Naturw. Classe*, LXXIII, pp. 38, 64.
1903. *Mitra (Strigatella) litterata*, Smith, *Faun. & Geogr. Mald. and Laccad. Archipelagoes*, II, pp. 591, 604.
1904. *Mitra litterata*, Hidalgo, *Cat. Moll. Test. Filipinas*, p. 63.
1907. *Mitra (Strigatella) litterata*, Couturier, *Journ. de Conchyliol.* LV, pp. 132, 144, 145.
1909. *Mitra (Strigatella) litterata*, Melvill, *Trans. Linn. Soc. London*, (2) XIII, p. 111.
1911. *Mitra litterata*, Smith, *Proc. Malac. Soc. London*, IX, p. 315.
1911. *Strigatella litterata*, Schepman, *Prosobr. Siboga-Exped. Monogr.* IV, pp. 200, 279.
1915. *Mitra litterata*, Bartsch, *Smiths. Inst. U. S. Nat. Mus. Bull.* XCI, p. 243.
1919. *Mitra (Strigatella) litterata*, Cooke, *Proc. Zool. Soc. London*, II, pp. 410, 411, Text-fig. (radular teeth).
1919. *Mitra (Strigatella) litterata*, Iwakawa, *Cat. Jap. Moll. Nat. Hist. Dept. Tokyo Imp. Mus.*, p. 144.
1923. *Mitra (Strigatella) litterata*, Dautzenberg and Bouge, *Journ. de Conchyliol.* LXVII, pp. 140, 144.
1924. *Mitra (Strigatella) litterata*, Fulton, *A Cat. of Shells of Rec. Moll.*, p. 21.
1928. *Mitra litterata*, Faustino, *Summary Phil. Mar. and Freshw. Moll.*, p. 284.
1929. *Strigatella litterata*, Iredale, *Mem. Queens. Mus.* IX, p. 287.
1931. *Strigatella litterata*, Oostingh, *Archiv f. Molluskknk.* LXIII, p. 21.
1933. *Mitra (Strigatella) litterata*, Dautzenberg and Bouge, *Journ. de Conchyliol.* LXXVII, p. 174.
1934. *Mitra (Strigatella) litterata*, Tomlin, *Bull. Raffles Mus. Singapore*, IX, p. 78.
1934. *Mitra (Strigatella) litterata*, Hirase, *A Coll. of Jap. Shells*, p. 71, pl. ci, fig. 9.
1935. *Strigatella litterata*, Dautzenberg, *Mèm. Mus. Roy. Hist. Nat. Belg. Hors Ser.*, II, Fasc. 17, pp. 100, 103-106, 206.
1936. *Strigatella litterata*, Peile, *Proc. Malac. Soc. London*, XXII, p. 152.
1937. *Strigatella litterata*, Asano, *Venus*, VII (1), p. 33.
1937. *Mitra litterata*, Viader, *Maur. Inst. Bull.* 1 (2), p. 21.
1938. *Mitra (Strigatella) litterata*, Adam and Leloup, *Mèm. Mus. Roy. Hist. Nat. Belg. Hors Ser.*, II, Fasc. 19, pp. 191, 205.
1939. *Strigatella litterata*, Allan, *Austr. Mus. Mag.* VII (1), p. 15, fig. 4 (top row).
1950. *Strigatella litterata*, Allan, *Australian Shells*, p. 180.
1953. *Mitra (Strigatella) litterata*, Tokioka, *Publ. Seto Mar. Biol. Lab.* III (2), p. 131.

Lamarck's *Mitra litterata* or "Lettered Mitre", as it has been commonly called, was based on specimens from the Indian Ocean, but without any mention of the exact locality. It has been wrongly spelt as 'litterata' by some authors (Reeve, Dubois, Catlow, Smith, von Martens, Garrett, Allan, Mitchell, Sowerby, Shopland). Lamarck's *Columbella bizonalis* is considered by Reeve, Deshayes, Jay, Tryon and Dautzenberg to be a synonym of this species. Melvill and Standen (1895) consider Reeve's *Mitra maculosa* (pl. xxii, fig. 175, 1844) as identical with *litterata*, while Pætel, Dautzenberg, Dautzenberg and Bouge as a variety of the latter. But I agree with Tryon (p. 155) who states: "Typically it is distinct enough from *M. litterata*"

Characters.—This form is remarkable for the irregular waved longitudinal chocolate-brown markings on the surface of its stoutly-ovate, thick, solid, smooth, somewhat ventricose shell. These look somewhat-like rude letters and, hence, the species is commonly

called " Lettered Mitre " But the size, colouration and markings of the shell appear to vary considerably. There are fine punctured transverse striations on the surface. The spire is short but acuminate, and usually shorter than the aperture. The apex is mostly eroded in the adult shells and in some cases the erosion may proceed to such a great extent as to reduce the number of whorls to two only. The colour of the shell, as stated by some authors, may be yellowish or whitish. But I am rather of opinion that the original yellow colour when fades away completely either due to exposure or long preservation in spirit or otherwise the shell may appear white. Smith states that in the two shells obtained from Aden he found rich brown predominating over white. The character of the outer lip appears to vary with age, *i.e.*, in the young condition it is thin, simple and uniformly curved throughout (fig. 7a), but as the growth proceeds it gradually becomes thickened, peculiarly contracted in the middle (some times with a distinct tooth-like projection), slightly angular below and somewhat raised at the upper part. So, a thickened outer lip of this character certainly gives a clear indication of the adult age (fig. 7). The columella bears four distinct plaits.

A reference to the radular teeth of this species is made by Cooke and Peile in the paper cited. The former shows the close affinity of *litterata* with *Strigatella lactuosa* (A. Adams) from Durban in the character of its radular teeth. Of all, the figures given by Reeve, Chenu and Deshayes (Ency. Meth.) appear quite typical of *litterata*. Garrett (1880) mentions to have found plenty of animals of this well-known species lurking under dead corals in holes and crevices on the outer reefs, Polynesian Islands.

Localities—Indian Seas—2; Andamans—2; Sta. 635: East of Lagoons, Heratera Island—2 (3.ii.23. 'Investigator'); Sta. 640: Reef flat in Bay between Huludu and Heratera Island—1 (6.ii.23. 'Investigator'); Sta. 648: North and wend of Fehendu Id., Horsburgh Atoll—(21.x.23. 'Investigator'); Sta. 655: Reef on north side of Fuladu Island, Goifurfhendu Atoll—3 (10.xii.23. 'Investigator').

Besides these, there are other specimens also in our named dry collection bearing the locality-labels Mauritius, Ceylon, Arakan, Andamans, Indian Seas, Singapore, Kingsmill, and representing different stages of growth of the species concerned. The shells may be large or small, but to decide whether they are young or old the characters of the outer lip as stated above, invariably provide the best clue, *i.e.*, a shell may appear large, but for this one should not think that it is adult unless the labial features prove it to be so. Out of the two shells, one (fig. 7), though appearing small, is adult with thick and peculiarly contracted outer lip, while the other (fig. 7a), though large, is certainly young with thin and simple outer lip. The former measures 15.5 mm. in length and 8.5 mm. in diameter, with its spire 5.5 in length and aperture 10 mm. But the largest adult shell in our named collection is from Mauritius measuring 27.5 mm. in length and 15.5 mm. in diameter, with its spire 10.5 mm. in length and aperture 7 mm.

Distribution.—*Strigatella litterata* (Lamarck) is a very common and greatly variable species and, according to Melvill and Sykes (1899), " very widely distributed throughout the Eastern Tropics " Dautzenberg furnished a detailed list of its distribution (1935), but he seems to have omitted certain very important localities as recorded by Smith

(Kolumadulu Atoll, Goidu Island, Hulule Island and Minikoi), by Thurston (Pamban) and by Iredale (Queensland). Subsequently Allan has also reported it from Australia, Asano from Oreai Island in Carolines, Adam and Leloup from Pœlœ Babi in Arœ Island, Netherland East Indies, and Tokioka from the Tokara Islands in Japan. The localities mentioned above (Arakan, Heratera Id., Fehendu Id. and Singapore) are of special interest.

Strigatella columbellaeformis (Kiener, 1837).

Type-locality.—Madagascar.

(Plate II, fig. 8.)

1837. *Mitra columbelliformis*, Kiener, *Icon. Coq. Viv.* IV, p. 47, pl. xv, fig. 46.
 1840. *Mitra columbelliformis*, Küster, in *Martini and Chemnitz's Syst. Conch.-Cab.* V, *Abth.* 2, p. 122, pl. xviii, figs. 4, 5.
 1844. *Mitra columbelliformis*, Lamarck, *Anim. sans Verteb.* (ed. Deshayes), X, p. 351.
 1844. *Mitra columbellaeformis*, Reeve, *Conch. Icon.* II, pl. xviii, fig. 138.
 1845. *Mitra columbellaeformis*, Catlow, *Conchologist's Nomenclator*, p. 296.
 1850. *Mitra columbellaeformis*, Jay, *Cat. of Shells*, p. 377.
 1852. *Strigatella columbellaeformis*, Mörch, *Cat. Conchyl. Yoldi*, 1, p. 83.
 1853. *Strigatella columbellaeformis*, H. & A. Adams, *Gen. Rec. Moll.* 1, p. 174.
 1860. *Mitra columbellaeformis*, Reeve, *Elements of Conchology*, 1, p. 49.
 1868. *Mitra columbellaeformis*, Pease, *Amer. Journ. Conch.* IV, p. 120.
 1869. *Strigatella columbellaeformis*, Dunker, *Cat. Mus. Godeffroy*, IV, p. 83.
 1872. *Mitra columbellaeformis*, von Martens and Langkavel, *Donum Bismarck.*, p. 16.
 1872. *Mitra columbellaeformis*, Garrett, *Proc. Zool. Soc. London*, p. 840.
 1874. *Strigatella columbellaeformis*, Dunker, *Cat. Mus. Godeffroy*, V, p. 118.
 1874. *Mitra columbellaeformis*, Sowerby, *Thesaurus*, IV, p. 18, pl. xv, figs. 255, 256.
 1878. *Strigatella columbellaeformis*, Kobelt, *Illustr. Conchyl.* 1, p. 66, pl. xxi, fig. 7.
 1880. *Strigatella columbellaeformis*, von Martens, in *Möbius's Beiträge zur Meeresfauna der Insel Mauritius und der Seychellen*, p. 256.
 1880. *Strigatella columbellaeformis*, Garrett, *Journ. of Conch.* III, p. 33.
 1883. *Mitra (Strigatella) columbelliformis*, Pætel, *Cat. Conchyl.-Samml.*, p. 27.
 1887. *Strigatella columbellaeformis*, von Martens, *Linn. Soc. Journ. Zool.* XXI, p. 184.
 1888. *Mitra (Strigatella) columbellaeformis*, Pætel, *Cat. Conchyl.-Samml.* 1, p. 175.
 1899. *Strigatella columbellaeformis*, Hedley, *Mem. Austr. Mus.* III (7), p. 467.
 1908. *Strigatella columbellaeformis*, Horst and Schepman, *Cat. Sist. Moll. Mus. Hist. Nat. Pays-Bas*, p. 85.
 1909. *Mitra (Strigatella) columbelliformis*, Melvill, *Trans. Linn. Soc. London, Ser. 2, Zool.* XIII, p. 111.
 1919. *Strigatella columbellaeformis*, Cooke, *Proc. Zool. Soc. London*, II, p. 410.
 1923. *Mitra (Strigatella) columbellaeformis*, Dautzenberg, *Journ. de Conchyliol.* LXVIII, p. 32.
 1924. *Mitra (Strigatella) columbellaeformis*, Fulton, *A Cat. of Shells of Rec. Moll.*, p. 20.
 1929. *Mitra (Strigatella) columbellaeformis*, Dautzenberg, *Faun. des Col. Franc.* III, p. 185.
 1933. *Mitra (Strigatella) columbellaeformis*, Dautzenberg and Bouge, *Journ. de Conchyliol.* LXXVII, p. 160.
 1935. *Strigatella columbellaeformis*, Dautzenberg, *Mém. Mus. Roy. Hist. Nat. Belg. Hors Ser.*, II, *Fasc.* 17, pp. 102, 103, 206.

1937. *Mitra columbellæformis*, Viader, *Maur. Inst. Bull.* I (2), p. 19.

1950. *Mitra (Strigatella) columbelliformis*, Abbott, *Bull. Raffles Mus. Singapore*, No. 22, p. 84.

The specific name *columbellæformis* possibly owes its origin to the Columbella-like appearance of its shell. Kiener's name *columbelliformis* was slightly amended to *columbellæformis* by Reeve, but, notwithstanding this, some authors (Pætel, Melvill, Abbott) have adopted the original spelling. Tryon (1882, p. 154) made a vain attempt to show that *Mitra columbellæformis* is the adult or aged state of *M. limbifera* Lam. Melvill, on the other hand, remarked in connection with the record of *columbellæformis* from the Cætivy Id., Indian Ocean: "An intermediate, between *acuminata* Sw., and *columbelliformis* occurred. Both may be extremes of one variable form" This idea is hardly justified, as the two forms are quite distinct. Some authors are inclined to treat Gray's *Mitra minuta* (1839) as probably a synonym of *columbellæformis*, but this has not been confirmed so far.

Characters.—*Columbellæformis* has characteristically a thick, solid, ovately-turbinated Columbella-like shell, with its spire short and acute but always much shorter than the aperture itself, and the surface transversely impressly regularly striated throughout—the impressed lines appearing minutely punctured. The colour varies from dark-brown to olive-brown, with distinct white spots scattered here and there. But one peculiarity observed here is that the whorls may be white or pale yellow round the upper part and olive-brown below. The outer lip has a well-defined notch at the upper part (where it is much elevated, especially in the adult or aged shell) which is followed by a distinct thickened tooth-like projection — a feature somewhat recalling that of *Mitra decurtata* Reeve; the lower part may be crenated throughout in the adult. The columella which is straight and six-plaited may extend downwards slightly beyond the outer lip as in *Strigatella acuminata* (Swainson). This species also appears to resemble Swainson's *Mitra coarctata* (figured by Reeve in pl. xix, No. 145) in the general appearance of its shell.

Cooke has studied the peculiarities of its radular teeth, while Garrett has furnished interesting notes on the ecology and other characters of the animal.

Locality.—Sta. 655: Reef on north side of Fuladu Island, Goifurfehendu Atoll—1 (10.xii.23. 'Investigator').

The single specimen in the collection appears to correspond to the description of the typical form, but embraces more closely Reeve's fig. 138. It measures 30 mm. in length (the apex being slightly eroded) and 14 mm. in diameter, with the spire 11.5 mm. in length and aperture 17 mm. The outer lip lacks entirely in crenations, while the inner lip bears only five plaits—both these conditions may possibly be due to its young age. There are six whorls in all.

Distribution.—*Strigatella columbellæformis* (Kiener) is a rare species which was originally known from Madagascar. But subsequently its range has been known to extend in the King Island Bay, Coetivy I., Pulo Panjang, Upolu, Philippines, Rotuma, Gilberts, Cooks, Paumotus, Society, Tuamutu, Tahiti and Raiatea. While recording *Mitra limbifera* Lam. from Funafuti lagoon Hedley says (p. 467): "Garrett (1880, pp. 5, 33) records this as *S. columbellæformis*, Kiener, from the Gilberts, Cook's, Society and Paumotus" But this remark does not appear to be correct

Strigatella acuminata (Swainson, 1832).

(Plate II, figs. 9, 9a.)

1832. *Mitra acuminata*, Swainson, *Zool. Illustr.* (2) III, pl. 128, fig. 3.
1833. *Mitra lutea*, Quoy and Gaimard, *Voy. "Astrclabe"*, *Moll.* II, p. 650, pl. lv, figs. 7-9.
1838. *Mitra lutea*, Kiener, *Icon. Coq. Viv.* IV, p. 51, pl. xv, fig. 47.
1839. *Mitra lutea*, Anton, *Verz. Conchyl.*, p. 69.
1839. *Mitra lutea*, Kuster, in *Martini and Chemnitz's Syst. Conch.*—*Cab.* V, *Abth.* 2, p. 79.
1840. *Mitra (Strigatella) acuminata*, Swainson, *A Treatise on Malacology*, p. 319.
1844. *Mitra acuminata*, Reeve, *Conch. Icon.* II, pl. xx, fig. 158.
1844. *Mitra lutea*, Lamarck, *Anim. sans Verteb.* (ed. Deshayes), X, p. 351.
1845. *Mitra acuminata*, Catlow, *Conchologist's Nomenclator*, p. 294.
1850. *Mitra acuminata*, Jay, *Cat. of Shells*, p. 376.
1853. *Strigatella lutea* and *Str. (Mitreola) acuminata*, H. & A. Adams, *Gen. Rec. Moll.* 1, p. 174.
1860. *Mitra acuminata*, Reeve, *Elements of Conchology*, 1, p. 49.
1863. *Mitra acuminata*, Deshayes, *Cat. Moll. Reunion*, p. 133.
1867. *Mitra acuminata*, Mitchell, *Cat. Moll. Coll. Govt. Central Mus. Madras*, p. 11.
1869. *Strigatella acuminata*, Dunker, *Cat. Mus. Godeffroy*, IV, p. 83.
1871. *Mitra acuminata*, von Martens and Langkavel, *Donum Bismarck.*, pp. 13, 14.
1872. *Mitra acuminata*, Garrett, *Proc. Zool. Soc. London*, p. 840.
1874. *Mitra acuminata*, Sowerby, *Thesaurus*, IV, p. 18, pl. viii (359), figs. 88, 89.
1874. *Strigatella acuminata*, Dunker, *Cat. Mus. Godeffroy*, V, p. 118.
1877. *Mitra acuminata*, Liénard, *Cat. Moll. Maurice*, p. 16.
1878. *Strigatella acuminata*, Kobelt, *Illustr. Conchyl.* 1, p. 67.
1880. *Strigatella acuminata*, von Martens, in *Möbius's Beiträge zur Meeresfauna der Insel Mauritius und der Seychellen*, p. 257.
1880. *Strigatella acuminata*, Garrett, *Journ. of Conch.* III, p. 32.
1882. *Mitra (Strigatella) acuminata*, Tryon, *Man. Conch.* IV, p. 153, pl. xlv, fig. 312.
1883. *Mitra (Mitreola) acuminata*, Paetel, *Cat. Conchyl.*—*Samml.*, p. 26.
1888. *Mitra (Strigatella) acuminata*, Paetel, *Cat. Conchyl.*—*Samml.* 1, p. 172.
1896. *Mitra (Strigatella) acuminata*, Casto de Elera, *Cat. Sist. Filipinas*, p. 99.
1899. *Mitra acuminata*, Hedley, *Mem. Austr. Mus.* III (7), pp. 446, 525.
1903. *Mitra (Strigatella) acuminata*, Smith, *Faun. & Geogr. Mald. and Laccad. Archipelagoes*, II, pp. 591, 604.
1904. *Mitra acuminata*, Hidalgo, *Cat. Moll. Test. Filipinas*, p. 59.
1906. *Mitra lutea*, Sherborn and Sykes, *Rept. of Bolten's "Mus. Bolt."*, p. 136 (No. 1712).
1907. *Mitra (Strigatella) acuminata* and *M. (Str.) lutea*, Couturier, *Journ. de Conchyliol.* LV, pp. 132, 133.
1908. *Strigatella acuminata*, Horst and Schepman, *Cat. Sist. Moll. Mus. Hist. Nat. Pays-Bas*, p. 84.
1909. *Mitra (Strigatella) acuminata*, Melvill, *Trans. Linn. Soc. London, Ser. 2, Zool.* XIII, pp. 72, 110, 111.
1911. *Strigatella acuminata*, Schepman, *Prosobr. Siboga-Exped. Monogr.* IV, p. 277.
1915. *Mitra lutea*, Dall, *An Index to Mus. Bolt.*, p. 37.
1919. *Strigatella acuminata*, Cooke, *Proc. Zool. Soc. London*, II, p. 410.
1923. *Mitra (Strigatella) acuminata*, Dautzenberg and Bouge, *Journ. de Conchyliol.* LXVII, pp. 140, 141.

1924. *Mitra (Strigatella) acuminata*, Fulton, *A Cat. of Shells of Rec. Moll.*, p. 20.
 1928. *Mitra acuminata*, Faustino, *Summary Phil. Mar. and Freshw. Moll.*, p. 275.
 1933. *Mitra (Strigatella) acuminata*, Dautzenberg and Bouge, *Journ. de Conchyliol.* LXXVII, p. 152.
 1935. *Strigatella lutea*, Dautzenberg, *Mém. Mus. Roy. Hist. Nat. Belg. Hors Ser.*, II, Fasc.17, pp. 107-109, 206.
 1936. *Strigatella acuminata*, Winckworth, *Proc. Malac. Soc. London*, XXII, p. 20.
 1937. *Mitra acuminata*, Viader, *Maur. Inst. Bull.* 1 (2), pp. 17, 20.
 1937. *Strigatella acuminata*, Asano, *Venus*, VII (1), p. 33.

In view of the fact that Swainson described *Mitra acuminata* earlier than Quoy and Gaimard's *M. lutea* and as both are proved identical, the retention of the name *acuminata* for the species in preference to *lutea* appears reasonable, though some authors (Kiener, Küster, Anton, Dall, Sherborn and Sykes, Dautzenberg) are inclined to do the reverse. Moreover, the attempt made by H. and A. Adams and Couturier to treat them both as specifically distinct appears erroneous.

Swainson's *acuminata* is sometimes confounded with Gmelin's *acuminata*. Winckworth considered them both as specifically distinct and rightly placed the former into the genus *Strigatella*, but his relegation of the latter to *Vexillum* rather than to *Costellaria* does not appear to be correct. Hanley (*op. cit.*, p. 103) and Gravely (*op. cit.*, p. 100) have rightly pointed out that Reeve's *Mitra crebrilirata* is a synonym of Gmelin's *acuminata*. Küster's reference to *acuminata* Swainson may be correct, but unfortunately his fig. 16 in pl. xiv meant for the same appears to represent an entirely different form.

Characters.—This species has a nice-looking, smooth, solid and ovately-oblong shell of yellowish colour, marked with one or two (rarely more) transverse bands of lighter hue in the middle of the bodywhorl. But the most important characters are (i) its sharply-acuminated spire (hence the popular name 'Acuminated Mitre') which is attenuated, slightly concave in outline and finely transversely striated—the striations sometimes extending even to the bodywhorl (in the young shell the spire appearing quite delicate and sharp—fig. 9*a*); (ii) thickened outer lip (fig. 9) which is gibbous near the top and slightly contracted in the middle (though in the young quite thin and simple); (iii) straight and more descending columella or inner lip somewhat-like that of *Strigatella columbellaeformis*, which bears only four plaits; (iv) inside of the aperture (including the lips) quite shining as in *Str. litterata*. In a perfect young shell of this species available in our named dry collection with the locality-mark 'Mauritius' I have found eight whorls (fig. 9*a*). But the number may be reduced in the adult, if the apex is eroded or broken.

For the interesting radular features of this species reference may be made to Cooke's paper cited above, while for the ecology and other important characters of the animal Garrett's paper may be consulted.

Locality.—Sta. 655 : Reef on north side of Fuladu Island, Goifurfehendu Atoll—2 (10.xii.23. 'Investigator').

Both the specimens in the collection are more or less of the same size. But the shell figured here (No. 9) measures 26 mm. in length and 10 mm. in diameter, with its spire 13 mm. in length and aperture 12.5 mm.; it has only six whorls. The lighter yellowish band on

the bodywhorl is found to be only one in either of the specimens, but the transversely striated grooves (especially on the bodywhorl) appearing quite inconspicuous or obsolete in both. White encrustations occur here and there on the surface (as shown in the figure) which spoil the beauty of the shell. In other respects the specimens appear quite typical. The largest example in our named dry collection from Mauritius measures 30 mm. in length and 12 mm. in diameter, with the spire 14 mm. in length and aperture 15 mm., while the smallest one from the same locality figured here (No. 9a) is only 19.5 mm. in length and 7 mm. in diameter, with its spire 9 mm. in length and aperture 10 mm. The latter has eight whorls as already stated above, while the former only seven.

Distribution.—*Strigatella acuminata* (Swainson) was originally described from an unknown habitat. But subsequently it has been recorded from Mauritius, Reunion, Ceylon, Nicobars, Coetivy I., Malay Archipelago, Black River and Fouquets, Pasir Pandjang, Banka, New Guinea, Fiji, New Caledonia, Carolines, Philippines, Rotuma, Port Dorey, Pelew I., Upolu, Rarotonga, Gilberts, Kingsmill, Tonga, Samoa, Cooks, Funafuti, Paumotus, Tahiti, Tuamutu, Rairoa, Apataki, Aratika, Hao, Amanu and Hawaii. Garrett reports its absence only in Marquesas among the South Sea Islands. Dautzenberg (1935) in his list of distribution of this species appears to have made two mistakes, *i.e.*, firstly, he omits certain important localities as mentioned by Smith (1903), namely, Addu Atoll, Kolumadulu Atoll, Hulule Island and Goidu Island, and, secondly, he includes Tranquebar in the list which can stand only for Gmelin's *acuminata* (= *crebrilirata* Reeve)—the commonest Mitrid of the Madras Coast, though not for Swainson's *acuminata*. Garrett states (1872) that the animals of this species are found under stones on reefs and range all through the South Sease, but abundant only at the Paumotus and Kingsmill Groups.

***Strigatella scutulata* (Schröter, 1788).**

Type-locality.—Indian Ocean.

(Plate III, figs. 1, 1a.)

- 1788. *Voluta scutulata seu discolor*, Chemnitz, *Conch.-Cab.* X, p. 168, pl. cli, figs. 1428, 1429.
- 1788. *Voluta scutulata*, Schröter, *Namen Reg. Conch.-Cab.*, p. 110.
- 1790. *Voluta scutulata*, Gmelin, *Syst. Not.* ed. XIII, p. 3452.
- 1798. *Mitra discolor*, Röding, *Mus. Bolt.*, p. 137.
- 1811. *Mitra scutulata*, Lamarck, *Ann. du Mus.* XVII, p. 213.
- 1817. *Voluta scutulata*, Dillwyn, *Descr. Cat. Rec. Shells*, 1, p. 552.
- 1822. *Mitra scutulata*, Lamarck, *Anim. sans Verteb.* VII, p. 314.
- 1824. *Mitra scutulata*, Blainville, *Dict. des Sci. Nat.* XXXI, p. 485.
- 1825. *Mitra scutulata*, Sowerby, *Cat. Tankerv.*, p. 78.
- 1825. *Voluta scutulata*, Wood, *Index Testaceol.*, p. 98, pl. xx, fig. 122.
- 1829. *Mitra scutulata*, Swainson, *Zool. Illustr.* (2) I.
- 1831. *Mitra scutulata*, Swainson, *Zool. Illustr.* (2) II.
- 1836. *Voluta scutellata*, Bosc, *Hist. Nat. des Coq.* V, p. 48.
- 1838. *Mitra scutulata*, Kiener, *Icon. Coq. Viv.* IV, p. 64, pl. xvii, fig. 57, 51.
- 1839. *Mitra scutulata*, Küster, in *Martini and Chemnitz's Syst. Conch.-Cab.* V, *Abth.* 2, p. 42, pl. viii, figs. 1, 2.

1844. *Mitra scutulata*, Lamarck, *Anim. sans Verteb.* (ed. Deshayes), X, p. 627.
1844. *Mitra scutulata*, Reeve, *Conch. Icon.* II, pl. xii, fig. 82.
1845. *Mitra scutulata*, Catlow, *Conchologist's Nomenclator*, p. 303.
1850. *Mitra scutulata*, Jay, *Cat. of Snells*, p. 380.
1852. *Strigatella scutulata*, Mörch, *Cat. Conchyl. Yoldi*, I, p. 89.
1853. *Strigatella scutulata*, H. & A. Adams, *Gen. Rec. Moll.* 1, p. 174.
1856. *Mitra scutulata*, Wood, *Index Testaceol.* (ed. Hanley), p. 105, pl. xx, fig. 122.
1860. *Mitra scutulata*, Reeve, *Elements of Conchology*, 1, p. 51.
1869. *Strigatella scutellata*, von Frauenfeld, *Beiträge zur Fauna der Nicobaren*, III, p. 860.
1869. *Mitra scutulata*, Lischke, *Jap. Meeres-Conchyl.* 1, p. 65.
1874. *Mitra scutulata*, Sowerby, *Thesaurus*, IV, p. 18, pl. xxi (372), figs. 430, 431.
1878. *Strigatella scutulata*, Kobelt, *Illustr. Conchyl.* 1, p. 66.
1882. *Mitra (Strigatella) scutulata*, Tryon, *Man. Conch.* IV, p. 155, pl. xlvi, figs. 332, 333.
1883. *Mitra (Strigatella) scutulata*, Paetel, *Cat. Conchyl.-Samml.*, p. 29.
1887. *Strigatella scutulata*, von Martens, *Linn. Soc. Journ. Zool.* XXI, p. 184.
1888. *Mitra (Strigatella) scutulata*, Paetel, *Cat. Conchyl.-Samml.* 1, p. 186.
1890. *Mitra (Strigatella) scutulata*, Römer, *Cat. Conchyl. Samml. Nat. Hist. Mus. Wiesbaden*, p. 400.
1891. *Mitra scutulata*, Smith, *Proc. Zool. Soc. London*, p. 410.
1899. *Mitra scutulata*, Melvill and Sykes, *Proc. Malac. Soc. London*, III, p. 223.
1901. *Mitra scutulata*, Melvill and Standen, *Proc. Zool. Soc. London*, II, p. 421.
1904. *Mitra scutulata*, Hidalgo, *Cat. Moll. Test. Filipinas*, p. 65.
1906. *Mitra discolor*, Sherborn and Sykes, *Rept. of Bolten's Mus. Bolt.*, p. 137 (No. 1714).
1909. *Mitra scutulata*, Hedley, *Rept. Austr. Assoc. Adv. Sci.*, p. 366.
1911. *Strigatella scutulata*, Schepman, *Prosobr. Siboga-Exped. Monogr.* IV, p. 277.
1915. *Mitra discolor*, Dall, *An Index to Mus. Bolt.*, p. 37.
1919. *Mitra scutulata*, Cooke, *Proc. Zool. Soc. London*, II, p. 407.
1919. *Mitra (Strigatella) scutulata*, Iwakawa, *Cat. Jap. Moll. in Nat. Hist. Dept. Tokyo Imp. Mus.*, p. 143.
1923. *Mitra (Strigatella) scutulata*, Dautzenberg and Bouge, *Journ. de Conchyliol.* LXVII, pp. 144, 151.
1924. *Mitra (Strigatella) scutulata*, Fulton, *A Cat. of Shells of Rec. Moll.*, p. 22.
1928. *Mitra scutulata*, Faustino, *Summary Phil. Mar. and Freshw. Moll.*, p. 283.
1928. *Mitra (Strigatella) scutulata*, Melvill, *Proc. Malac. Soc. London*, XVIII, p. 108.
1929. *Strigatella discolor*, Iredale, *Mem. Queens. Mus.* IX, p. 286.
1931. *Strigatella scutulata*, Oostingh, *Archiv f. Molluskenk.* LXIII, p. 210.
1931. *Strigatella scutulata*, Oostingh, *Misc. Zool. Sumatrana*, LIII, p. 3.
1933. *Mitra (Strigatella) scutulata*, Dautzenberg and Bouge, *Journ. de Conchyliol.* LXXVII, p. 189.
1934. *Mitra (Strigatella) scutulata*, Hirase, *A Coll. of Jap. Shells*, p. 71, pl. oi, fig. 8.
1935. *Strigatella scutulata*, Dautzenberg, *Mém. Mus. Roy. Hist. Nat. Belg. Hors Ser.*, II, Fasc. 17, pp. 115-117, 207.
1939. *Strigatella scutulata*, Allan, *Austr. Mus. Mag.* VII (1), p. 15.
1951. *Mitra scutulata*, Laseron, *Rec. Austr. Mus.* XXII (4), pp. 335, 343.

I follow Dautzenberg in referring the species *scutulata* to Schröter rather than to Chemnitz or Gmelin as suggested by other workers. Chemnitz, no doubt, first introduced the term *scutulata*, but along with others to designate the species and, hence, his name is not considered valid. Gmelin is also ignored on the ground of his describing the species much later than Schröter. Iredale emphatically states (possibly following Sherborn and Sykes, Dall): "The common species *Mitra scutulata* must be called *Strigatella discolor* Bolten (*Mus. Bolten.* II, p. 137, 1798, for Chemn. 10, t. 151, f. 1428, 1429)" He may be right in referring the species to the genus *Strigatella*, but while urging so much for the use of the name *discolor* for the same, he ought to have seen more carefully how it could be possible to replace *scutulata* by *discolor*. Again, Melvill and Standen seem to have tried erroneously to include *scutulata* in the synonymy of *Mitra decurtata*—an entirely different species, while Tryon has done the reverse, though both the forms are sufficiently distinct. The wrong spelling '*scutellata*' as quoted by Bosc appears to have been perpetuated by von Frauenfeld also.

Characters.—The shell of *scutulata* is thick, ovately-acute, blackish or chocolate-brown or olive-brown and marked with regular impressed transverse striations (these may be obsolete in some cases in the middle of the bodywhorl only). But what is more remarkable is that the surface is adorned with whitish or yellowish-white short waved longitudinal strigations formed by minute irregularly scattered spots. Besides these, larger whitish spots may also be present here and there. All these together present a cobweb-like appearance which earns for the species the popular name "Cobweb-marked Mitre." The strigations may be obsolete in some cases, but wherever present their number may not be always and everywhere the same. The whorls are slightly ventricose and often marked with a yellow band at the upper part of each just below the suture, though this is not so prominent as in *amphorella*. The spire is sharply-acuminated, but sometimes appearing attenuated and somewhat concave in outline as in *Mitra attenuata* (Tryon's fig. 268 in pl. xliii). The outer lip in the adult shell is slightly thickened, sometimes elevated at the upper part, somewhat straight in the middle and effuse below (fig. 1). But in the young shell it appears thin, simple and uniformly curved throughout (fig. 1a). The shell in some cases may be completely encrustated with white.

Allan's note (1939, p. 15) regarding the ecology of this very common mollusc is of special interest: "The small shells (including those of *limbifera*) are found at half tides in crevices of coral boulders on reefs, in similar positions to those occupied by small reef-living *Purpura* shells. This is in strong contrast to the sand-living habits of the long, slender, ribbed Mitres". I have also found these animals during low tide attached to the undersurface of stones and boulders lying in small shallow pools overgrown with sea-weeds (in close association with those of *Purpura*, *Thais* and *Murex* at Beyt Island opposite Port Okha and also at Dwarka in front of the Guest House).

Localities.—Lamba on the coast of the Arabian Sea near Porbander, Kathiawar—2 (Jan. 1953. Dr. H. C. Ray); Coromandel Coast of India—2; Dharwar, Bombay—1 (Sri A. M. Patil); Cat's eye rocks, Lower Burma—2; Andamans—1.

The specimens in the collection show individual variations, but they appear more or less typical in essential features. The strigations appear to increase with age. The spire in the adult shell (fig. 1) is found quite attenuated and somewhat concave in outline—a condition somewhat recalling that of *M. attenuata*. The largest specimen in the lot measures 47 mm. in length and 20.5 mm. in diameter, with its spire 21 mm. in length and aperture 27 mm. It has eight whorls. The marked difference between the outer lip of a young shell (fig. 1a) of this species and that of an adult one can easily be made out by having a look into these two figures. The inside of the aperture in the young shell (including the lips) appears slightly pinkish.

The shell from Dharwar was completely encrusted with a white deposit and it was not possible, therefore, to study its shell-characters, save those of columella and outer lip.

The species somewhat approaches *Mitra strigata* Swainson (1829) in the presence of strigations on its surface and also *Mitra attenuata* in the form of its spire, outer lip (in adult condition) and colouration.

Distribution.—*Strigatella scutulata* (Schröter) is one of the most well-known forms whose wide range has been known to extend in Aden, Ratnagiri, Mauritius, Reunion, Nicobars, Sullivan Island, Malay Archipelago, South Sumatra, Pulau Berhala, Java, Celebes, Timor, Moluccas, Australia, Fiji, New Caledonia, Lifu, Philippines (Luzon, Cebu, Tondo, Ilocos Norte, Laylay, Tabigui, Misamis, Mindanao, Lugban, Batanzas), Sandwich, Tanabe, Raiatea, Tuamutu, Apataki, Napuka and Japan. The localities mentioned above are new records and extend the distribution of this variable species beyond the known range.

***Strigatella amphorella* (Lamarck, 1811).**

(Plate III, figs. 2, 2a.)

- 1811. *Mitra amphorella*, Lamarck, *Ann. du Mus.* XVII, p. 214.
- 1822. *Mitra amphorella*, Lamarck, *Anim. sans Verteb.* VII, p. 316.
- 1824. *Mitra amphorella*, Blainville, *Dict. des Sci. Nat.* XXXI, p. 486.
- 1838. *Mitra amphorella*, Kiener, *Icon. Coq. Viv.* IV, p. 57, pl. xvii, fig. 56, 56.
- 1839. *Mitra amphorella*, Küster, in *Martini and Chemnitz's Syst. Conch.-Cab.* V, *Abth.* 2, p. 78, pl. xiv, figs. 14, 15.
- 1839. *Mitra amphorella*, Anton, *Verz. Conchyl.*, p. 69.
- 1844. *Mitra amphorella*, Lamarck, *Anim. sans Verteb.* (ed. Deshayes), X, p. 330.
- 1844. *Mitra amphorella*, Reeve, *Conch. Icon.* IV, pl. xii, fig. 85a.
- 1845. *Mitra amphorella*, Catlow, *Conchologist's Nomenclator*, p. 294.
- 1850. *Mitra amphorella*, Jay, *Cat. of Shells*, p. 376.
- 1853. *Strigatella amphorella*, H. & A. Adams, *Gen. Rec. Moll.* 1, p. 174.
- 1860. *Mitra amphorella*, Reeve, *Elements of Conchology*, 1, p. 79.
- 1861. *Mitra amphorella*, Dunker, *Moll. of Japan*, p. 8.
- 1867. *Mitra amphorella*, Mitchell, *Cat. Moll. Coll. Govt. Central Mus. Madras*, p. 11.
- 1869. *Mitra amphorella*, Lischke, *Jap. Mceres-Conchyl.* 1, p. 68.
- 1874. *Strigatella amphorella*, Dunker, *Cat. Mus. Godeffroy*, V, p. 118.
- 1874. *Strigatella scutulata* var. *amphorella*, Sowerby, *Thesaurus*, IV, p. 18, pl. 372, fig. 432

1878. *Strigatella amphorella*, Kobelt, *Illustr. Conchyl.* 1, p. 66, pl. xxiv, fig. 9.
1880. *Mitra amphorella*, Garrett, *Journ. of Conch.* III, pp. 3, 10.
1882. *Mitra amphorella*, Dunker, *Index Moll. Mars Jap.*, p. 52.
1882. *Mitra amphorella* (as a synonym of *scutulata*), Tryon, *Man. Conch.* IV, p. 155, pl. xlv, fig. 334.
1883. *Mitra (Strigatella) amphorella*, Paetel, *Cat. Conchyl.-Samml.*, p. 26.
1887. *Strigatella amphorella*, von Martens, *Linn. Soc. Journ. Zool.* XXI, p. 184.
1888. *Mitra (Strigatella) scutulata* var. *amphorella*, Paetel, *Cat. Conchyl.-Samml.* 1, p. 187.
1890. *Mitra (Strigatella) amphorella*, Römer, *Cat. Conchyl.-Samml. Nat. Hist. Mus. Wiesbaden*, p. 40.
1891. *Mitra amphorella*, Smith, *Proc. Zool. Soc. London*, p. 410.
1899. *Mitra (Strigatella) amphorella*, Melvill and Sykes, *Proc. Malac. Soc. London*, III, p. 223.
1901. *Mitra scutulata* var. *amphorella*, Melvill and Standen, *Proc. Zool. Soc. London*, II, p. 421.
1904. *Mitra scutulata* var. *amphorella*, Hidalgo, *Cat. Moll. Test. Filipinas*, p. 65.
1923. *Mitra (Strigatella) scutulata* var. *amphorella*, Dautzenberg and Bouge, *Journ. de Conchyliol.* LXVII, p. 152.
1924. *Mitra (Strigatella) amphorella*, Fulton, *A Cat. of Shells of Rec. Moll.*, p. 20.
1928. *Strigatella scutulata* var. *amphorella*, Melvill, *Proc. Malac. Soc. London*, XVIII, p. 108.
1928. *Mitra amphorella*, Faustino, *Summary Phil. Mar. and Freshw. Moll.*, p. 283.
1930. *Strigatella amphorella*, Oostingh, *Misc. Zool. Sumatrana*, XLIX, p. 6.
1933. *Mitra (Strigatella) amphorella*, Dautzenberg, *Journ. de Conchyliol.* LXXVII, p. 154.
1935. *Strigatella scutulata* var. *amphorella*, Dautzenberg, *Mém. Mus. Roy. Hist. Nat. Belg. Hors Ser.*, II, Fasc. 17, pp. 117, 118, 207.
1935. *Strigatella amphorella*, Peile, *Proc. Malac. Soc. London*, XXII, p. 142.
1938. *Mitra (Strigatella) amphorella*, Suvatti, *Moll. of Siam*, p. 37.

The nomenclature of *amphorella* has given rise to some controversy in literature. Most of the workers appear to have treated it as a distinct species, while a few only as a variety of *scutulata*. Tryon and Faustino have gone even a step further to consider it as synonymous with the latter. At first I was inclined to regard it as a variety of *scutulata*, but after carefully examining all the essential features of its shell I found that it can be treated as distinct. While dealing with this species Garrett seems to have wrongly referred it to Reeve's figs. 83a, 83b rather than to fig. 85a. His suggestion to place it under the genus *Nebularia* also appears erroneous.

Characters.—*Amphorella* or “Amphora-shaped Mitre”, as it has been commonly called, is chiefly characterized by its ovately-oblong, thick, light to dark-brown (sometimes chocolate-brown) shell having subsutural yellowish or yellowish-white bands more conspicuous than in *scutulata*. There are incised spiral grooves at the upper part and base of the shell, but these are obsolete in the middle of the bodywhorl. The spire is generally short and obtuse, but may be elevated and stout in some cases. The whorls are somewhat ventricose and the sutures pronounced. The strigations so characteristic of *scutulata* are usually obsolete, but a few small white spots may be present near the apex and at the base of the shell. The columella is four-plaited with a distinct callosity at the upper part, while the outer lip is sinuated. The aperture is usually longer than the spire.

Localities.—Shore collecting in the Gulf of Kutch near the Cement Factory at Sika Port, Kathiawar-2 (January, 1953. Dr. H. C. Ray) ; Jack Id.—1.

The large shell figured here (No. 2a) which I collected near the Cement Factory at Sika Port measures 47 mm. in length and 21 mm. in diameter, with its spire 22 mm. in length and aperture 27 mm. It appears somewhat peculiar in shape and has six whorls and four columellar folds. The spire is much elevated and stout and the subsutural bands are whitish and conspicuous. The colour of the shell (though worn) appears dark-brown. The other shell (fig. 2) from the Jack Id. has a shorter spire and yellowish subsutural bands.

Distribution.—*Strigatella amphorella* (Lamarck) has so far been recorded from Karachi, Mauritius, Elphinstone Island Bay, Andamans, Borneo, Pulau Berhala on the east coast of Sumatra, Australia, New Caledonia, Gulf of Siam, Fiji, Philippines (Cebu, Tebu, Labuan, Luzon, Ilocos), Viti, Paumotus, Tuamutu and Japan. Melvill and Sykes state that the species "occurs commonly in the Philippines and ranges through the Pacific" But it is the first time that *amphorella* is being recorded from the Gulf of Kutch.

***Strigatella paupercula* (Linnaeus, 1758).**

(Plate III, fig. 3.)

1685. *Buccinum dentatum*, Lister, *Hist. Conch.*, pl. 819, fig. 35.
 1742. *Strombus integer*, Gualtieri, *Index Test.*, pl. liv. fig. L.
 1758. *Voluta paupercula*, Linnaeus, *Syst. Nat. ed. X*, p. 731.
 1767. *Voluta paupercula*, Linnaeus, *Syst. Nat. ed. XII*, p. 1190.
 1780. *Voluta paupercula*, Born, *Test. Mus. Caes. Vindob.*, p. 223.
 1780. *Turritula paupercula*, Chemnitz, *Conch.-Cab. IV*, p. 227, pl. cxlix, figs. 1386, 1387.
 1790. *Voluta paupercula*, Gmelin, *Syst. Nat. ed. XIII*, p. 3447.
 1798. *Mitra venosa*, Röding, *Mus. Bolt.*, p. 137.
 1811. *Mitra zebra*, Lamarck, *Ann. du Mus. XVII*, p. 215.
 1817. *Mitra paupercula*, Dillwyn, *Descr. Cat. Shells*, 1, p. 534.
 1817. *Mitra paupercula*, Schumacher, *Ess. Nouv. Syst.*, p. 238.
 1822. *Mitra paupercula*, Lamarck, *Anim. sans Verteb. VII*, p. 317.
 1824. *Mitra paupercula*, Blainville, *Dict. des Sci. Nat. XXXI*, p. 486.
 1825. *Mitra paupercula*, Sowerby, *Cat. Tankerv.*, p. 78.
 1830. *Mitra paupercula*, Menke, *Syn. Meth. Moll.*, p. 85.
 1830. *Mitra paupercula*, Deshayes, in *Bruguère's Ency. Meth. Vers. II*, p. 461, pl. cclxxii, 8a-b.
 1833. *Mitra paupercula*, Quoy and Gaimard, *Voy. "Astrolabe", Zool. II*, p. 643, pl. xlv, figs. 13-15.
 1836. *Mitra paupercula*, Bosc, *Hist. Nat. Coq. V*, p. 35.
 1838. *Mitra paupercula*, Kiener, *Icon. Coq. Viv. IV*, p. 48, pl. xv, fig. 48.
 1839. *Mitra paupercula*, Küster, in *Martini and Chemnitz's Syst. Conch.-Cab. V, Abth. 2*, pp. 71, 72, pl. xiii, figs. 9, 10.
 1842. *Mitra paupercula*, Gray, *Figs. of Moll. Anim.*, p. 15, pl. xxviii, Fig. 7.
 1844. *Mitra paupercula*, Lamarck, *Anim. sans Verteb. (ed. Deshayes), X*, pp. 331, 332.
 1844. *Mitra paupercula*, Reeve, *Conch. Icon. II*, pl. xii, fig. 84.
 1844. *Mitra paupercula*, Reeve, *Proc. Zool. Soc. London*, No. CXLII, p. 185.

1845. *Mitra paupercula*, Catlow, *Conchologist's Nomenclator*, p. 301.
1847. *Strigatella zebra*, Gray, *Proc. Zool. Soc. London*, Pt. XV, p. 141.
1850. *Mitra paupercula* and *M. zebra*, Jay, *Cat. of Shells*, pp. 380, 381.
1852. *Strigatella paupercula*, Mörch, *Cat. Conchyl. Yoldi*, 1, p. 88.
1853. *Strigatella paupercula*, H. & A. Adams, *Gen. Rec. Moll.* 1, p. 174.
1855. *Voluta paupercula*, Berge, *Conchylienbuch*, p. 252.
1855. *Voluta paupercula*, Hanley, *Ipsa Linn. Conchyl.*, p. 222.
1856. *Mitra paupercula*, Wood, *Index Testaceol.* (ed. Hanley), p. 103, pl. xx, fig. 75.
1857. *Turris paupercula* and *Strigatella zebra*, Gray, *Syst. Arrang. Moll. Brit. Mus.*, pp. 23, 30.
1859. *Mitra (Strigatella) paupercula*, Chenu, *Man. de Conch.* 1, pp. 194, 195, fig. 908.
1859. *Mitra paupercula*, Gray, *Figs. of Moll. Anim.* IV, p. 5, pl. xxviii, fig. 7.
1860. *Mitra paupercula*, Reeve, *Elements of Conchology*, 1, p. 50.
1863. *Mitra paupercula*, Deshayes, *Cat. Moll. Reunion*, p. 133.
1863. *Mitra (Strigatella) paupercula*, Mörch, *Cat. Hencks.*, p. 20.
1865. *Mitra paupercula*, Dunker, *Cat. Mus. Godeffroy*, II, p. 21.
1867. *Mitra paupercula*, Mitchell, *Cat. Moll. Coll. Govt. Central Mus. Madras*, p. 1i.
1869. *Strigatella paupercula*, von Frauenfeld, *Beiträge zur Fauna der Nicobaren*, III, p. 860.
1869. *Strigatella paupercula*, Dunker, *Cat. Mus. Godeffroy*, IV, p. 83.
1869. *Mitra paupercula*, von Martens, *von der Deckens, Reise*, p. 61.
1874. *Strigatella paupercula*, Dunker, *Cat. Mus. Godeffroy*, V, p. 118.
1874. *Mitra paupercula*, Sowerby, *Thesaurus*, IV, p. 19, pl. xxi (372), figs. 428, 429.
1877. *Mitra paupercula*, Liénard, *Cat. Moll. Maurice*, p. 20.
1879. *Strigatella paupercula*, von Martens, *Monatsb. der Königl. Akad. der Wiss. Berlin*, p. 729.
1880. *Strigatella paupercula*, von Martens, *in Möbius's Beiträge zur Meeresfauna der Insel Mauritius und der Seychellen*, p. 257.
1880. *Strigatella paupercula*, Garrett, *Journ. of Conch.* III, pp. 25, 34, 35.
1882. *Mitra (Strigatella) paupercula*, Tryon, *Man. Conch.* IV, p. 156, pl. xlvi, fig. 340.
1883. *Mitra (Strigatella) paupercula*, Paetel, *Cat. Conchyl.-Samml.*, p. 29.
1888. *Mitra (Strigatella) paupercula*, Pæstel, *Cat. Conchyl.-Samml.* 1, p. 184.
1890. *Mitra (Strigatella) paupercula*, Römer, *Cat. Conchyl.-Samml. Nat. Hist. Mus. Wiesbaden*, p. 40.
1894. *Mitra paupercula*, Brancsik, *Jahr. d. Naturw.-Sch. ver. des Trans. Comm.*, p. 214.
1895. *Mitra (Strigatella) zebra*, Melvill and Standen, *Journ. of Conch.* VIII, p. 101.
1899. *Mitra (Strigatella) paupercula* var. ? *zebra*, Melvill and Sykes, *Proc. Malac. Soc. London*, III, p. 223.
1899. *Mitra paupercula*, Hedley, *Mem. Austr. Mus.* III (7), p. 467.
1900. *Mitra (Strigatella) paupercula*, Smith, *Proc. Zool. Soc. London*, p. 118.
1904. *Mitra paupercula*, Hidalgo, *Cat. Moll. Test. Filipinas*, p. 64.
1906. *Mitra venosa*, Sherborn and Sykes, *Rept. of Bolten's 'Mus. Bolt.'*, p. 137 (No. 1717).
1908. *Strigatella paupercula*, Horst and Schepman, *Cat. Sist. Moll. Mus. Hist. Nat. Pays-Bas*, p. 85.
1909. *Mitra (Strigatella) paupercula*, Melvill, *Trans. Linn. Soc. London*, (2) XIII, p. III.
1911. *Mitra paupercula*, Smith, *Proc. Malac. Soc. London*, IX, p. 315.
1911. *Strigatella paupercula*, Schepman, *Prosobr. Siboga-Exped. Monogr.* IV, p. 278, pl. xxiii, fig. 5 (radular teeth).
1915. *Mitra paupercula*, Dall, *An Index to Mus. Bolt.*, p. 37,

1915. *Strigatella zebra*, Dall, *A Monogr. Moll. Fauna Orth. Pugnax Zone of Olig. of Tampa, Florida*, p. 61.
1916. *Mitra (Strigatella) paupercula*, Boettger, *Abhandl. d. Senckenb. Naturf. Gesell.* XXXVI, Heft 3, p. 299.
1923. *Mitra (Strigatella) pauperculi*, Dautzenberg and Bouge, *Journ. de Conchyliol.* LXVII, pp. 146, 147 150, 153.
1924. *Mitra (Strigatella) paupercula*, Fulton, *A Cat. of Shells of Rec. Moll.*, p. 21.
1928. *Mitra paupercula* and *M. zebra*, Faustino, *Summary Phil. Mar. and Freshw. Moll.*, pp. 281, 285.
1929. *Mitra (Strigatella) paupercula*, Dautzenberg, *Faun. des Col. Franc.* III, p. 186.
1934. *Mitra (Strigatella) paupercula*, Tomlin, *Bull. Raffles Mus. Singapore*, IX, pp. 78, 79.
1935. *Strigatella paupercula* f. *typica*, Dautzenberg, *Mém. Mus. Roy. Hist. Nat. Belg. Hors. Ser.*, II, Fasc. 17, pp. 109-112, 206, pl. iii, fig. 2.
1936. *Strigatella paupercula*, Peile, *Proc. Malac. Soc. London*, XXII, p. 142.
1937. *Mitra paupercula*, Viader, *Maur. Inst. Bull.* 1 (2), p. 22.
1937. *Strigatella paupercula*, Asano, *Venus*, 1 (2), p. 33.
1939. *Strigatella paupercula*, Allan, *Austr. Mus. Mag.* VII(1), p. 15, fig. 1 (top row).
1950. *Strigatella paupercula*, Allan, *Australian Shells*, p. 180, Text-fig. 40 (No. 7).
1950. *Mitra (Strigatella) paupercula*, Abbott, *Bull. Raffles Mus. Singapore*, No. 22, p. 84.
1953. *Strigatella (Strigatella) paupercula*, Solem, *Field. Zool.* XXXIV, No. 22, p. 225.

Linnaeus's *Mitra paupercula*, commonly known as the "Poor Mitre", though an elegant and well-defined species, has been confounded by some authors with Lamarck's *retusa*. Schröter (*op. cit.*, 1783, p. 217) may be correct in his reference to Lister's fig. 35 in pl. 819, but his fig. 11 in pl. i meant for the same appears to represent *retusa*. Dillwyn seems to have ignored this fact while including the latter in the synonymy of *paupercula*. But to make matters worse, Melvill and Sykes have unhesitatingly done the reverse, which is hardly correct. Other small species of the group *Strigatella*, namely, *scutulata*, *amphorella* and *virgata* are also found to have been similarly confused, one with the other, though all of them may claim separate ranks. Röding's *Mitra venosa* is considered by Sherborn and Sykes as well as Dautzenberg to be a synonym of *paupercula*.

Characters.—The presence of conspicuous zebra-like white or yellow-white, slightly waved uninterrupted longitudinal stripes on the chocolate or dark-brown background is the most distinctive feature of *paupercula*. Besides these, there are delicate regular incised spiral lines on the uppermost whorls and a few distinct grooves towards the base of the body-whorl which may be slightly contracted below in the young shell as shown by Dautzenberg in his fig. 2. The spire is prominent and sharply-acuminated and usually shorter than the aperture. The whorls are somewhat ventricose. The columella is four-plaited and the outer lip sinuated. In the adult shell the outer lip is only slightly thickened, but in the young quite thin and simple (*see* Dautzenberg's fig. 2). The interior of the aperture may be slightly stained with brown. The zebra-like stripes on its shell possibly earned for it the specific name *zebra* given by Lamarck and followed by Gray, Melvill and Standen, Dall and Faustino: Schepman has studied the peculiarities of its radular teeth.

Garrett states that he has found these animals in Polynesian Islands lurking under lumps of dead coral and in crevices on both the outer and inner reefs, while Abbott collected them in shallow but slightly weedy water at Pulo Panjang and on the lagoon side of the barrier reef between Pulo Siput and Pulo Pandan, Cocos-Keeling Islands.

Locality.—Off Havelock Island, Ritchies Archipelago, South Anadman—1 (26. iii. 34. Dr. H. S. Rao).

The single shell in the collection appears to accord well with the description of the typical form. It measures 23·5 mm. in length and 12·5 mm. in diameter, with its spire 11 mm. in length and aperture 13·5 mm. There are only five whorls (the apex being slightly eroded) and four columellar plaits. But a perfect shell in our named dry collection from New Caledonia has seven whorls.

Distribution.—*Strigatella paupercula* (Linn.) is found very widely distributed in the Indo-Pacific, having been recorded from the Red Sea, Mauritius, Seychelles, Bourbon, Madagascar, Zanzibar, Mozambique, Chagos Archipelago, Cargados Carajos, Coetivy I., Fouquets, Natal, Ceylon, Andamans, Nicobars, Malay Archipelago, Java, Celebes, Poelo Babi and Poelo Weh, Madura-bay, Lombok, Sumba, Flores, Moluccas, Timor, Sailus Ketjil, Pulo Panjang, Banda, Christmas I., Cocos-Keeling Is., Solomon Is., Fiji, Philippines (Luzon, Tablas, Mindanao), Oshima-Osumi, Oho-Shima, New Caledonia, New Ireland, Carolines, Lifu, Samoa, Tonga, Gilberts, Sandwich, Kingsmill, Loyalty, Angaur, Funafuti and Hawaii.

***Strigatella virgata* (Reeve, 1844)**

Type-locality.—Island of Luzon in Philippines (found under stones and crevices of rocks).

(Plate III, figs. 4, 4a-c.)

1833. *Mitra retusa*, Quoy and Gaimard, *Voy. "Astrolabe"*, *Zool.* II, p. 645, pl. xlv, figs. 19-22.
 1836. *Mitra virgata* (in part), Bosc, *Hist. Nat. des Coq.* V, p. 47.
 1839. *Mitra retusa* var., Gray, *Zool. Beechey's Voy.*, p. 134, pl. xxxvi, fig. 5.
 1844. *Mitra virgata* (in part), Reeve, *Proc. Zool. Soc. London*, No. CXLII, p. 185.
 1844. *Mitra virgata* (in part), Reeve, *Conch. Icon.* II, pl. xxv, fig. 197b (juvenile shell).
 1845. *Mitra virgata*, Catlow, *Conchologist's Nomenclator*, p. 304.
 1850. *Mitra virgata*, Jay, *Cat. of Shells*, p. 381.
 1852. *Strigatella virgata*, Mörch, *Cat. Conchyl. Yoldi*, 1, p. 83.
 1853. *Strigatella (Zierliana) virgata*, H. & A. Adams, *Gen. Rec. Moll.* 1, p. 175.
 1860. *Mitra virgata*, Reeve, *Elements of Conchology*, 1, p. 51.
 1863. *Mitra (Strigatella) virgata*, Mörch, *Cat. Lassen*, p. 18.
 1880. *Strigatella virgata*, Garrett, *Journ. of Conch.* III, pp. 25, 34, 35.
 1882. *Mitra (Strigatella) virgata*, Tryon, *Man. Conch.* IV, p. 156, pl. xlvi, fig. 341 (juvenile shell).
 1883. *Mitra (Zierliana) virgata*, Paetel, *Cat. Conchyl.-Samml.*, p. 30.
 1887. *Strigatella paupercula* var. *virgata*, von Martens, *Linn. Soc. Journ. Zool.* XXI, p. 184.
 1888. *Mitra (Strigatella) virgata*, Paetel, *Cat. Conchyl.-Samml.* 1, p. 189.
 1892. *Mitra (Strigatella) virgata*, Boettger, *Nachr. d. d. Malak. Gesell.* XXIV, p. 163.

1899. *Mitra virgata*, Hedley, *Mem. Austr. Mus.* III (7), pp. 467, 525.
 1899. *Mitra (Strigatella) virgata*, Melvill and Sykes, *Proc. Malac. Soc. London*, III, p. 223.
 1899. *Mitra virgata*, Dautzenberg, *Ann. Soc. Roy. Malac. Belg.* XXXIV, p. 4.
 1900. *Mitra (Strigatella) paupercula* var. *virgata*, Smith, *Proc. Zool. Soc. London*, p. 118.
 1904. *Mitra virgata*, Hidalgo, *Cat. Moll. Test. Filipinas*, p. 67.
 1908. *Strigatella virgata*, Horst and Schepman, *Cat. Sist. Moll. Hist. Nat. Pays-Bas*, p. 85.
 1919. *Mitra (Strigatella) virgata*, Iwakawa, *Cat. Jap. Moll. in Nat. Hist. Dept. Tokyo Imp. Mus.*, p. 144.
 1923. *Mitra (Strigatella) paupercula* var. *virgata*, Dautzenberg and Bouge, *Journ. de Conchyliol.* LXVII, pp. 148, 149.
 1924. *Mitra (Strigatella) virgata*, Fulton, *A Cat. of Shells of Rec. Moll.*, p. 22.
 1928. *Mitra virgata*, Faustino, *Summary Phil. Mar. and Freshw. Moll.*, p. 285.
 1934. *Mitra (Strigatella) virgata*, Tomlin, *Bull. Raffles Mus. Singapore*, IX, p. 79.
 1934. *Mitra (Strigatella) virgata*, Hirase, *A Coll. of Jap. Shells*, p. 71, pl. ci, fig. 11.
 1935. *Strigatella paupercula* var. *virgata*, Dautzenberg, *Mém. Mus. Roy. Hist. Nat. Belg. Hors Ser.*, II, Fasc. 17, pp. 112-114, 206, pl. iii, fig. 1.
 1937. *Mitra virgata*, Viader, *Maur. Inst. Bull.* 1 (2), p. 21.
 1937. *Strigatella virgata*, Asano, *Venus*, VII (1), p. 34.
 1953. *Mitra (Strigatella) virgata*, Tokioka, *Publ. Seto Mar. Biol. Lab.* III(2), p. 131.
 1953. *Strigatella (Strigatella) virgata*, Solem, *Field. Zool.* XXXIV, No. 22, p. 225.

The confusion that prevails about the nomenclature of Reeve's *virgata* was first introduced by Reeve himself when he figured two entirely different shells under the same species. Chenu possibly followed him (1859, p. 195) in presenting the figure of *retusa* (No. 1001 — an exact copy of Reeve's fig. 197a) in the name of *virgata* and so also Hidalgo while referring to Reeve's fig. 197a in connection with the record of *virgata* from the Philippine Islands. Garrett has, however, rightly pointed out that Reeve's fig. 197a should stand for *retusa*, while fig. 197b for *virgata*. But notwithstanding this, Viader did not hesitate to include *virgata* in the synonymy of *retusa*.

Again, the close similarity between *virgata* and *paupercula* regarding colouration and markings has misled some workers to treat the former as a variety (von Martens, MacAndrew, Dautzenberg and Bouge, Dautzenberg) or a synonym of the latter (Jickeli—1874, p. 32). But Garrett has enumerated the following characters which justify the separation of *virgata* from *paupercula* as a distinct species: (a) the shell of *virgata* is usually smaller in size, more abbreviate and Columbella-like in form, with the spire decidedly more shorter than the rest of the body; (b) the colour is dark-brown to blackish brown and the flexuous vertical white or yellow-white stripes on the body are sometimes found to be broken or interrupted in the middle of the bodywhorl, especially in the adult; (c) the revolving grooves more conspicuous at the base of the shell and frequently punctured, though generally obsolete in the middle of the bodywhorl (excepting the juvenile shells where they are found to cover about three-fourth of that whorl); (d) the bodywhorl is found to be more or less distinctly fluted in many cases—a feature never met with in *paupercula*; (e) the outer lip more heavily calloused in the middle of the inner margin showing in some cases a distinct tooth-like projection somewhat-like that of *Str. litterata*, which coupled with the contraction of the lip in the region makes the aperture usually more narrow; (f) sutures slightly more prominent and the base

of the bodywhorl more contracted ; (g) the inside of the aperture stained with dark or blackish-brown ; (h) the apex acuminate but mostly eroded ; (i) spire shorter than in *paupercula*. All these characters can be better seen in the adult shells than in the young ones.

Dautzenberg and Bouge as well as Dautzenberg himself, no doubt, realized that Reeve's two figures (197a, 197b) do not represent the same species *virgata*, but they could not possibly think only by having a look into the fig. 197b (based on a young shell of the same) that the difference between it and *paupercula* proper could be so marked, especially in the adult condition, as to permit of its separation from the latter as a distinct species and, hence, they did not hesitate to regard *virgata* to be a variety of *paupercula*. Jickeli might have been misled in the same way, but he committed a greater mistake while trying to include *virgata* in the synonymy of *paupercula*. Why Viader proceeded even further to treat the former as a synonym of *retusa* is really very difficult to understand. The inclusion of the species *virgata* under the subgenus *Zierbiana* as suggested by H. & A. Adams and Paetel appears rather erroneous in view of the distinct *Strigatella*-like features present in its shell-characters.

Characters.—The essential points of distinction between *virgata*, commonly called the "Striped Mitre", and *paupercula* have already been discussed above. The species *virgata* appears to show some affinity with *Str. litterata* in the character of its outer lip, while with *paupercula* regarding colouration and markings.

Localities.—North beach and inshore region of Fehendu Id.—4 (23. × .23. 'Investigator') ; Sta. 645 : Lagoon reef, east of Maradu (shore collecting)—4 (April, 1923. 'Investigator') ; Andamans—2 ; Off Havelock Island, Ritchies Archipelago, South Andaman—1 (Juvenile. 9. ii. 30).

The largest specimen in the lot is from the Lagoon reef (fig. 4b) measuring 23.5 mm. in length and 12.5 mm. in diameter, with its spire 8 mm. in length and aperture 15 mm. The smallest one (fig. 4) is from off the Havelock Island which measures only 12 mm. in length and 6 mm. in diameter, with its spire 5 mm. in length and aperture 7 mm. In both, the number of whorls is found to be five and that of columellar folds only four. But one peculiarity observed in case of the juvenile shell is that there are numerous very minute yellow-white spots scattered here and there on its surface in addition to the longitudinal stripes. Moreover, its thin and simple outer lip bears rudimentary crenations. Besides these, there is also a fairly good series of specimens in our named dry collection obtained from Mauritius, Bourbon, Andamans, Ceylon, Kingsmill, Tutuila in Samoa and New Caledonia, which show individual variations in shape, size, colouration, etc., of their shells. Some of them seem to agree with Hirase's fig. 11, some with Dautzenberg's fig. 1 and a few only (the juvenile shells) with Reeve's fig. 197b.

I have given eight figures (including dorsal and ventral views) based on four specimens obtained from different localities so as to show the range of variations in their shell characters. The colour in the juvenile shell appears dark-brown, while in the adult ones blackish-brown. The apex is found to be eroded mostly in the adult shells. But the peculiarities in the outer lip of the shell appear to develop gradually with the age of the animal. The stripes on the surface may be long and uninterrupted in the young condition, but as the growth proceeds

these gradually get broken or interrupted in the middle of the bodywhorl. The spiral grooves in the juvenile specimens may extend about three-fourth of the bodywhorl, but in the adult ones found confined only to the base.

Distribution.—*Strigatella virgata* (Reeve) is a greatly variable species which was originally described from the island of Luzon in Philippines. But subsequently its range has been found to extend in Madagascar, Zanzibar, Ceylon, Owen Island, Port Blair, Sumatra, Java, Flores, Timor, Amboina, Fiji, Cebu, Mindanao, Masbate, Marinduque, Lugban, Sibuyan, Zamboanga, Balabac, Romblon, New Caledonia, Lifu, Pins I., Carolines, Liu-Kiu I., Tonga, Viti, Samoa, Loyalty, Kingsmill, Gilberts, Wallis, Funafuti, Lifuka, Christmas I., Loo-Choo, Oshima-Osumi, Oho-Shima, Tokara Islands, Rua-sura, Solomon and Tikopia. Its occurrence at Paumotus needs confirmation. But the localities mentioned above, such as, Fehendu Id., Lagoon reef east of Maradu, Off Havelock Id., are new records. It appears from the available records of distribution of the species that its range hardly extends north-west of the Indo-Pacific, *i.e.*, in the Arabian Sea and further up.

***Strigatella astricta* (Reeve, 1844)**

(Plate III, fig. 5.)

1844. *Mitra astricta*, Reeve, *Proc. Zool. Soc. London*, No. CXLII, p. 194.
 1844. *Mitra astricta*, Reeve, *Conch. Icon.* II, pl. xxiv, fig. 188.
 1845. *Mitra astricta*, Catlow, *Conchologist's Nomenclator*, p. 294.
 1853. *Mitra (Mitreola) astricta*, H. & A. Adams, *Gen. Rec. Moll.* I, p. 174.
 1868. *Mitra astricta*, Pease, *Amer. Journ. Conch.* V, p. 120.
 1874. *Mitra astricta*, Sowerby, *Thesaurus*, IV, p. 22, pl. 364, figs. 206-208, 224.
 1880. *Mitra astricta*, Garrett, *Journ. of Conch.* III, p. 10.
 1882. *Mitra (Strigatella) astricta*, Tryon, *Man. Conch.* IV, p. 154, pl. xlv, figs. 315-317.
 1883. *Mitra (Mitreola) astricta*, Paetel, *Cat. Conchyl.-Samml.*, p. 26.
 1888. *Mitra (Strigatella) astricta*, Paetel, *Cat. Conchyl.-Samml.* 1, p. 173.
 1899. *Mitra astricta*, Hedley, *Mem. Austr. Mus.* III (7), pp. 466, 525.
 1911. *Mitra astricta*, Schepman, *Prosobr. Siboga-Exped. Monogr.* IV, p. 227.
 1919. *Mitra (Strigatella) astricta*, Cooke, *Proc. Zool. Soc. London*, II, p. 410.
 1923. *Mitra (Strigatella) astricta*, Dautzenberg and Bouge, *Journ. de Conchyliol.* LXVII, p. 141.
 1924. *Mitra (Strigatella) astricta*, Fulton, *A Cat. of Shells of Rec. Moll.*, p. 20
 1937. *Mitra astricta*, Viader, *Maur. Inst. Bull.* 1(2), p. 18.
 1950. *Mitra astricta*, Ostergaard, *Pacific Sci. Honolulu*, IV(2), pp. 86-89, fig. 8.

Reeve's *Mitra astricta* is a very rare species which was described from an unknown habitat. H. & A. Adams and Paetel tentatively placed it under *Mitreola*, but its true systematic position into *Strigatella* was rightly determined by Tryon, Dautzenberg and Bouge and Fulton.

Characters.—This species can readily be recognized by its oblong-ovate shell of light yellowish-brown to olive-brown colour, which is truncated at the base and marked with regular distinct transverse grooves on the surface running parallel to its axis and frequently punctured. The fine transverse brown lines and white subsutural bands, as mentioned by Reeve, may not be present in all cases. There are five or six whorls, of which the up-

permost ones only, says Garrett, may be finely granulated. The aperture usually exceeds the spire in length. The columella is more or less straight and four-plaited. The outer lip is not thickened, but slightly crenated and somewhat effuse below.

Garrett says that he collected animals of this interesting species near low water mark on rocky coast at the Sandwich and Marquesas Islands. Cooke's careful study has revealed certain very interesting features in the radular teeth of this form. The habits of spawning and the mode of development of this mollusc (beginning from the egg to the veliger stage) have been nicely illustrated with figures by Ostergaard in the paper cited.

Locality.—Cat's eye rocks, Lower Burma—2.

Both the specimens appear quite typical and agree with Reeve's description and figure. But in the absence of white subsutural bands and fine brown lines they approach the Polynesian examples recorded by Garrett. Like the latter, they have also got fine granulations on the uppermost whorls. The colour is yellowish-brown. The shell figured here measures 25 mm. in length and 11 mm. in diameter, with its spire 12 mm. in length and aperture 13 mm. The inside of the aperture appears more or less white.

Distribution.—*Strigatella astricta* (Reeve) has so far been known to occur in Mauritius, Sandwich, Marquesas, New Caledonia, Lifu, Pins I., Maui, Rairoa, Funafuti and Honolulu. This is the first time that the species is being recorded from the Indian waters.

Subfamily *CYLINDROMITRINAE*.

Genus **Cylindromitra** Fischer, 1884.

Type. *Voluta crenulata* Schröter, 1788.

- 1817. *Cylindra*, Schumacher, *Ess. Nouv. Syst.*, p. 236.
- 1846. *Cylindra*, Hermannsen, *Index Gen. Malacoz.* 1, p. 350.
- 1847. *Cylindra*, Gray, *Proc. Zool. Soc. London*, Pt. XV, p. 142.
- 1852. *Cylindra*, Mörch, *Cat. Conchyl. Yoldi*, 1, p. 85.
- 1853. *Cylindra*, H. & A. Adams, *Gen. Rec. Moll.* 1, p. 179.
- 1853. *Cylindra*, Gray, *Ann. & Mag. Nat. Hist.* (2) XII, p. 129.
- 1859. *Cylindra*, Chenu, *Man. de Conch.* 1, p. 196.
- 1868. *Cylindra*, Stoliczka, *Cretaceous Fauna of Southern India*, II, pp. 101, 102.
- 1868. *Cylindra*, Troschel, *Das Gebiss der Schnecken*, II, p. 67.
- 1869. *Cylindra*, von Frauenfeld, *Beiträge zur Fauna der Nicobaren*, III, p. 860.
- 1872. *Cylindra*, Garrett, *Proc. Zool. Soc. London*, p. 893.
- 1878. *Cylindra*, Kobelt, *Illustr. Conchyl.* 1, p. 68.
- 1880. *Cylindra*, Garrett, *Journ. of Conch.* III, pp. 65, 66, 69, 73.
- 1882. *Cylindra*, Tryon, *Man. Conch.* IV, pp. 109, 196.
- 1883. *Cylindra*, Paetel, *Cat. Conchyl.-Samml.*, p. 26.
- 1884. *Cylindromitra*, Fischer, *Man. de Conch.*, p. 614.
- 1888. *Cylindra*, Paetel, *Cat. Conchyl.-Samml.* 1, p. 172.
- 1890. *Cylindra*, Römer, *Cat. Conchyl.-Samml. Nat. Hist. Mus. Wiesbaden*, p. 41.
- 1895. *Cylinder*, Melvill and Standen, *Journ. of Conch.* VIII, p. 102.
- 1897. *Cylindromitra*, Melvill and Sykes, *Proc. Malac. Soc. London*, II, p. 168.

1898. *Cylinder*, Melvill and Sykes, *Proc. Malac. Soc. London*, III, p. 41.
 1899. *Cylindromitra*, Cossmann, *Ess. Paléoconch. Comp.* III, pp. 152, 154.
 1899. *Cylindra*, Hedley, *Mem. Austr. Mus.* III (7), p. 469.
 1901. *Cylindra*, Melvill and Standen, *Proc. Zool. Soc. London*, II, p. 424.
 1904. *Cylindra*, Hidalgo, *Cat. Moll. Test. Filipinas*, p. 77.
 1907. *Cylindra*, Couturier, *Journ. de Conchyliol.* LV, p. 135.
 1908. *Cylindromitra*, Horst and Schepman, *Cat. Sist. Moll. Mus. Hist. Nat. Pays-Bas*, p. 86.
 1911. *Cylindra*, Schepman, *Prosobr. Siboga-Exped. Monogr.* IV, p. 289.
 1915. *Cylindromitra*, Dall, *Smiths. Inst. U. S. Nat. Mus. Bull.* XC, p. 52.
 1919. *Cylindromitra*, Cooke, *Proc. Zool. Soc. London*, II, p. 420.
 1919. *Cylindra*, Iwakawa, *Cat. Jap. Moll. Nat. Hist. Dept. Tokyo Imp. Mus.*, p. 143.
 1920. *Cylindromitra*, Tomlin, *Journ. of Conch.* XVI (4), p. 127.
 1922. *Cylindra*, Peile, *Proc. Malac. Soc. London*, XV, p. 94.
 1923. *Cylindromitra*, Dautzenberg and Bouge, *Journ. de Conchyliol.* LXVII, p. 249.
 1924. *Cylindra*, Fulton, *A Cat. of Shells of Rec. Moll.*, p. 20.
 1928. *Cylindromitra*, Faustino, *Summary Phil. Mar. and Freshw. Moll.*, p. 297.
 1929. *Cylindromitra*, Thiele, *Handb. der Syst. Weichtierk.* 1, pp. 341, 741.
 1929. *Cylindra*, Iredale, *Mem. Queens. Mus.* IX, p. 287.
 1931. *Cylindra*, Oostingh, *Archiv f. Molluskenk.* LXIII, p. 211.
 1933. *Cylindromitra*, Dautzenberg and Bouge, *Journ. de Conchyliol.* LXXVII, p. 163.
 1934. *Cylindra*, Hirase, *A Coll. of Jap. Shells*, p. 71.
 1935. *Cylindromitra*, Dautzenberg, *Mém. Mus. Roy. Hist. Nat. Belg. Hors Ser.*, II, Fasc. 17, pp. 166, 187, 208.
 1939. *Cylindromitra*, Allan, *Austr. Mus. Mag.* VII (1), p. 16.
 1950. *Cylindromitra*, Allan, *Australian Shells*, p. 181.
 1953. *Cylindra*, Solem, *Field. Zool.* XXXIV, No. 22, p. 224.

Cylindra was established as a genus by Schumacher, in 1817, with *Voluta crenulata* Chemnitz as the type, and many authors also followed him. Fischer, on the other hand, thought that if this usage is maintained, there may be possibility of its being confused with Montfort's genus *Cylinder* (1810)¹ of the family Conidae which has priority over *Cylindra* and, accordingly, he proposed *Cylindromitra* as a suitable substitute for *Cylindra*. His fear was confirmed when Melvill and Sykes as well as Melvill and Standen unhesitatingly used the name *Cylinder* in place of *Cylindra*. Dall made a wrong attempt to treat *Cylindromitra* as a synonym of Bolten's genus *Pterygia* and Tomlin also referred to the same. Dautzenberg and Bouge were at first inclined to subordinate *Cylindromitra* to *Mitra* proper, but later on they gave it a distinct generic rank. With the changing of the generic name *Cylindra* to *Cylindromitra*, the subfamily name Cylindrinae has to be changed to Cylindromitrinae.

Troschel was inclined to place *Cylindra* into the family Marginellidae owing to the similarity of its shells with the large Margins regarding shape and the radula having but one row of teeth. This view appears to have been supported by von Martens. But a critical study of the anatomy of their soft parts (including the radular teeth) made by Gray, MacDonald, Thiele and Peile elucidated the fact that they are more closely related to the Mitres than to any other groups and thereby rightly ascertained the true systematic position of this genus into the family Mitridae.

¹ I. Montfort, *D. Conch. Syst.* II, p. 590 (1810).

Characters.—Shell solid, ovate or subcylindrically ovate or oblong-ovate, with the spire short but conical and sometimes slightly decussated; surface smooth or mostly decussated with numerous impressed longitudinal and transverse striae (which may be punctured) or ridges (which may be noduled or granose); columella straight and provided with several oblique plaits (varying from four to ten); outer lip thickened and crenulated.

The animals of this group do not have any opercula and are principally found crawling on sandy patches among coral reefs inside the barrier. So, in habits they are said to be more similar to those of the genus *Imbricaria*.

Only one species, *Mitra dactylus* Linn., represents this genus in the collection.

Cylindromitra dactylus (Linnaeus, 1767)

Type-locality.—Bay of Bengal.

(Plate III, fig. 6.)

1685. *Buccinum m. crassum variegatum*, Lister, *Hist. Conch.*, pl. 813, fig. 23.
 1758. *Cylindrus crassus*, Seba, *Thesaurus*, III, p. 149, pl. liii, fig. S.
 1767. *Voluta dactylus*, Linnaeus, *Syst. Nat.* ed. XII, p. 1188.
 1780. *Voluta dactylus*, Born, *Test. Mus. Caes. Vindob.*, p. 219.
 1783. *Voluta dactylus*, Schröter, *Einl.* 1, p. 208.
 1788. *Voluta dactylus*, Chemnitz, *Conch.*—*Cab.* X, p. 160, pl. cl., figs. 1411, 1412.
 1790. *Voluta dactylus*, Gmelin, *Syst. Nat.* ed. XIII, p. 3443.
 1811. *Mitra dactylus*, Lamarck, *Ann. du Mus.* XVII, p. 212.
 1817. *Voluta dactylus*, Dillwyn, *Descr. Cat. Rec. Shells*, 1, p. 522.
 1822. *Mitra dactylus*, Lamarck, *Anim. sans Verteb.* VII, p. 314.
 1824. *Mitra dactylus*, Blainville, *Dict. des Sci. Nat.* XXXI, p. 485.
 1825. *Mitra dactylus*, Blainville, *Man. de Malac. et Conchyliol.*, pl. xxviii, fig. 3.
 1825. *Mitra dactylus*, Sowerby, *Cat. Tankerv.*, p. 78.
 1830. *Mitra dactylus*, Deshayes, in *Bruguière's Ency. Meth. Vers.* II, p. 452, pl. cclxxii, fig. 5a-b.
 1830. *Mitra dactylus*, Menke, *Syn. Meth. Moll.*, p. 85.
 1836. *Mitra dactylus*, Bosc, *Hist. Nat. des Coq.* V, p. 32.
 1839. *Mitra dactylus*, Kiener, *Icon. Coq. Viv.* IV, p. 102, pl. xxxi, fig. 103.
 1839. *Mitra dactylus*, Küster, in *Martini and Chemnitz's Syst. Conch.*—*Cab.* V, *Abth.* 2, pp. 94, 95, pl. xvi, figs. 7, 8.
 1839. *Mitra dactylus*, Anton, *Verz. Conchyl.*, p. 68.
 1840. *Mitrella dactylus*, Swainson, *A Treatise on Malacology*, p. 321.
 1842. *Mitra dactylus*, Reeve, *Conch. Syst.*, pp. 251, 253, pl. cclxxix, fig. 7.
 1844. *Mitra dactylus*, Reeve, *Conch. Icon.* II, pl. xii, fig. 88.
 1844. *Mitra dactylus*, Lamarck, *Anim. sans Verteb.* (ed. Deshayes), X, pp. 327, 328.
 1845. *Mitra dactylus*, Catlow, *Conchologist's Nomenclator*, p. 297.
 1847. *Cylindra dactylus*, Gray, *Proc. Zool. Soc. London*, Pt. XV, p. 142.
 1850. *Mitra dactylus*, Jay, *Cat. of Shells*, p. 377.
 1852. *Cylindra dactylus*, Mörch, *Cat. Conchyl. Yoldi*, 1, p. 85.
 1853. *Mitra (Cylindra) dactylus*, Gray, *Ann. & Mag. Nat. Hist.* (2) XII, p. 129.
 1853. *Cylindra dactylus*, H. & A. Adams, *Gen. Rec. Moll.* 1, p. 179.
 1855. *Voluta dactylus*, Hanley, *Ipsa Linn. Conchyl.*, p. 217.
 1855. *Mitra dactylus*, Berge, *Conchylienbuch*, p. 252.
 1856. *Mitra dactylus*, Wood, *Index Testaceol.* (ed. Hanley), p. 100, pl. xix, fig. 47.

1859. *Mitra (Cylindra) dactylus*, Chenu, *Man. de Conch.* 1, pp. 195, 196, fig. 1021.
1860. *Mitra dactylus*, Reeve, *Elements of Conchology*, 1, p. 49.
1868. *Cylindra dactylus*, Troschel, *Das Gebiss der Schnecken*, II, p. 69.
1869. *Cylindra dactylus*, von Frauenfeld, *Beiträge zur Fauna der Nicobaren*, III, p. 860.
1869. *Cylindra dactylus*, Dunker, *Cat. Mus. Godeffroy*, IV, p. 84.
1874. *Mitra dactylus*, Sowerby, *Thesaurus*, IV, p. 15, pl. xviii (369), fig. 346.
1874. *Cylindra dactylus*, Dunker, *Cat. Mus. Godeffroy*, V, p. 120.
1878. *Cylindra dactylus*, Kobelt, *Illustr. Conchyl.* 1, p. 68, pl. xxv, fig. 3.
1880. *Cylindra dactylus*, Garrett, *Journ. of Conch.* III, pp. 7, 65.
1882. *Cylindra dactylus*, Tryon, *Man. Conch.* IV, p. 197, pl. lvii, fig. 658.
1883. *Mitra (Cylindra) dactylus*, Paetel, *Cat. Conchyl.—Samml.*, p. 27.
1888. *Mitra (Cylindra) dactylus*, Paetel, *Cat. Conchyl.—Samml.* 1, p. 177.
1890. *Mitra (Cylindra) dactylus*, Römer, *Cat. Conchyl.—Samml. Nat. Hist. Mus. Wiesbaden*, p. 41.
1895. *Mitra (Cylinder) dactylus*, Melvill and Standen, *Journ. of Conch.* VIII, p. 103.
1898. *Mitra (Cylinder) dactylus*, Melvill and Sykes, *Proc. Malac. Soc. London*, III, p. 41.
1899. *Cylindra dactylus*, Hedley, *Mem. Austr. Mus.* III (7), p. 469.
1904. *Cylindra dactylus*, Hidalgo, *Cat. Moll. Test. Filipinas*, p. 77.
1906. *Voluta dactylus*, Sherborn and Sykes, *Rept. of Bolten's 'Mus. Bolt.'*, p. 53.
1908. *Cylindromitra dactylus*, Horst and Schepman, *Cat. Sist. Moll. Mus. Nat. Hist. Pays-Bas*, p. 86.
1911. *Cylindra dactylus*, Schepman, *Prosobr. Siboga-Exped. Monogr.* IV, p. 289.
1915. *Mitra dactylus*, Dail, *An Index to Mus. Bolt.*, p. 37.
1919. *Cylindromitra dactylus*, Cooke, *Proc. Zool. Soc. London*, II, p. 420.
1919. *Cylindra dactylus*, Iwakawa, *Cat. Jap. Moll. Nat. Hist. Dept. Tokyo Imp. Mus.*, p. 146.
1922. *Cylindra dactylus*, Peile, *Proc. Malac. Soc. London*, XV, p. 94.
1923. *Mitra (Cylindromitra) dactylus*, Dautzenberg and Bouge, *Journ. de Conchyliol.* LXVII, pp. 251, 252, 254.
1924. *Mitra (Cylindra) dactylus*, Fulton, *A Cat. of Shells of Rec. Moll.*, p. 21.
1928. *Cylindromitra dactylus*, Faustino, *Summary Phil. Mar. and Freshw. Moll.*, p. 297.
1931. *Cylindra dactylus*, Oostingh, *Archiv f. Molluskenk.* LXIII, p. 211.
1933. *Mitra (Cylindromitra) dactylus*, Dautzenberg and Bouge, *Journ. de Conchyliol.* LXXVII, pp. 163, 164.
1934. *Cylindra dactylus*, Hirase, *A Coll. of Jap. Shells*, p. 71, pl. ci, fig. 16.
1935. *Cylindromitra dactylus*, Dautzenberg, *Mém. Mus. Roy. Hist. Nat. Belg. Hors Ser.*, II, Fasc. 17, pp. 169-172, 187, 208.
1939. *Cylindromitra crenulata*, Allan, *Austr. Mus. Mag.* VII (1), p. 16, fig. 1 (bottom row).

It was Linnaeus who first used the name *dactylus* for this species with particular reference to Lister's fig. 23 in pl. 813 and that is why Hanley also rightly remarked: "Lister's fig. 23 in pl. 813 cited by Linnaeus is an undoubted representative of *Mitra dactylus* which proves of much importance in sanctioning the established identification" Allan in her paper on Mitres of Australia (1939) has wrongly figured one shell of typical *dactylus* under the name of *crenulata*, though she rightly figures the latter in pl. 26, No. 14, in her book on Australian shells (1950, p. 181). The true systematic position of the well-known form *dactylus* was quite uncertain until it was finally placed into the genus *Cylindromitra*.

Characters.—The most important diagnostic feature of this interesting species is its solid, ovate, somewhat large Marginella-like shell of whitish colour, clouded with chestnut or fleshy-brown and marked throughout with distant, narrow, deeply impressed revolving obscurely punctured brown striae. The spire is short but conical and slightly decussated with striae. The bodywhorl may sometimes be slightly shouldered. The columella is straight and six-plaited, while the outer lip is thickened, crenated at the margin and effuse below. This mollusc is commonly called the "Date Mitre"

Peile who studied the radula of *dactylus* preserved in the British Museum, London, remarked: "It is in bad condition and evidently lacks laterals. The rhachidian appears to be almost rectangular with slightly incurved base reminiscent of *Mitra* and *Marginella*. The number and form of the cusps cannot be determined" The observations made by Gray (1853) enabled him to conclude: "The proboscis of *Mitra (Cylindra) dactylus* differs from the hard, smooth, rigid form of all other species of Mitres I have seen in being of a spongy texture and closely covered with large conical warts (but without any teeth)" Cooke's remark also appears interesting: "According to Troschel, *Cylindromitra* (formerly *Cylindra*) *nucea* Meusch., has no laterals, while specimens of *C. dactylus* L. have been examined both by himself and Dr. Gray without any trace of a radula being discovered. It is possible therefore that *Cylindromitra* forms the last term in the series of degraded forms of Mitridian radula; on the other hand, it may be wiser to wait for further evidence before a final decision can be reached" Swainson (1829) has pointed out the relationship of *dactylus* with his species, *Mitra bicolor*, regarding the extension of its columellar folds below.

The animals of this species are known to live in sand or sandy-mud.

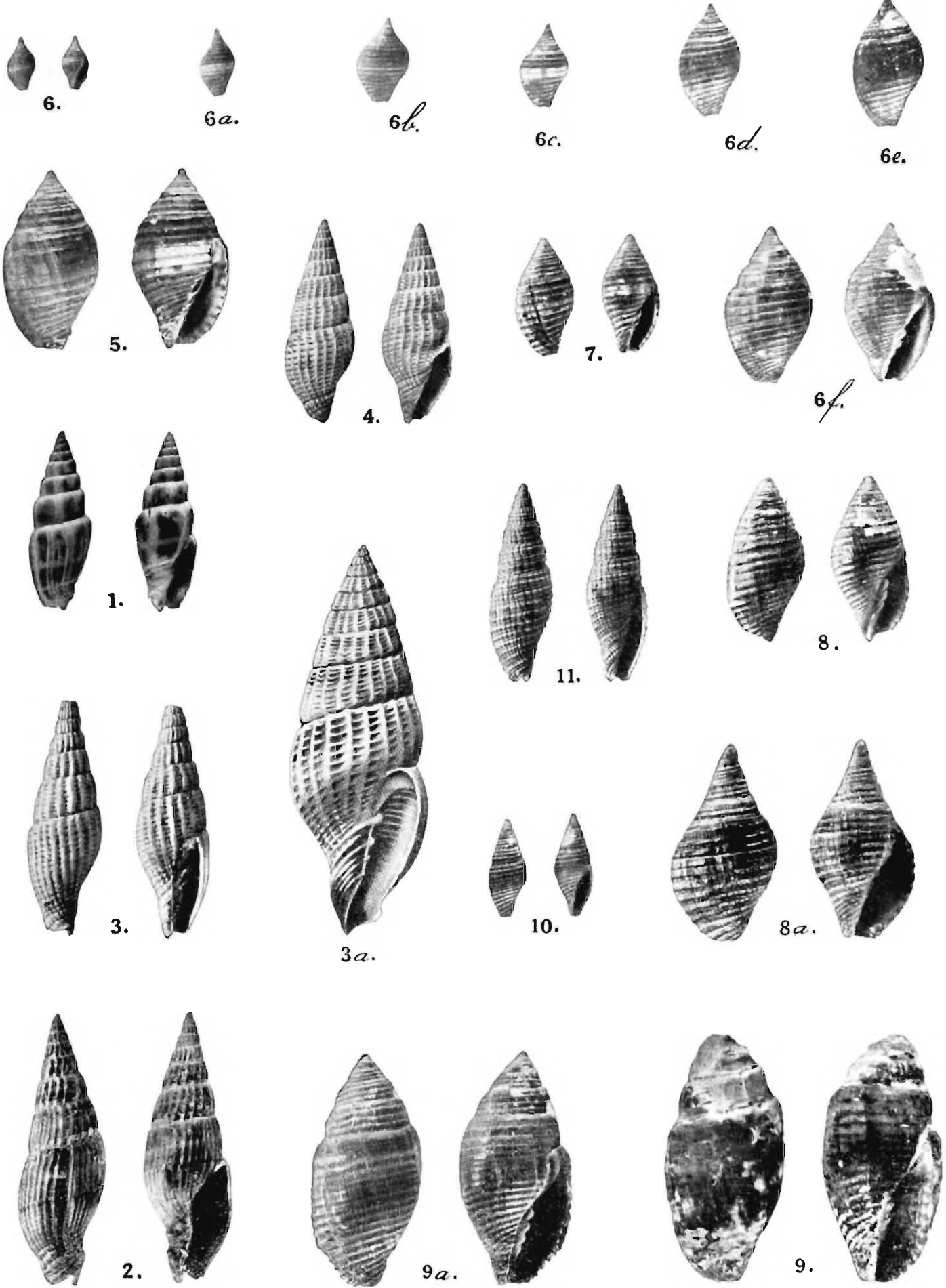
Locality.—Rangachang, 8 miles S.-E. of Aberdeen, Port Blair, Andamans—1 (18.ii.52. Dr. H. C. Ray).

The single specimen at my disposal appears to agree perfectly with the figures of *dactylus* given by Lister, Chemnitz, Kiener, Küster, Reeve, Chenu, Kobelt and Tryon. It measures 39 mm. in length and 21.5 mm. in diameter, with the spire 9 mm. in length and aperture 30 mm. There are seven whorls and six columellar plaits.

Distribution.—*Cylindromitra dactylus* (Linn.) was originally described from the Bay of Bengal, but without any mention of the exact locality, date of collection, etc. Subsequently, it has been found very widely distributed throughout the Indo-Pacific, having been recorded from Andamans, Nicobars, Amboina, Flores, Tjilaoet-Eureum in Java, Lang I. in South Sumatra, Bay of Badjo, Fiji, Woodlark Island in British New Guinea, New Caledonia, Pins I., Lifu, New Hebrides, Carolines, Philippines (Cebu, Bohol, Mindanao, Manila, Balabac), Funafuti, Viti, Tonga, Rarotonga, Samoa, Society, Paumotus, Loyalty, Gilberts, Vavau, Taumutu, Tahiti, Loo-Choo and Oho-Shima. The Species appears to be more common in the eastern part of the Indo-Pacific than in the west where its range hardly extends beyond Andamans and Nicobars. The locality 'Rangachang' is a new record. Garrett states that he failed to find *dactylus* only at Cook's amongst the Polynesian Islands.

EXPLANATION OF PLATE I.

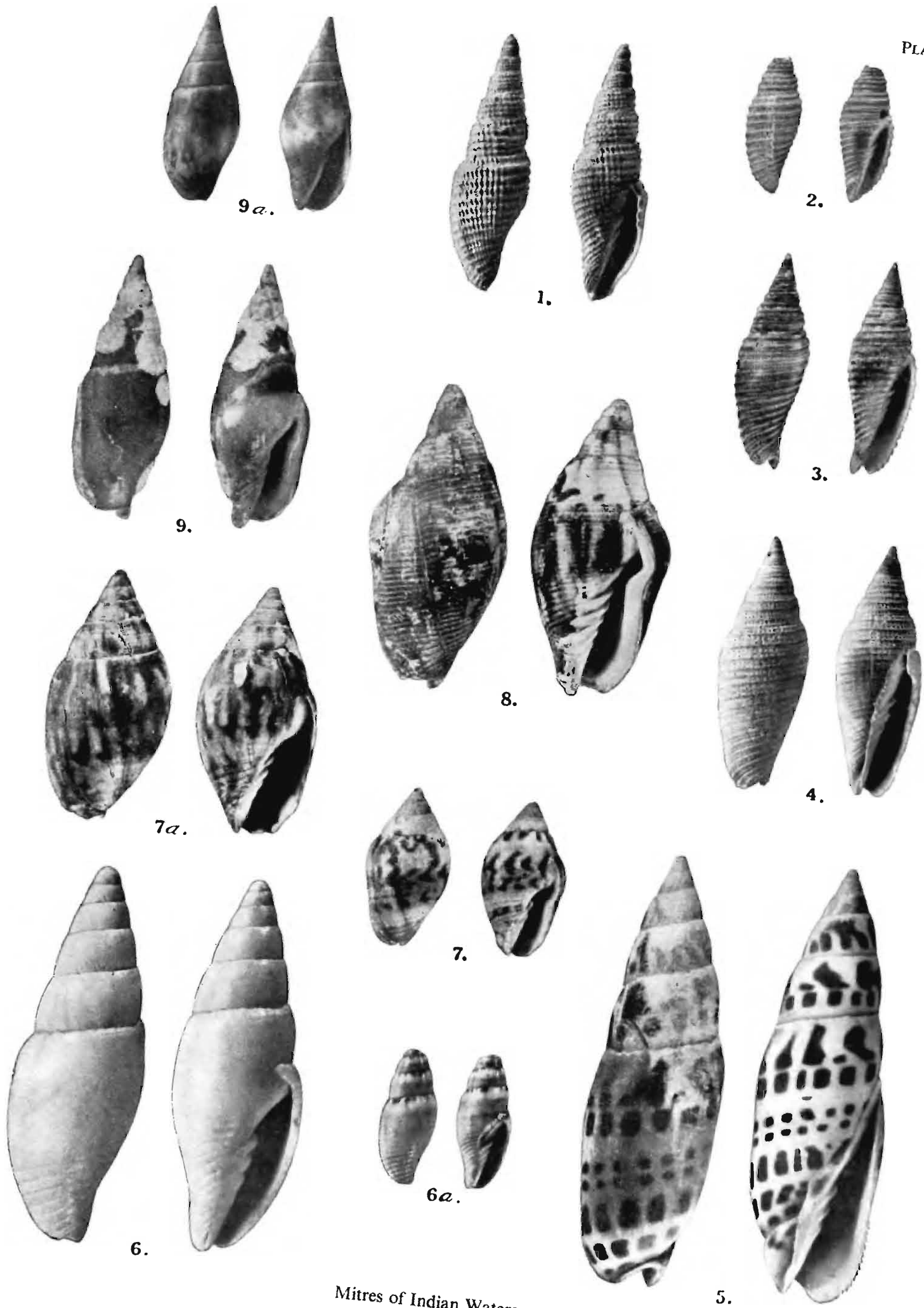
- FIG. 1.—Shell of *Vexillum deshayesi* (Reeve). x2. Andamans.
- FIG. 2.—Shell of *Costellaria acuminata* (Gmelin). x2. Madras.
- FIG. 3.—Shell of *Costellaria sculptilis* (Reeve) var. *interviewi* nov. x2. Interview Island, Andamans.
- FIG. 3a.—Shell of *Costellaria sculptilis* (Reeve). (After Hedley).
- FIG. 4.—Shell of *Costellaria obeliscus* (Reeve). x2. Andamans.
- FIG. 5.—Shell of *Chrysame cucumerina* (Lamarck). x2. Indian Seas.
- FIGS. 6, 6a-f.—Shells of *Chrysame chrysalis* (Reeve) showing different stages of growth. x2. Andamans (6-6e) and Fuladu Island (6f).
- FIG. 7.—Shell of *Chrysame tabanula* (Lamarck). x2. Andamans.
- FIGS. 8, 8a.—Adult (8) and juvenile (8a) shells of *Chrysame buryi* (Melvill and Sykes). x2. and x7. Port Blair, Andamans.
- FIGS. 9, 9a.—Adult (9) and young (9a) shells of *Chrysame aurantia* (Gmelin). x2. Port Blair, Andamans.
- FIG. 10.—Shell of *Chrysame rüppelli* (Reeve). x2. Andamans.
- FIG. 11.—Shell of *Scabricula pretiosa* (Reeve). x2. Andamans.



Mitres of Indian Waters.

EXPLANATION OF PLATE II.

- FIG. 1.—Shell of *Cancilla isabella* (Swainson). x2. Maungmagan, Lower Burma.
- FIG. 2.—Shell of *Cancilla circula* (Kiener). x2. Andamans.
- FIG. 3.—Shell of *Cancilla interlirata* (Reeve). x2. Sandheads, mouth of the River Hooghly
- FIG. 4.—Shell of *Cancilla rufilirata* (Adams and Reeve). x2. Port Blair, Andamans.
- FIG. 5.—Shell of *Mitra mitra* (Linnaeus). Nat. size. Fehendu Id.
- FIGS. 6. 6a.—Adult and young shells of *Vicimitra prosphora* Iredale. x2. Chowpathy beach, Bombay (adult-6). Nat. size (young-6a)—Sandy beach at Lamba near Porbander, Kathiawar.
- FIGS. 7, 7a.—Adult and young shells of *Strigatella litterata* (Lamarck). x2. Andamans.
- FIG. 8.—Shell of *Strigatella columbellaeformis* (Kiener). x2. Reef on north side of Fuladu Island.
- FIGS. 9, 9a.—Adult and young shells of *Strigatella acuminata* (Swainson). x2. Reef on north side of Fuladu Island (adult-9) and Mauritius (young-9a).



Mitres of Indian Waters.