Records of the Zoological Survey of India

Contribution to the Molluscan Fauna of India
Part II. Marine Molluscs of the Coromandel Coast, Palk Bay and Gulf of Mannar—
Gastropoda : Mesogastropoda (Partim)

by

A. S. Rajagopal and H. P. Mookherjee

Issued by the Director
Zoological Survey of India, Calcutta
CONTRIBUTION TO THE MOLLUSCAN FAUNA OF INDIA
PART II. MARINE MOLLUSCS OF THE COROMANDEL
COAST, PALK BAY AND GULF OF MANNAR—
GASTROPODA : MESOGASTROPADA
(PARTIM)

By
A. S. RAJAGOPAL AND H. P. MOOKHERJEE
Zoological Survey of India, Calcutta
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INTRODUCTION

This is the second contribution in the series, "Contributions to the molluscan fauna of India." In the earlier part systematic studies on the order Archaeogastropoda was completed by the present authors (Rajagopal and Mookherjee, 1978).

This part deals with systematic studies of eight families namely, Littorinidae, Turritellidae, Architectonicidae, Planaxidae, Potamididae, Cerithiidae, Epitoniidae and Janthinidae under the order Mesogastropoda, all of which are predominantly marine and/or estuarine in their habitat. The remaining families in the order which also are marine/estuarine will be dealt with in a later part.

Since a brief review of the earlier works on the molluscan fauna of the east coast of India has already been presented in the previous work of this series, it is omitted here.

The material for this study is provided by the large back-log of unnamed collection accumulated for over 60 years in the Zoological Survey of India. It also includes the collections brought from three tours along the Coromandel Coast, Palk Bay and Gulf of Mannar conducted in 1968, 1975 and 1978 under the leadership of one of the authors (A. S. R.).

On the whole, the study includes 15 genera and 36 species spread over 8 families in the order Mesogastropoda. Included in it are three species, Turritella (Haustator) trisulcata Lamarck, Clypeomorus delectum (A. Adams) and Epitonium lamellosum (Lamarck) which are recorded here for the first time from the Indian coast and another, Cerithium balteatum Philippi is recorded for the first time from the coast of mainland India. Two others, i.e., Torinia straminea (Gmelin) and Cerithidea (Cerithidea cingulata) (Gmelin) are represented in their
respective material by topotypes from Tranquebar. Two other species, viz., *Clypeomorus splendens* (Sowerby) and *Cerithium tenellum* Sowerby are new additions to the National Zoological Collections of the Zoological Survey of India.

The classification adopted in this paper is mainly the one given by Thiele (1931)*

**II. ABBREVIATIONS USED**

CMFRI—Central Marine Fisheries Research Institute; Coll.—collector (s); colln.—collection; d.—dry; E.—East; ex.—example (s); Id.—Island; I.F.S.—Inshore Fisheries Survey vessel; Is.—Islands; Km.—Kilometre (s); MBS.—Marine Biological Station; N.—North; NZC.—National Zoological Collections; Reg. No.—Register Number; S.—South; S.E.—South-east; Sta.—Station; vill.—village; W.—West; w.—wet; ZSI.—Zoological Survey of India.

Consolidated list of marine molluscs reported so far from the east coast of India between Madras and Kanya Kumari (species arranged alphabetically), Taxa marked with asterisk (*) have been dealt with in the paper.

**Phylum MOLLUSCA**

**Class GASTROPODA**

**Order MESOGASTROPODA**

**Family LITTORINIDAE**

* *Littorina (Littoraria) kraussi* Rosewater.
* *Littorina (Littoraria) undulata* Gray.

*Littorina (Littorinopsis) carinifera* (Menke).
* *Littorina (Littorinopsis) melanostoma* Gray.
* *Littorina (Littorinopsis) scabra scabra* (Linnaeus).

*Nodilittorina (Granulilittorina) leucosticta leucosticta* (Philippi).
* *Nodilittorina (Granulilittorina) millegrana* (Philippi).
* *Nodilittorina (Nodilittorina) pyramidalis pyramidalis* Quoy and Gaimard.

*The attention of the authors was drawn to the creation by Habe T. und Kosuge, S. of the order Heterogastropoda to include families Triphoridae, Architectonicidae, Mathildidae, Epitoniidae and Janthinidae, when the paper was in its final stage. This classification has not been followed here as the authors could not study it in depth.*
Family—**TURRITELLIDAE**

* Turritella acutangula Linnaeus.
* Turritella attenuata Reeve.
  Turritella bacillum Kiener.
* Turritella columnaris Kiener.
  Turritella triplicata Studer.
* Turritella (Haustator) trisulcata Lamarck.

Family—**ARCHITECTONICIDAE**

Architectonica aspera (Hinds).
* Architectonica laevigata (Lamarck).
  Architectonica modesta (Philippi)
* Architectonica perspectiva (Linnaeus)
  Architectonica picta (Philippi)
  Architectonica purpurata (Hinds).
* Torinia dorsuosa (Hinds)
* Torinia straminea (Gmelin).

Family—**VERMETIDAE**

Spiroglphysis spirulaeformis (de Serres).
Vermicularia inopertus (Ruppell).
Tenagodus lacteus (Lamarck).
Tenagodus encausticus (Morch).

Family—**PLANAXIDAE**

Planaxis breviculus Deshayes var. tessellata Nevill.
Planaxis nigra Quoy.
Planaxis similis Smith.
* Planaxis (Planaxis) sulcatus (Born).

Family—**POTAMIDIDAE**

* Cerithidea (Cerithideopsilla) cingulata (Gmelin).
  Cerithidea obtusa Lamarck.
* Telecopium telescopium (Linnaeus).
  Terebralia palustris (Linnaeus).

Subfamily—**BATILLARIINAE**

* Batillaria angulifera (Sowerby)

Family—**CERITHIIDAE**

Subfamily—**CERITHINAE**

* Cerithium balteatum Philippi.
  Cerithium carnaticum Melvill & Standen.
Cerithium citrinum Sowerby.
* Cerithium columna Sowerby
  Cerithium gemma Sowerby.
  Cerithium litteratum Born.
  Cerithium nodulosum Bruguiere.
  Cerithium proditum Bayle.
  Cerithium rubus Martyn.
* Cerithium scabridum Philippi.
* Cerithium tenellum Sowerby.
  Cerithium vulgatum Bruguiere.
* Clypeomorus delectum (A. Adams).
* Clypeomorus moniliferus (Kiener).
* Clypeomorus splendens (Sowerby).
* Clypeomorus traulii (Sowerby).
  Colina selecta Melvill & Standen.
  Colina pupaeformis A. Adams.
  Rhinoclavis (Proclava) kochi (Philippi).
  Rhinoclavis (Rhinoclavis) aspera (Linnaeus).
  Rhinoclavis (Rhinoclavis) fasciata (Bruguiere).
* Rhinoclavis (Rhinoclavis) sinensis (Gmelin).

Family—TRIPHORIDAE

Triphora concinna Hinds.
Triphora violacea (Quoy & Gaimard).

Family—EPITONIIDAE

* Acrilla acuminata (Sowerby).
  Eglisia tricarinata Adams & Reeve.
* Epitonium immaculatum (Sowerby).
* Epitonium lamellosum (Lamarck).
* Epitonium latifasciatum (Sowerby).
  Epitonium melior (Melvill & Standen).
* Epitonium pallasii (Kiener).
  Epitonium philippinarum (Sowerby).
* Epitonium pyramidale (Sowerby).
  Epitonium scalaris (Linnaeus).
* Epitonium subauriculatum (Souverbie)
  Epitonium subtile (Sowerby).

Family—JANTHINIDAE

* Janthina globosa Swainson.
  Janthina jehennei Petit.
* Janthina roseola Reeve.
Phylum MOLLUSCA
Class GASTROPODA
Sub-class PROSOBRACHIA
Order MESOGASTROPODA

Mesogastropoda is the second of the three orders of the Prosobranchiate gastropods. It is characterised by a usually conical shell, generally with a siphonal canal and a canal noncalcified operculum. Internally radula is commonly of taenioglossate type, pedal ganglia usually without cords. Only one monopectinate ctenidium, one osphradium, one nephridium and one auricle are retained as a result of torsion. These lie now to the left side of the rectum and anus though they were originally, i.e., before torsion members of the right side, the pretorsional members of the left side having disappeared, except that, part of the nephridium of this side has got united with the gonoduct.

Key to the identification of the Indian families of order MESOGASTROPODA:

Shell usually conical, small to moderate size; whorls inflated with spire moderately elevated or depressed; with or without umbilicus
Shells moderate to large; spire generally elevated with few to many whorls; umbilicus present

A Shell conical, broad; spire depressed; umbilicus wide with toothed margin
Shell not broad; spire generally elevated; umbilicus small; surface either smooth or spirally striated.

B Shells thick, elongated with many whorls; whorls generally inflated with sculpture,
spirally striated; without siphonal notch and anterior canal. ... ... ... ... Turritellidae
Shells are not like above ... ... ... ... 3

3. Shells variously shaped with rounded whorls; spire elevated. Whorls bearing longitudinal prominent ribs. Aperture circular. ... ... Epitonidae
Shells elongated with few to many whorls; without longitudinal ribs. ... ... ... ... 4

4. Shells with many whorls, straight sided; sculpture usually with spiral ridges. Aperture provided with distinct anterior canal. Generally found in brackish water. ... ... Potamididae
Shells with few whors, rounded; sculpture generally ornamented with tubercles and ridges. Anterior canal generally present. Generally found in marine, extends to estuarine waters. ... ... Cerithiidae

Family LITTORINIDAE

This family morphologically allied to the family Planaxidae is represented here by a single subfamily namely, Littorininae.

Shell in some species nodulose, granulose, or with surface axially folded, in others with surface smooth or spirally folded (carinate).

Subfamily LITTORININAE

Under this subfamily a single genus Littorina Ferussac is dealt with here bearing subgenera Littoraria Griffith and Pidgeon, Littorinopsis Morch, Nodilittorina von Martens and Granulilittorina Habe and Kosuge.

Shell higher than broad, with more or less rounded whorls; surface smooth or granulose, conspicuously coloured; operculum horny; aperture ovate with its margin thin and unbroken by canals. ... ... ... ... Littorina

Family LITTORINIDAE

Subfamily LITTORININAE

Genus Littorina Ferussac, 1822

_Type-species:_ Turbo littoreus Linnaeus, 1758.*
Subgenus Littoraria Griffith and Pidgeon, 1834.
_Type-species:_ Littorina zebra (Donovan, 1825).
Littorina (Littoraria) undulata Gray, 1839.
Littorina undulata Gray, 1839†, _Zool. Capt. Beechey's Voy. in H. M. S. Blossom, Malusks_, p. 140. (Type-locality designated subsequently by Rosewater [1970]:

† Reference not seen in the original.

Littorina columna: Philippi, 1847, Abbild. und beschreib. Conchyl., 3: 14, Litorina, sp. No. 12, pl. 6, fig. 15.


For complete synonymy Rosewater (1970) may be consulted.


Distribution—In India: Vengurla, N. of Goa, Goa; Khumpta, N. of
Kanara, Malabar, Cochin, Varkalay, Kanya Kumari, Tiruchendur, Pamban, Gulf of Mannar and Palk Bay, Mandapam Camp; Royapuram beach, Madras; Andaman & Nicobar Is; Lakshadwip.


Remarks—Reeve (op. cit.) and Tryon (op. cit.) have given descriptions which are brief but adequate. Satyamurti (1952) is in greater detail and following Reeve (op. cit.) he has rightly stressed the variable nature of the shell character, Gravelý (op. cit.) and Rosewater (op. cit.) have given a good account of its ecology. The latter (op. cit.) also provides elaborate description noting the variable nature of its shell and its extensive distribution in the Indo-Pacific region. He states that it lives intertidally on rocky shores commonly clustering in rock crevices during daylight, becoming active at night and crawling on the rocks.

The large number of shells both dry and wet before us presents a wide range of sizes and colour patterns and agrees with the above descriptions.

Shell nonumbilicate, solid, ovately conoid. Columella though appressed by callus, may or may not be violet. Pody-whorl slightly concavely impressed round the upper part, then convex, evenly rounded without sharp angulation below.

Measurements (in mm.)

<table>
<thead>
<tr>
<th></th>
<th>Range (100 exs.)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Height</td>
<td>5.05—21.90</td>
</tr>
<tr>
<td>Maximum Diameter</td>
<td>3.60—13.20</td>
</tr>
<tr>
<td>Minimum Diameter</td>
<td>3.25—12.80</td>
</tr>
</tbody>
</table>

Littorina (Littoraria) Kraussi Rosewater, 1970


*Material*—(1) 8 exs. (w.), Sta. 11—Shore colln., in front of the Circuit House, Tuticorin, 21-2-1968, (2) 1 ex. (w.), Sta. 14—From a rock, Kanya Kumari, 24-2-1968 (Coll. A. S. Rajagopal); (3) 3 exs. (w),

Distribution—In India: Goa.


For a detailed distribution list of this species Rosewater (1970) may be consulted.

Remarks—Rosewater (op. cit.) has provided the nomen novum as above to this species to replace the earlier name, Littorina glabrata which has been found to be a secondary homonym of Paludina glabrata P.‘eiffer [= Littorina neritoides (Linnaeus)].

The material under study agreed well with the description of the species given by Rosewater (op. cit.).

Shell turbinate, pale flesh colour, non-umbilicate, painted with oblique or zigzag brown streaks. Whorls scarcely convex. Body-whorl moderately weakly keeled at the periphery. Spire whorls above penultimate whorl dark anteriorly and light posteriorly. Aperture oval and outer lip thin in young ones and moderately thick in adults. Columella variable in colour from dark brown to nearly white.

Measurements (in mm.)

<table>
<thead>
<tr>
<th>Measurement</th>
<th>Range (8 exs.)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Height</td>
<td>10.25—21.40</td>
</tr>
<tr>
<td>Maximum Diameter</td>
<td>6.65—12.25</td>
</tr>
<tr>
<td>Minimum Diameter</td>
<td>6.25—11.75</td>
</tr>
</tbody>
</table>

Genus Littorina Ferussac, 1822

Subgenus Littorinopsis Morch, 1876

Type-species: Phasianella angulifera Lamarck, 1822

Littorina (Littorinopsis) scabra scabra (Linnaeus, 1758).

Buccinum foliorum Rumphius, 1705,* d' Amboinische Rariteitkamer, p. 98, pl. 29, sp. Y; (pre Linnean).

Helix scabra Linnaeus, 1758, Syst. Nat. ed. X. 1 : 770 (Type-locality: Amboina, Moluccas); Lectotype designated by Rosewater (1970): Specimen figured by Chemnitz, 11, pl. 210, fig. 2074.

Buccinum lineatum: Gmelin, 1791, Syst. Nat., ed. XIII, 1 (6) : 3493, refers to Knorr, Vergu, 3, pl. 4, fig. 4.


Littorina scabra ventricosa: Philippi, 1847, Abbild. und Beschreib. Conchyl., 2 : 222, Litorina, pl. 5, fig. 8.

Littorina scabra: Reeve, 1857, Conch. Icon., 10 : Littorina, sp. no. 21, pl. 5, figs. 21a to 21c; Tryon, 1887, Man. Conch., 9 : 243, pl. 42, figs. 18-20, Satyamurti, 1952,


For a complete synonymy reference may be made to Rosewater [1970].


**Distribution**—In India: Vengurla, N. of Goa, Khumpta (Kumpta); N. of Kanara; Netraati R., Mangalore; Cochin Harbour, Kerala; Tuticorin, Pamban & Krusadai Id.; Mandapam, Palk Bay, Rameswaram, Madras, Ennur backwater, Adyar R. estuary; Port Canning, Calcutta; Andamans.


A more detailed distribution list is available in Rosewater (1970).

**Remarks**—Rosewater (*op. cit.*) recognises two subspecies under this, viz., *scabra* which is Pan Indo-Pacific and *angulifera* which is Atlantic. His excellent description of the nominate subspecies is based on both shell characters and animal. He has also dealt with the ecology distinctive to this subspecies, i.e., its preference to stems and leaves of Mangroves in backwaters and estuaries and its avoidance of shore rocks of open seas. Gravely (*op. cit.*) also had noted this point earlier. According to Rosewater (*op. cit.*) this is ovoviviparous and
produces closely related, in bred populations within which variations or mutations may develop and are perpetuated.

The specimens in the collection agree with the description given by Rosewater (op. cit.).

Shell thin, turbinately ovate, spirally ridged, spire elevated, suture narrowly channelled in larger shells. Body-whorl sharply angular below, subcarinate to carinate at the periphery. Colour of the shells variable often with mosaic of dark brown blotches arranged axially or zigzag in an oblique order. Columella excavately appressed. Outer lip somewhat expansive.

<table>
<thead>
<tr>
<th>Measurements (in mm.)</th>
<th>Range (30 exs.)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Height</td>
<td>6.95—20.75</td>
</tr>
<tr>
<td>Maximum Diameter</td>
<td>4.55—13.60</td>
</tr>
<tr>
<td>Minimum Diameter</td>
<td>4.25—12.90</td>
</tr>
</tbody>
</table>

**Littorina (Littorinopsis) melanostoma** Gray, 1839


**Distribution**—In India: Matla R., Gangetic Delta, Port Canning, Sunderbans; False Point, Orissa; Mandi off Mandapam Camp.


**Remarks**—Rosewater (op. cit.) has given a detailed description of this species. He (op. cit.) and Gravely (op. cit.) have also dealt with its distinctive habitat in estuarine areas on mangrove trees and grasses.


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* Reference not seen in the original.
thin, inner lip greatly thickened, weakly concave, glazed with dark brown callous.

Measurements (in mm.)

<table>
<thead>
<tr>
<th></th>
<th>Range (2 exs.)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Height</td>
<td>13.60—21.40</td>
</tr>
<tr>
<td>Maximum Diameter</td>
<td>7.15—10.35</td>
</tr>
<tr>
<td>Minimum Diameter</td>
<td>6.60—9.75</td>
</tr>
</tbody>
</table>

Genus Nodilittorina von Martens, 1897

Type-species: Littorina pyramidalis Quoy and Gaimard, 1833.

Subgenus Nodilittorina von Martens, 1897.

Nodilittorina (Nodilittorina) pyramidalis pyramidalis (Quoy & Gaimard, 1833)


Turbo trochiformis: Dillwyn, 1817, Descriptive Catalogue of Recent Shells, 2: 826 (Southern Ocean); refers to Gmelin. T. Nodulosus, p. 3582 and to Chemnitz, Conchyl. Cab., 5, pl. 163, f. 1545, 1546; not T. trochiformis Brochii, 1814.


Regarding the nomenclature Rosewater (op. cit.) has given a detailed account of how the earlier names given by Gmelin (op. cit.) and Dillwyn (op. cit.) are preoccupied and not available. Hence the only name that becomes valid is the one as stated above by the application of the law of priority.


Distribution—In India: Bandra, N. of Bombay, Vengurla, N. of Goa; Goa, Kumta (Kumta), N. of Kanara, Kanya Kumari, W. of Mandapam Camp, Gulf of Mannar, Rameswaram Is., Pamban, Palk
Strait, Ramen Point, West side of Pamban Pass between Gulf of Mannar and Palk Bay, Tiruchendur, Tamil Nadu.


Remarks—Shell thick, pyramidally ovate, non-umbilicate. Spire turreted, whorls concavely slanting at the upper part, then angled, conspicuously bearing raised spiral cords with raised white nodules. Microscopic sculpture consisting of overall closely spaced wavy spiral threads. Axial sculpture consisting of oblique growth lines. Aperture roundly oval, dark reddish brown with a narrow yellowish white band going inward from near anterior junction of outer lip and columella. Columella broadly excavated, reddish brown.

Nodules in two rarely in three on body-whorl, a single row on spire whorls, the other row often covered over by the next succeeding whorl. Nodules on peripheral row of body whorl sometimes appearing double by the cord dividing spirally.

Rosewater (op cit.) says that this species is found on shore rocks considerably above high tide line a fact which is fully corroborated by the material under study.

<table>
<thead>
<tr>
<th>Measurements (in mm.)</th>
<th>Range (100 exs.)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Height</td>
<td>3.95—12.50</td>
</tr>
<tr>
<td>Maximum Diameter</td>
<td>2.70—7.85</td>
</tr>
<tr>
<td>Minimum Diameter</td>
<td>2.65—7.35</td>
</tr>
</tbody>
</table>

Genus *Nodilittorina* von Martens, 1897

Subgenus *Granulilittorina* Habe and Kosuge, 1966

*Type-species:* *Litorina millegrana* Philippi, 1848.

*Nodilittorina* (Granulilittorina) *millegrana* (Philippi, 1848).

*Litorina granularis* 'Gray' of Authors, non Gray, 1839*

[Gray, holotype, BM (NH) 87. 4. 26.9 is an eastern Atalantic species, *Nodilittorina miliaris* (Quoy & Gaimard)].


* Reference not seen in the original.


**Distribution**—In India: Bandra, North of Bombay, Ratnagiri, Maharashtra; Goa, South of Kerala, Kanya Kumari, Tiruchendur, Tamil Nadu, Pondicherry, Andamans.


**Remarks**—The large collection containing various sizes of shells agrees well with the description given by Rosewater (*op. cit.*).

This specie occurs on shore rocks above high tide line.

Shell moderately thick, rounded oval to subtorbinate, grayish white with axially prominent reddish brown streaks. Non-umbilicate; surface bearing granulose spiral cords often alternating with non-granulose weaker cords on the body-whorl and spire. Suture well impressed. Body-whorl smoothly rounded at the periphery. Aperture widely oval, flesh coloured, usually with a white band extending inward from near the anterior junction of outer lip and columella. Columella excavated showing a crescent shaped area on base adjacent to columella callus. Outer lip moderately thick.
Measurements (in mm.)

<table>
<thead>
<tr>
<th>Height</th>
<th>Range (120 exs.)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Maximum Diameter</td>
<td>2.20—9.50</td>
</tr>
<tr>
<td>Minimum Diameter</td>
<td>1.85—8.65</td>
</tr>
</tbody>
</table>

Family TURRITELLIDAE

Only one genus Turritella Lamarck is recognised and the same has been represented with four species.

Shell bearing more or less massive, slender and attenuated with spiral ridges weaker towards the body-whorl...

Turritella

Family TURRITELLIDAE

Marwick (1957) has made a generic revision of this family.

Genus Turritella Lamarck, 1799

Type-species: Turbo duplicatus Linnaeus.

Turritella acutangula (Linnaeus, 1758)

Turbo acutangula Linnaeus, 1758, Syst. Nat., ed. X, 766 : sp 559,

(Type-locality: Not given)


Turritella duplicata: Kiener (1843-44)* Coq. Viv., 10, Turritella : 3-4, pl. 1, all figs.:

Reeve, 1849, Conch. Icon., 5, Turritella, sp. No, 2, pl. 1, fig. 2.

Turritella (Zaria) duplicata: Tryon, 1886, Man. Conch., 8 : 207, pl. 65, figs. 20-22.

We have followed Gravely (op. cit.) in adopting the above name for the species.


* The date is determined as per Sherborn, C. D., and Woodward, B. B. 1901, Proc. malac. Soc. Lond., 4 (5) : 216-219,

_Distribution_—In India: Bombay, Devagad, Krusadai Id., Pamban Madras, Nicobars.

_Elsewhere_: Indian Ocean: Madagascar, Sri Lanka, Maungmagan (Rangoon); Pacific: Indonesia, Philippines.

_Remarks_—Satyamurti has given an adequate description of the species.

Shell stout, ponderous, turbinately turreted, pale yellowish, non-umbilicate, whorls about 16, markedly bulged in the middle, first few with several subequal keels, later whorls with two or three prominent keels, others disappearing or becoming obsolete. Upper half of whorls light chestnut coloured. Aperture sinuous, columella with thin polished callus.

A large number of shells in different sizes and stages of growth represents the collection for study.

<table>
<thead>
<tr>
<th>Measurements (in mm.)</th>
<th>Range (35 exs.)</th>
</tr>
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<tbody>
<tr>
<td>Height</td>
<td>14.45—106.50</td>
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<tr>
<td>Maximum Diameter</td>
<td>4.50—27.70</td>
</tr>
<tr>
<td>Minimum Diameter</td>
<td>4.45—27.45</td>
</tr>
</tbody>
</table>

_Turritella attenuata_ Reeve, 1849

_Turritella duplicata_ var, Kiener (1843-44)* _Coq. Viv. 10 :_ pl. 1, Figs. 20 a & b.

_Turritella attenuata_ : Reeve, 1849, _Couch, Icon., 5, Turritella_, sp. No. 4. pl. 1, fig. 4 ;


**Distribution**—In India: Kundugal Point, Pamban, Madras, Puri, Digha.

**Elsewhere**: Eastern Sea.

**Remarks**—Reeve (*op. cit.*) and Satyamurti (*op. cit.*) have provided brief but adequate descriptions to this species.

Shell light brownish or pinkish, attenuate, elongate, whorls with spirally raised striations. Striations similar in size on earlier whorls. In later whorls, i.e., 10th or 12th onwards middle one striation becoming stronger; others getting gradually weak and obsolete. Whorls strongly single keeled bulged in middle, upper part of whorl sloping, lower part curved and constricted by suture. Upper part of whorls tinged with blue. Aperture sinuate.

A large number of shells of different sizes forms the material under study.

<table>
<thead>
<tr>
<th>Measurements (in mm.)</th>
<th>Range (35 exs.)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Height</td>
<td>32.20-95.70</td>
</tr>
<tr>
<td>Maximum Diameter</td>
<td>9.30-21.30</td>
</tr>
<tr>
<td>Minimum Diameter</td>
<td>9.25-19.80</td>
</tr>
</tbody>
</table>
Turritella columnaris Kiener


Distribution—In India: Madras.

Elsewhere: Mergui Archipelago, Rangoon, California.

Remarks—Brief but adequate descriptions are found in Kiener (op. cit.), Reeve (op. cit.) and Tryon (op. cit.).

Shell elongate sharply lanceolately turreted, of mottled, greyish or brownish colour. Whorls large in number (about 30), not much inflated, sometimes flattened in middle, earlier ones with two strong spiral striations, others with more or less uniform spiral ridges (about 10 in number), ridges obsolescently granulated, suture excavated. Base strongly angulated.

A single imperfect shell represents this in the collection.

Subgenus Haustator Montfort, 1810

Type-species: Turbo imbricataria Lamarck

Turritella (Haustator) trisulcata Lamarck, 1822.


* Reference not seen in the original.
Distribution—In India: Mandapam Camp.
Elsewhere: Red sea, Persian Gulf, Gwadar (Baluchistan), Mergui Archipelago.

Remarks—Brief but adequate descriptions of this species can be had from Deshayes (op. cit.), Reeve (op. cit.) and Tryon (1886).

Shell acuminately turreted with dark chestnut to light brown spiral or transpiral markings. Whorls with three ridges, intermediate grooves concave and spirally striated. Aperture subquadrangular, outer lip sinuous. Whorls towards apex whitish tinged with violet or blue.

Most of the shells under study are eroded to varying degrees. A few of them, which are mainly chestnut or brown coloured, are the least eroded; and the rest are bleached. The "Orange-brown transpiral flammules" mentioned by authors are nothing but the unfaded remnants of the original brown colour on eroded shells.

This is the first record of the species from the Indian coast.

Measurements (in mm.) Range (80 exs.)
Height 14.00—47.55
Maximum Diameter 4.40—12.90
Minimum Diameter 4.25—12.10

Family ARCHITECTONICIDAE

Two genera namely Architectonica (Bolten) Roding and Torinia Gray have been dealt in this paper.

Shells depressedly conical with sharply angulated margin. Whorls with spiral ridges and grooves; base flattened ... ... ... ... Architectonica.

Shells flatly disc-shaped. Margin with number of spiral ridges; whorls with granular spiral sculpture showing radial lines above and below ... ... ... ... ... ... ... ... Torinia.

Family ARCHITECTONICIDAE

Genus Architectonica (Bolten) Roding, 1798

Type-species: Trochus perspectivus Linnaeus.

Architectonica perspectiva (Linnaeus, 1758).

Trochus perspectivus Linnaeus, 1758, Syst. Nat., Ed. X : 757, sp. 503 (Type-locality: "ad 0. Asiae littora");

Solarium perspectivum: Reeve, 1864, Conch. Icon., 15: Solarium, sp. No. 11, pl. 2, fig. 11; Tryon, 1887, Man. Conch., 9: 8, pl. 2, figs. 18-21.

Hinds' (1844) trochlear and formosum and Philippi's (1848) zonatum and incisum are considered synonyms of this species (Reeve, op. cit.; Tryon, op. cit.).

Material—(1) 3 exs. (d.), Sea shore, 4 Km. (2½ miles) S. E. of MBS. Porto Novo, 25-1-1957; (2) 2 exs (d.), Sea shore about 1.6 Km. (1 mile), S. of Fort, Tranquebar, 29-1-1957 (Coll. A. G. K. Menon & G. Ramakrishna); (3) 3 exs. (d.), Sta. 5—Shore colln. between Killai R. mouth and Chinnavayakal Vill. 13-2-1968; (4) 39 exs. (d.), Sta. 7—Shore colln., Point Calimere, 16-2-1968; (5) 29 exs. (d.), Sta. 8—Shore colln., Agasthampalli, 17-2-1968; (6) 3 exs. (d.), Sta. 9—Shore colln., Vedaranyam, 18-2-1968 (Coll. A. S. Rajagopal); (7) 2 exs. (d.), Sta. 8—Shore colln. Karaikal, from Fisherman's village south upto light house, 6-2-1975; (8) 9 exs. (d.), Sta. 11—Shore colln., opposite Fort to the mouth of Uppanar, Tranquebar, 11-2-75; (9) 1 ex. (d.), Sta. 20—Coastal waters of Madras from the High Court to Triplicane, 9-10 fms. on board “Chota Investigator”, 25-2-1975, (10) 2 ex. (d.), Sta. 3—Shore colln., Sethubabachatram, Palk Bay, 14-1-1978 (Coll. A. S. Rajagopal & H. P. Mookherjee).

Distribution—In India: Digha, Pamban, Andaman Is.

Elsewhere: Baluchistan coast (Gwadar), Mergui, Arakan & Penang, Indian Ocean, Pacific Ocean: China to Australia.

Remarks—The descriptions given by Reeve (op. cit.) and Tryon (op. cit.) are brief and inadequate while the same by Satyamurti (op. cit.) and Crnohorsky (op. cit.) are fairly complete and satisfactory.

Shell conoid, depressed, moderately thick, attractively coloured with spiral bands, widely unbilicated with flattened base and angulated periphery. Whorls scarcely inflated, transversely obliquely striated throughout, spirally distinctly narrowly grooved below suture. Upper edge of each whorl spirally marked by three prominent unbroken bands in brown, white and chocolate respectively. Along lower edge a spiral rib alternately coloured with interrupted bands of white and brown or dark brown. On body-whorl this rib followed by well defined white slender thread-like groove. Body-whorl sharply angular and bordered by spiral ridges. Basal aspect of shell slightly bulged and radiately striated. Periphery with broad raised margin divided medially by closely-set double spiral ridge. Basal aspect of shell slightly bulged and radiately striated. Periphery with broad raised margin divided medially by closely-set double groove spirally. Umbilicus wide with strongly plicated brown-tinted margin. Immediately next to this beaded spiral rib with channel on
either side. Beaded rib running along side margin of umbilicus deeply inside up to apex. Aperture ventral, subquadrangular. Outer lip sharply angulated at lower margin.

The shells before us are of various sizes and stages of growth and show variations also in shades and colour patterns. In some cases despite the colour pattern having been bleached the sculpture has remained uniform and unaffected.

<table>
<thead>
<tr>
<th>Measurements (in mm.)</th>
<th>Range (30 exs.)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Height</td>
<td>4.65—18.05</td>
</tr>
<tr>
<td>Maximum Diameter</td>
<td>11.20—31.20</td>
</tr>
<tr>
<td>Minimum Diameter</td>
<td>10.00—28.50</td>
</tr>
</tbody>
</table>

**Architectonica laevigata** (Lamarck, 1822)

*Solarium laevigatum* Lamarck, 1822*, Hist. nat. Anim, sans Vert., 7: 3 (Type-locality: ?)


* Reference not seen in the original.

**Distribution**—In India: Puri, Madras Coast, Kundugal Point (Pamban).

**Elsewhere**: Persian Gulf (Marine Survey: 26° 4' N. and 56° 2' E.), Karachi, Maungmagan (Burma).

**Remarks**—Shells of this and the preceding species have sometimes been collected from proximity of the same localities in India. Though the two species are distinct from each other some of the shell characters are so similar that quite often one is mistaken for the other. The description by authors like Reeve (op. cit.) and Satyamurti (op. cit.) are available, but the one by Tryon (op. cit.) clarifies the points of difference and is most helpful in separating this from the preceding one.

The chief diagnostic characters of this species are that the body-whorl in particular, is spirally quadrissulcate (excluding the sulcus below the suture) and the shell covered plentifully with blotches of pinkish purple, orange, brown or yellowish brown. The colour always appears in the form of blotches and never in prominent continuous bands as in the preceding species.

In the material under examination, the shells in good condition are of various sizes and exhibit clearly the above characters. Some are moderately elevated while other are more depressed. In a few cases where the shells are eroded, the coloured blotches are feeble and the transpiral striae and one of the sulcus, i.e., the second from above which runs in the middle or upper half of the body-whorl, are either weakly represented or completely faded.

<table>
<thead>
<tr>
<th>Measurements (in mm.)</th>
<th>Range (15 exs.)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Height</td>
<td>5.65—23.20</td>
</tr>
<tr>
<td>Maximum Diameter</td>
<td>11.15—36.10</td>
</tr>
<tr>
<td>Minimum Diameter</td>
<td>7.30—33.55</td>
</tr>
</tbody>
</table>

**Genus Torinia** Gray, 1840, 1842

*Type-species*: *Trochus cylindricus* Gmelin.

*Torinia straminea* (Gmelin, 1791)


**Torrinia straminea**: Tryon, 1887, *Man. Conch.*, 9 : 19, pl. 6, figs. 93-96.


We agree with Tryon (1887) in considering Hinds’ *fulva* as a synonym of this species.

**Material**— (1) 1 ex. (d.), Sea shore, about 3.2 km. (2 miles) north of Tranquebar, 1-2-1957 (Coll. *A. G. K. Menon & G. Ramakrishna*; (2) 1 ex. (d.), Sta. 7—Shore colln., Point Calimere, 16-2-1968; (3) 1 ex. (d.), Sta. 8—Shore colln., Agasthiampalli, 17-2-1968 (Coll. *A. S. Rajagopal*); (4) 1 ex. (d.), Sta. 17—Coastal waters of Pondicherry up to Nallavarukkupam, on board, I. F. S. No 3, Bottom trawl at 7 fms., 18-2-1975, (5) 1 ex. (d.), Sta. 8—Shore colln., behind Circuit house, Tuticorin, 21-2-1978 (Coll. *A. S. Rajagopal & H. P. Mookherjee*).

**Distribution**—In India: Tranquebar, Madras, Pamban.

**Elsewhere**: Indian Ocean, Philippines, New Guinea.

**Remarks**—In the specimens before us, the peripherry of the body-whorl consists of three strong spiral ridges; the middle one having on either side of it a prominent channel beside which a thin thread-like ridge may develop in some specimens. In all other respects they agree with the descriptions given by Tryon (*op. cit.*) and Satyamurti (*op. cit.*).

An example of the type of the species from Tranquebar is represented in the material.

<table>
<thead>
<tr>
<th>Measurements (in mm.)</th>
<th>Range (2 exs.)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Height</td>
<td>8.50—13.65</td>
</tr>
<tr>
<td>Maximum Diameter</td>
<td>13.25—20.25</td>
</tr>
<tr>
<td>Minimum Diameter</td>
<td>12.50—17.65</td>
</tr>
</tbody>
</table>

**Torrinia dorsuosa** (Hinds, 1844)


Distribution—In India: Madras, Pamban, Andamans.
Elsewhere: Indian Ocean: Madagascar, Sri Lanka, Pacific Ocean: Philippines: Mindoro Id., Easter Id.

Remarks—Adequate description is provided by Tryon (op. cit.) and Satyamurti (op. cit.).

Shell disc-like and convexly lenticular, superficially resembling Umbonium vestiarium. Broadly umbilicate, spirally ribbed, ribs finely beaded by oblique transpiral grooves, lowest rib of each whorl most prominent. Periphery of body-whorl with two prominent ridges with channel in middle. Margin of umbilicus crenulated. Continuous brown bands next to suture and below upper sulcus and interrupted brown bands round periphery and near umbilicus, as stated by Tryon (op. cit.), present in fresh shells.

The shell before us is in good condition but without the colour bands. In all other respects it agrees with the above description.

Measurements (in mm.)
- Height: 5.40
- Maximum Diameter: 10.10
- Minimum Diameter: 9.25

Family Planaxidae

A single genus is represented in the family namely, Planaxis Lamarck.

The generic character is almost the same as mentioned earlier for the family... Planaxis (Planaxis)

Family Planaxidae

Genus Planaxis Lamarck, 1822

Subgenus Planaxis S. S.

Type-species: Buccinum sulcatum Born.

Planaxis (Planaxis) sulcatus (Born, 1780)

Buccinum sulcatum Born, 1780, Test. Mus. Caes. Vindob.: 258, pl. 10, figs. 5, 6 (Type-locality: not known).

Gmelin's *pyramidalis*, Dunker's *menkeanus*, Lamarck's *undulatus*, Deshayes' *buccinoides* and probably A. Adams *obscurus* are considered synonyms of this species (Reeve, *op. cit.*; Tryon, *op. cit.*).

**Material**—(1) 3 exs. (d.), Sta. 1C—Shore about 2.4 Km. (1½ miles) S. of Inspection Bungalow, Tuticorin, 16-4-1955; (2) 143 exs. (w.), Sta. 2D—In front of P.W.D. Inspection Bungalow, Tuticorin, 17-4-1955; (3) 5 exs. (d.), Sta. 2C—Shore about 2.4 Km. S. of Inspection Bungalow, Tuticorin, 3-5-1955; (4) 1 ex. (d.), Sta 2G—Submerged Coral reefs near, Pulli Island, 8 Km. (5 miles) from Krusadai, 7-5-1955 (Coll. H. C. Ray); (5) 326 exs. (w.), Sta. 11—Shore colln., behind Circuit House, Tuticorin, 21-2-1968; (6) 5 exs. (d.), Sta. 12—Shore colln., Hare Island, off Tuticorin, 22-2-1968; (7) 3 exs. (d.), Sta. 13—Shore colln. Vanthivu Id., off Tuticorin, 23-2-1968; (8) 329 exs. (w.), Sta. 16—Shore colln. near Madras State Fisheries extension unit, Tuticorin, 25-2-1968 (Coll. A. S. Rajagopal); (9) 1 ex. (d.), Sta. 6—Shore colln., Rameswaram, 1-2-1975; (10) 63 exs. (w.), Sta. 7—Shore colln., Palk Bay, Mandapam Camp, 3-2-1975; (11) 10 exs. (w.) & 3 exs. (d.), Sta. 9—Shore colln., Hare Id. near Port of New Tuticorin, 22-1-1978, (12) 1 ex. (w.), & 1 ex. (d.), Sta. 10—Along the shore near Asstt. Collector's Bungalow, Tuticorin, 23-1-1978 (Coll. A. S. Rajagopal & H. P. Mookherjee).

**Distribution**—In India: Bombay, Devgarh, Pamban, Pulli reefs, Krusadai and Shingie Is., Madras, Vishakhapatnam, Andamans.


**Remarks**—Among the descriptions available in Reeve (*op. cit.*), Tryon (*op. cit.*), Gravely (*op. cit.*), Satyamurti (*op. cit.*), and cernohorsky (*op. cit.*), the most adequate is the one in Satyamurti.

Shell solid, thick, superficially not unlike *Littorina*, spotted or tessellated with chocolate or black and white, spirally uniform grooved, spire more or less corroded (some times encrusted with barnacles). Whorls five. Body-whorl largest, faintly angular. Aperture subtrigonal, Columella straight, white. Callus thick above, thin and laminate below with a V-shaped canal anteriorly. Outer lip thin and wavy corresponding to groove on body-whorl. Internally white spiral ridges corresponding to external spiral grooves, ridge beside suture internally white and most strongly developed.

A large number of specimens of various sizes represents the material examined.
This species occurs more or less in similar situations as *Littorina (Littoraria) undulata* Gray. In the littoral parts of the Palk Bay (Mandapam) and Gulf of Mannar (Tuticorin), it was found abundantly in association with species of *Nerita, Littorina* and *Cerithium.*

<table>
<thead>
<tr>
<th>Measurements (in mm.)</th>
<th>Range (120 cxs.)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Height</td>
<td>5.20—23.65</td>
</tr>
<tr>
<td>Maximum Diameter</td>
<td>3.50—16.10</td>
</tr>
<tr>
<td>Minimum Diameter</td>
<td>2.95—14.50</td>
</tr>
</tbody>
</table>

### Family POTAMIDIDAE

This is represented by the two subfamilies Potamidinae and Batillarinae which can be identified by the key given below.

**Key to the identification of the Indian subfamilies.**

- Shells massive, turreted with smooth or nodular spiral ridges. Radula with a central, posteriorly rounded, sometimes with long lappets, upper edge with 5 or more teeth, laterals long and somewhat narrow, mostly with little broader edges, which have many teeth on the external edge. Aperture broader than long. Outer margin somewhat expanded and thickened to form a groove. Lower margin of aperture sinuous, forming a short siphonal canal ... ... Potamidinae.
- Shells turreted with spiral ridges. Radula with a central tooth of trapezoidal shape on either side with a basal tooth, upper edge with largely triangular middle tooth and on either side 1—4 close teeth, laterals with massive long drawn out ends; upper edge with a large main tooth and a few other close-set teeth, marginal somewhat long, a little broader in front, with 4 to 6 teeth, the outermost being the largest. Aperture with a sinus or canal at the base. Columellar end has no prolongation ... ... Batillariinae.

### Subfamily POTAMIDINAE

Under this subfamily two genera *Cerithidea* Swainson and *Telescopium* Montfort have been dealt in this study.

- Shells slender. Tubercles present on the spiral ridges form transpiral plaits ... ... Cerithidea.
- Shells large. Spiral ridges are without tubercles. Transpiral ridges absent. Aperture broader than long Telescopium.
Subfamily **Batillariinae**

A single genus *Batillaria* Benson is represented here in this subfamily.

The generic character is almost the same as represented earlier for the subfamily... *Batillaria*.

**Family—Potamididae**

**Subfamily—Potamidinae**

**Genus Cerithidea** Swainson, 1840

*Type-species:* *Murex decollata* Linnaeus.

*Subgenus Cerithideopilla* Thiele, 1929

*Type-species:* *Cerithium fluviatile* Potiez & Michaud.

*Cerithidea* (*Cerithideopsilla*) *cingulata* (Gmelin, 1791)


*Tymanotonos fluviatilis* Reeve, 1866, *Conch. Icon.*, 15 : *Tymanotonos*, sp. No. 9, pl. 2, figs. 9a & 9b.


Reeve (*op. cit.*) has rightly considered *Strombus pictus* (Bolten) Roding as a synonym of his *fluviatilis*. Tryon’s (1887) efforts to merge the above species with his *fuscatus* which is a West African species, are not tenable.

*Material*—(1) 6 exs. (w.) Ennur Backwater, Madras, 4-5 ft., October, 1913 (Coll. ?), (2) 24 exs. (w.), Sta. 4—Ennur backwater, Madras, 18-1-1915 (Coll. N. Annandale); (3) 9 exs. (w.), Sta. ?—Pamban backwater, 18-9-1925 (Coll. S. L. Hora); (4) 1 ex. (w.), Sta. ?—Shore colln., Tuticorin Harbour, February—March, 1926, (5) 4 exs. (w.), Sta. ?—On sand and mud round edge of lagoon, Tuticorin, 13-3-1926, (6) 3 exs. (w.), Sta. ?—Tuticorin, 15-3-1926 (Coll. H. S. Rao); (7) 4 exs. (d.), Sta. 1c—Shore about 2·4 Km. (1½ miles) S. of Inspection Bungalow, Tuticorin, 16-4-1955 (Coll. H. C. Ray); (8) 8 exs. (d.), Sta. ?

**Distribution**—The range of distribution extends from the Persian Gulf through the Indian Ocean to the western part of the Pacific, i.e., to the sea of China.

In India: Kathiawar, Bombay, Malabar, Cochin, Kundugal Point, Pamban, Krusadai Id., Madras, Krishna Estuary, Chilka Lake, Konarak, Canning: Matla R., Andamans, Great Nicobar; Casuarina Bay.

**Elsewhere**: Mesopotamia: Nasariyeh on Euphrates; Karachi, Sri Lanka, Burma: Irrawaddy, Amherst, Mergui; Indonesia, Sumatra; Thailand; Tale Sap; Lampée, Bushire, Haiphu hong, Annesley Bay.

**Remarks**—While Reeve (op. cit.), Tryon (op. cit.) and Gravely (op. cit.) have provided brief descriptions, Satyamurti (op. cit.) v. Benthem Jutting (op. cit.) are in greater detail and found to be adequate.

Shell small narrow, pyramidal. Whorls flattened, each with flat, spiral ridges. Ridges broad and strongly tuberculated. Thin threadlike ridge running in suture. Tubercles equidistant, falling more or less into regular transpiral rows. Brown, black and white bands running spirally, regularly on whorls. Tubercles obsolete on back of body-whorl, except on uppermost row. Aperture oblique, expanded broadly at outer lip above and below. Distinct varicose elevation present on the body-whorl opposite outer lip.

The radula of this species is described and figured by Troschel (Prashad, 1921).

This is a characteristically brackish water species found abundantly on mud-flats of estuaries and backwaters. Though it can tolerate water of low salinity, it never lives in pure freshwater.

A large number of specimens of various sizes is present in the material studied. Some of the shells are encrusted with barnacles. Empty shells are commonly occupied by hermit crabs.

The material includes two examples representing topotypes of the species from Tranquebar.

<table>
<thead>
<tr>
<th>Measurements (in mm.)</th>
<th>Range (150 exs.)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Height</td>
<td>4.20—30.75</td>
</tr>
<tr>
<td>Maximum Diameter</td>
<td>2.00—10.30</td>
</tr>
<tr>
<td>Minimum Diameter</td>
<td>1.90—9.20</td>
</tr>
</tbody>
</table>
Genus Telescopium Montfort, 1810

Type-species: Trochus telescopium Linnaeus, 1758.

Telescopium telescopium (Linnaeus, 1758)


Telescopium fuscum: Reeve, 1865, Conch. Icon., 15: Telescopium, sp. No. 1, pl. 1, figs. 1a & 1b.


van Benthem Jutting (op. cit.) may be consulted for a more detailed synonymy than presented here.


Remarks—von Martens (1897), van Benthem Jutting (op. cit.) and Cernohorsky (op. cit.) have provided very good descriptions. van Benthem Jutting has also figured the radula elements and given its formula.

This is a common species found along mud-flats in mangrove areas where the water is saline or brackish. The animal stays partly buried in the mud with only the top of the spire exposed. It also occurs in brackish water fish ponds along north coast of Java.

van Benthem Jutting (op. cit.) quotes that in Philippines this species is sold in the markets for food.

In the collection examined are examples with very little variation in the shell characters.
Measurements (in mm.)

<table>
<thead>
<tr>
<th></th>
<th>Range (7 exs.)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Height</td>
<td>79.45—105.05</td>
</tr>
<tr>
<td>Maximum Diameter</td>
<td>37.45—51.10</td>
</tr>
<tr>
<td>Minimum Diameter</td>
<td>35.05—47.20</td>
</tr>
</tbody>
</table>

Subfamily BATILLARINAE

Genus Batillaria Benson, 1842

Type-species: Batillaria zonalis (= Cerithium zonale Lamarck)

Batillaria anquilifera (Sowerby, 1866)

Lampania anquilifera Sowerby. 1866, in Reeve's Conch. Icon., 15: Laupania, sp. No. 1, pl. 1, fig. 1 (Type-locality: Australia).

Potamides (Lampania) anquilifera Tryon, 1887, Man. Conch., 9: 167, pl. 35, fig. 17.


Distributiou—In India: Madras.

Elsewhere: Australia.

Remarks—Brief descriptions can be had from Sowerby (op. cit.) and Tryon (op. cit.).

Shell small, slender, turreted, whorls flattened, spirally ribbed, ribs thrown into strong tubercles, sometimes tubercles of upper two rows tending to coalesce. Tubercles more or less evenly spaced, giving transpirally plaited appearance to shell. Suture clearly demarcating whorls. Dark and light brown bands running spirally on whorls. Body whorl slightly angular in middle. Tubercles weak or obsolete on ribs beneath angle. Aperture oblique subtrigonal, longer than broad,
slightly produced anteriorly and ending truncately in a wide canal. Varicose elevation opposite aperture present.

<table>
<thead>
<tr>
<th>Measurements (in mm.)</th>
<th>Range (70 exs.)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Height</td>
<td>16.40—25.50</td>
</tr>
<tr>
<td>Maximum Diameter</td>
<td>6.15—9.25</td>
</tr>
<tr>
<td>Minimum Diameter</td>
<td>5.35—7.75</td>
</tr>
</tbody>
</table>

A collection in a cardboard box labelled *Cerithidea angulifera* Sowerby (13 exs., Loc.—Madras, Reg. No. 1054) is present in the Zoological Survey of India Collections. Registered on 28-11-1893; it originally belonged to the Asiatic Society of Bengal.

This species occurs in backwaters commonly with *Cerithidea (Cerithideopsilla) cinulata* (Gmelin), though not in such abundance as the latter. Shells of this species are often mistaken for the latter due to striking similarity in shell structure.

**Family Cerithiidae**

This is represented here by a single subfamily namely, Cerithiinae. Shell turreted with prominent anterior canal, sculptured with axial and spiral elements; columella calloused; operculum paucispiral with eccentric nucleus; radula taenioglossate; palial gonducts open; males aphallic... *Cerithiidae*

**Subfamily Cerithiinae**

This subfamily has been represented with three genera *Rhinoclavis* Swainson, *Cerithium* Bruguiere and *Clypeomorus* Josseaume.

- Shell with columellar callus plaited; siphonal canal upturned...
- Shell without plaits on columellar callus; siphonal canal not upturned...

**A.** Shell thick, fusiform, turreted with prominently nodulose spiral cords; anterior siphonal canal produced into upturned anal canal; aperture with prominent columellar plait...

**B.** Shell moderately thick, turreted, strongly and variously sculptured; Columella bears deposit of callus; anterior siphonal canal produced...

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<th></th>
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<tbody>
<tr>
<td>Rhinoclavis</td>
<td></td>
</tr>
<tr>
<td>Cerithium</td>
<td></td>
</tr>
<tr>
<td>Clypeomorus</td>
<td></td>
</tr>
</tbody>
</table>

...
RAJAGOPAL & MOOKHERJEE: Molluscan fauna of India

Family CERITHIIDAE

Subfamily CERITHINAE

Genus Rhinoclavis Swainson, 1840

Type-species: Murex vertagus Linnaeus, 1758

Subgenus Rhinoclavis S.S.

Rhinoclavis (Rhinoclavis) sinensis (Gmelin, 1791)

Murex sinensis Gmelin, not Cerithium sinense Philippi, 1848; 1791, Syst. Nat., Ed. XIII, i (6) : 3542, sp. 54 (Type locality: "in mari Senegaliam allunate").


Cerithium obeliscus Bruguiere, 1792*, Encyc. Meth., 1 (2) : 472, pl. 443, figs. 4a & 4b;


Vertagus obeliscus : Reeve, 1865, Conch. Icon., 15, Vertagus, sp. No. 7, pl. 2, figs. 7a,7b.


Rhinoclavis sinensis : Cernohorsky, 1972, Mar. Shells Pacific, 2 : 67-68, pl. 15, fig. 3.


Material—(1) 8 exs. (d.), Sta. 2—Krusadai Id., Gulf of Mannar, March, 1950 (Coll. S.L. Hora & A.G.K. Menon); (2) 3 eds. (d.), Sta. 2c:-Shingle Id., 2.4 Km. (1½ miles) E. of Krusadai Id., 3.5.1955, (3) 1 ex. (w.), Sta. 20—Galaxea reef, Krusadai Id., 4-5-1955, (4) 8 exs. (w.), Sta. 2G—Pulli Is. about 8 Km. (5 miles) from Krusadai, 7.5.1955 (Coll. H. C. Ray); (5) 2 exs. (d.), Sta. 13—Shore colln., Vanthivu Id., off Tuticorin, 23-2-1968 (Coll. A.S.Rajagopal).

Distribution—In India: Port Okha, Gulf of Kutch; Bombay, Goa, Kanya Kumari ; liare Id., S.W of Mandapam, Pamban, Krusadai Id.; Waltair, Vizagapatnam; Andaman Is.


* Reference not seen in the original.
The locality records attributed to this species in the Caribbean Sea (Dillwyn *op.cit.*, and Kiener *op.cit.*) may not be reliable, Tryon (*op.cit.*) probably unaware of this, has mentioned only East Indies, Polynesia, Mauritius. Houbrick (1978) has given a more detailed distribution list.

Remarks—Kiener (*op.cit.*) and Tryon (*op.cit.*) are brief in their description of the species. Dillwyn (*op.cit.*), Reeve (*op.cit.*), Satyamurti (*op.cit.*) and Houbrick (*op.cit.*) are in greater detail, but Tryon and Houbrick are most accurate.

This species occurs mostly in sandy spaces of reef-flats in the intertidal zone and often available in the sandy areas with coral fragments and weeds behind the reef.

Shell turrited, ventr cose, generally brownish spotted on spiral cords between nodes and clouded with chestnut chocolate; whorls angular or slightly shouldered near suture, traversed by spirally beaded ribs (3 or 4 rows) below angle, lower ribs granulated, uppermost at angle strongly pointedly tuberculate). Interstices latticed with spiral and transversal striae. Body whorl with obtuse lateral varix, aperture squaished, columella short, reflected, with heavy deposition of callus all along and laminate anteriorly. Ins de strongly plaited. Anterior canal produced as spout-like upturned anal canal. Outer lip round, extending up to anal canal.

<table>
<thead>
<tr>
<th>Measurements (in mm.)</th>
<th>Range (13 exs.)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Height</td>
<td>36.50—39.00</td>
</tr>
<tr>
<td>Maximum Diameter</td>
<td>15.40—16.95</td>
</tr>
<tr>
<td>Minimum Diameter</td>
<td>12.15—14.55</td>
</tr>
</tbody>
</table>

**Genus Cerithium** Bruguiere, 1789*

*Type-species: *Cerithium adansonii* Bruguiere, 1792 +

*Cerithium columnum* Sowerby, 1834.


Cerithium menkei: Deshayes, 1863, *Cat. Moll. Reunion*: 97, pl. 11, fig. 15. Also, C. citrinum Sowerby and bicolor Hombron et Jacquinot are probably varieties of this (Tryon *op. cit.*, p. 123).


**Distribution** — In India: Pamban, Andamans.

**Elsewhere** : Red Sea; Mozambique; Mauritius; Sri Lanka; Indonesia; Borneo Bank (Shore & Ref), North-ubian, S. of Lucipara Id., Banda Ree, Ke Is., Roma Id. Ree; Polynesia; Australia.

**Remarks** — Reve's (*op. cit.*) description of the species though brief is better than Tryon's (*op. cit.*) while Satyamurti's and Cernohorsky's descriptions are more elaborate and adequate.

Shell rough, ventricose in some and more turreted in others, reddish brown or pale yellow. Whorls traversed by many rows of larger and smaller spiral ridges with occasional chestnut or chocolate dots, and irregular transpiral undulations; undulations bulged into crest making whorls angular in middle. Body-whorl ratherly wide, with prominent varix opposite aperture. Aperture large, expanded, sub-circular, white within. Anterior canal long, oblique and excavated. Posterior canal short, constricted. Outer lip fluted.

A single shell with the animal is represented in the material studied. The animal with its operculum has retreated inside. A major portion of the shell is covered with encrustations. A tiny specimen of *Saptadanta nasika* Prashad and Rao and found anchorage on ventral side of the shell close to posterior canal.

**Measurements** (in mm.)

<table>
<thead>
<tr>
<th>Measure</th>
<th>Range (13 exs.)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Height</td>
<td>12.95—30.50</td>
</tr>
<tr>
<td>Maximum Diameter</td>
<td>6.40—15.00</td>
</tr>
<tr>
<td>Minimum Diameter</td>
<td>5.80—11.00</td>
</tr>
</tbody>
</table>
Cerithium tenellum Sowerby, 1855


Distribution—In India: Pamban.
Elsewhere: Indonesia: Postillon Is., Borneo Bank shore; Philippines.
Remarks—Reeve (op.cit.), Tryon (op.cit.) and Satyamurti (op.cit.) have given brief description of the species.

Shell small, slender, thin, white or rose coloured, nearly transparent. Numerous irregular, white varices on shell. Whorls angulated above middle with spiral rows of tubercles, tuberculated also on angle and at suture, tubercles white, chestnut or chocolate coloured. One or more slender chocolate lines run spirally on whorls in some shells. Aperture small rounded, anterior canal short, opening widely. Outer lip slightly expanded, simple and thickened outside.

A good number of shells of different sizes represents the collection. Some of the shells bear incrustations on them. Empty shells are often inhabited by hermit crabs. This collection is a new acquisition to the Zoological Survey of India.

<table>
<thead>
<tr>
<th>Measurements (in mm.)</th>
<th>Range (35 exs.)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Height</td>
<td>5.30—17.20</td>
</tr>
<tr>
<td>Maximum Diameter</td>
<td>3.55—6.25</td>
</tr>
<tr>
<td>Minimum Diameter</td>
<td>3.10—5.10</td>
</tr>
</tbody>
</table>

* Reference not seen in the original
Cerithium balteatum Philippi, 1848


Distribution—In India : Andaman Is.
Remarks—Brief descriptions are available in philippi (op.cit.), Reeve (op.cit.) and Tryon (op.cit.)

Shell moderately small, turreted, acuminate, white with several varices. Whorls well demarcated, spirally ribbed, ribs tuberculated, swelled above, narrowed near suture, Body-whorl with two strong tuberculated ribs below periphery (besides ribs above), narrowed below. ribs. Aperture squarish, Columellar, callus thin. Anterior canal narrow and produced. Outer lip internally crenulated and externally thickened.

A number of shells in fairly good condition are represented in the collection. Some of them are covered with encrustations.

This appears to be the first record of the species from mainland India. It extends the distribution from Andaman Islands to the east coast of India.

Measurements ( in mm. )

<table>
<thead>
<tr>
<th>Measurement</th>
<th>Range ( 2 exs. )</th>
</tr>
</thead>
<tbody>
<tr>
<td>Height</td>
<td>15.10—19.50</td>
</tr>
<tr>
<td>Maximum Diameter</td>
<td>5.85—7.50</td>
</tr>
<tr>
<td>Minimum Diameter</td>
<td>4.80—6.10</td>
</tr>
</tbody>
</table>

Cerithium scabridum Philippi, 1848

This is *ruppelli* according to Tryon (*op.cit.*) but we consider it to be distinct and agree with Satyamurti in treating it as a separate species.


**Distribution**: India: Krusadai Id. and Pulli reef.


**Remarks**—Descriptions for the species are given by Philippi (*op.cit.*) and Satyamurti (*op.cit.*)

Shell oblong-turreted, slender, of moderate size, whorls distinctly demarcated by suture, whorls tuberculated, sometimes tubercles so conspicuous in middle as to give whorl shouldered appearance, tubercles not rounded, nor separated from one another; but coalescing to form continuous spiral ridges. Interstices with spiral striae. Spire with several irregularly arranged varices. Body-whorl with prominent varix opposite aperture. Aperture narrowly obliquely ovate, anterior canal narrow, produced and widening outwardly. Outer lip inwardly crenulated and outwardly thickened.

<table>
<thead>
<tr>
<th>Measurements (in mm.)</th>
<th>Range (14 exs.)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Height</td>
<td>15.30—22.45</td>
</tr>
<tr>
<td>Maximum Diameter</td>
<td>6.5—8.45</td>
</tr>
<tr>
<td>Minimum Diameter</td>
<td>5.30—7.20</td>
</tr>
</tbody>
</table>

**Genus Clypeomorus Jousseaume, 1888**

Type-species: Clypeomorus *clypeomorus* Jousseaume, 1888

*Clypeomorus moniliferus* (Kiener, 1841).


*Cerithium moniliferum*: Reeve, 1865, *Conch. Icon.*, 15 : *Cerithium*, sp. no. 20, pl. 4, fig. 23; Dufresne in Kiener (1841-42), *Coq. Viv.*, 6, *Cerithium*. 49, pl. 16, fig. 3.


According to Cernohorsky *variagatum* Quoy and Gaimard, 1834 (non Fischer, 1807), *concilium* Hombron et Jacquinot, 1854 are synonyms of this species.

* Reference not seen in the original


Remarks—Reeve (op. cit.) and Tryon (op. cit.) are brief in their description of this species while Satyamurti (op. cit.) and Cernohorsky (op. cit.) are in greater detail. This species greatly varies in colour, form and sculpture.
Shell elongate-ventricose, whorls with three spiral rows of brown, dark chocolate or black tubercles. Spiral thread-like striae in between each row. Body-whorl with six or rarely seven principal rows of tubercles. Secondary rows of tubercles between principal rows very inconspicuous. Varix opposite aperture present. Aperture short somewhat oval, anterior canal short, deeply excavated. Posterior canal-like groove formed at junction of outer lip. A ridge inside similar to that in *Planaxis sulcatus* present. Outer lip thick, rows of fine ridges within. Operculum brown, flat, oval and horny.

A large number of specimens of various sizes and shades constitutes the collection studied. A few are with the animal inside. Empty shells are generally found with hermit crabs. A considerable number of the shells are either shore worn or encrustated.

<table>
<thead>
<tr>
<th>Measurements (in mm.)</th>
<th>Ranges (270 exs.)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Height</td>
<td>6.05—26.95</td>
</tr>
<tr>
<td>Maximum Diameter</td>
<td>3.50—15.00</td>
</tr>
<tr>
<td>Minimum Diameter</td>
<td>3.45—12.20</td>
</tr>
</tbody>
</table>

**Clypeomorus traillii** (Sowerby, 1855)

*Cerithium trailli* Sowerby (not Adam et Leloup, 1938), 1855*, Thes. Conch., 2 (16)

(Type-locality : ?)


**Material**—(1) 18 exs. (d.), Sta. 12—Shore collection, Hare Id., off Tuticorin, 22-2-1968, (2) 2 exs. (d.), Sta. 13—Shore collection, Vanthivu Id., off Tuticorin, 23-2-1968. (Coll. A. S. Rajagopal.)

**Distribution**—In India: Pamban, Palk Bay: Lakshadwip.

**Elsewhere** : Singapore, Java, Philippines.

**Remarks**—Among the descriptions of the species provided by Reeve (*op. cit.*), Tryon (*op. cit.*), Satyamurti (*op. cit.*) and Cernohorsky (*op. cit.*), the same by the last two authors are best and adequate.

Shell pyramidal, ventricose, with acutely pointed apex. Whorls straight, gradually increasing, penultimate whorl rather tumid, body-whorl largest. White varices present irregularly on different whorls. Whorls traversed by regular spiral rows of beaded striae alternating with non-beaded fine threadlike striae. Beads chestnut or chocolate coloured. A prominent varix, present opposite aperture. Aperture ovate, white

---

* Reference not seen in the original.

The collection under study consists of shells eroded to various extents.

<table>
<thead>
<tr>
<th>Measurements (in mm.)</th>
<th>Range (12 exs.)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Height</td>
<td>24.00—36.65</td>
</tr>
<tr>
<td>Maximum Diameter</td>
<td>11.25—16.25</td>
</tr>
<tr>
<td>Minimum Diameter</td>
<td>8.75—12.95</td>
</tr>
</tbody>
</table>

**Clypeomorus splendens** (Sowerby, 1855)


Tryon (1887) considers Sowerby's *purpurascens* as a synonym.

**Material**—(1) 1 ex. (d.), Sta. ?—Sandy point, Krusadai Id., 2-9-1925 (Coll. S. L. Hora); (2) 3 exs. (d.), Sta. 13—Shore colln., Vanthivu Id., off Tuticorin, 23-2-1968 (Coll. *A. S. Rajagopal*); (3) 2 exs. (d.), Sta. 4—Shore colln., Devipattinam, 16-1-1978, (4) 9 exs. (d.), Sta. 6—Shore colln., Keelakkarai, 28-1-1978 (Coll. *A. S. Rajagopal & H. P. Mookherjee*).

**Distribution**—In India : Krusadai Id., Pamban. Elsewhere : Philippines : Id. of Zebu.

**Remarks**—The brief descriptions provided by *Reeve* (*op. cit.*), Tryon (*op. cit.*) and *Satyamurti* (*op. cit.*) give a general account of the shell characters of the species.

Shell moderately short, pyramidal, ventricose. Whorls traversed by spiral ribs with prominent large spiny granules; one or more in series better developed making whorls subangulate. Granules chestnut or chocolate coloured, in some cases alternating with white, in lighter coloured shells. Fine thread-like striae running spirally between ribs. Aperture ovate. Columella devoid of callus. Outer lip crenulated. Anterior canal short.

The material under study consists of shells which are in fairly good condition though the apex is slightly broken in some and the shells are somewhat shore worn. This is a new acquisition to the collections of the Zoological Survey of India.

* Reference not seen in the original.
Measurements (in mm.)

<table>
<thead>
<tr>
<th></th>
<th>Range (3 exs.)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Height</td>
<td>16.50—22.35</td>
</tr>
<tr>
<td>Maximum Diameter</td>
<td>7.60—0.95</td>
</tr>
<tr>
<td>Minimum Diameter</td>
<td>6.50—9.45</td>
</tr>
</tbody>
</table>

Clypeomorus delectum (A. Adams, 1855)

*Cerithium delectum* A. Adams, 1855* in* Sowerby’s *Thes. Conchyl.*, 2: 875 (Type-locality: Galapagos Is. ?); Reeve, 1865, *Conch. Icon.* : 15, *Cerithium*, ap. no. 112, pl. 16, figs. 112 a, 112 b; Tryon, 1887, *Man. Conch.*, 9: 138, pl. 26, figs. 80-82. Reeve (op.cit.) has correctly treated this and Kiener’s *zebrum* separately, while Tryon (op.cit.) has made it a synonym of the latter. With the limited number of specimens before us for study we are inclined to consider that the two species are different.

*Material*—(1) 1 ex. (d.), Sta. 1C—Shore about 2.4 Km. (1½ miles) S. of Inspection Bungalow, Tuticorin, 16-4-1955 (Coll. H. C. Ray), (2) 1 ex. (d.), Sta. 7—Shore colln., Palk Bay, Mandapam Camp, 3-2-1975 (Coll. A. S. Rajagopal & H. P. Mookherjee)

*Distribution*—In India: Palk Bay.

*Elsewhere* : Pacific : Galapagos Is.

*Remarks*—Reeve’s (op. cit.) description, though brief is adequate.


Only two shells in tolerably good condition represent this in the collection. No colouration or markings are visible on them.

This appears to be the first record of this species from the Indian Coast.

Measurements (in mm.)

<table>
<thead>
<tr>
<th></th>
<th>Range (2 exs.)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Height</td>
<td>10.45—11.50</td>
</tr>
<tr>
<td>Maximum Diameter</td>
<td>4.35—4.75</td>
</tr>
<tr>
<td>Minimum Diameter</td>
<td>3.65—3.80</td>
</tr>
</tbody>
</table>

Family Epitoniiidae

The genera namely, *Epitonium* (Bolten) Roding and *Acrilla* H. Adams have been represented in this family.

* *Reference not seen in the original.*
Shells encircled by transpiral crests, base of the body-whorl not marked off from the rest of the shell. ... ... ... Epitonium

Shells glossy, no transpiral crests present. Transpiral ribs present. Base of the body-whorl is distinct from the rest of the shell. ... ... Acrilla.

Family Epitonidae

Genus Epitonium (Bolten) Roding, 1798

Type-species: Turbo scalaris Linnaeus (=Epitonium brave Roding).

Epitonium immaculatum (Sowerby, 1844).

Scalaria immaculata Sowerby, 1844, Proc. zool. Soc. London, Pt. 12 : 26-27 (Type-locality: Catanuan, Province of Tayabas, Id. Luzon, Philippines); Sowerby, 1844, Thes. Conchyl., 1 (IV) : 93, pl. 33, fig. 58; Reeve, 1873, Conch. Icon., 19, Scalaria. sp. No. 24, pl. 4, fig. 24; Tryon, 1887, Man. Conch., 9 : 61, pl. 12, fig. 80.

Material—(1) 1 ex. (d.), Sta. 1J—Shore N. of Inspection Bungalow, Tuticorin, 24-5-1955 (Coll. H. C. Ray), (2) 1 ex. (d.), Sta. 7—Shore of Point Calimere, Tamil Nadu, 16-2-1968, (3) 6 exs. (d.), Sta. 8—Shore of Agasthiampalli. Tamil Nadu, 17-2-1968 (Coll. A. S. Rajagopal)

Distribution—In India: Bombay.

Elsewhere: Catanuan, Luzon Id., Philippines.

Remarks—The descriptions given by Reeve (op. cit.) and Tryon (op. cit.), though brief are adequate.

Shell elongate, white, subumbilicated. Whorls contiguous, tumid and rounded, spirally minutely striated, crenulated at suture, suture deep, impressed. Varices thin, unequal, irregular, disappearing in the middle of whors. Aperture ovate, peristome thickened.

The material examined comprises of shells of various sizes.

<table>
<thead>
<tr>
<th>Measurement (in mm.)</th>
<th>Range (8 exs.)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Height</td>
<td>10.70—17.30</td>
</tr>
<tr>
<td>Maximum Diameter</td>
<td>5.10—7.10</td>
</tr>
<tr>
<td>Minimum Diameter</td>
<td>4.40—5.35</td>
</tr>
</tbody>
</table>

Epitonium latifasciaum (sowerby, 1874)

Scalaria latifasciata Sowerby, 1874, in Reeves Conch. Icon., 19, Scalaria. sp. no. 177, pl. 15, figs. 117a, b. (Type-locality: Maheburg, Mauritius); Tryon, 1887, Man. Conch., 9 : 56, pl. 11, figs. 45, 46.

Material—(1) 2 exs. (d.), Sta. 8—Shore of Agasthiampalli, Tamil Nadu, 17-2-1968 (2) 2 exs. (d.), Sta. 11—Shore colln. behind Circuit House, Tuticorin, 21-2-1968 (Coll. A. S. Rajagopal); (3) 1 ex. (d.),
Sta. 8—Shore colln. behind Circuit House, Tuticorin, 21-1-1978 (Coll. A. S. Rajagopal & H. P. Mookherjee)

**Distribution**—In India: Bombay.

**Elsewhere**: Mauritius.

**Remarks**—Reeve's *(op. cit.)* description is adequate and slightly more elaborate than Tryon's *(op. cit.)*.

Shell pyramidal, narrowly umbilicate, pale fulvous (reddish-yellow) or white; sometimes with three brown bands spirally on whorls, middle one broadest. Suture deeply impressed, simple. Whorls round, increasing rapidly with numerous thin plate-like transpiral varices. Aperture oval, peristome uniformly slightly thickened.

In the collection studied, there are five shells; two of them with brown bands and one without. The other two shells are imperfect.

<table>
<thead>
<tr>
<th>Measurements (in mm.)</th>
<th>Range (4 exs.)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Height</td>
<td>6.95—12.25</td>
</tr>
<tr>
<td>Maximum Diameter</td>
<td>3.70—6.30</td>
</tr>
<tr>
<td>Minimum Diameter</td>
<td>3.40—5.35</td>
</tr>
</tbody>
</table>

**Epitonium subauriculatum** (Souverbie, 1866)

*Scalaria attenuata* Sowerby (not Pease, 1860), 1874, in Reeve's *Conch. Icon.*, 19, *Scalaria*, sp. no. 116, pl. 15, fig. 16 (Name invalidated due to preoccupation)


*Scalaria microsoma*: Tapparone-Canevri, 1876, *J. de Conchyl.*, 24 : 152.

**Material**—1 ex. (d.), Sta. II—Shore colln. behind Circuit House, Tuticorin, 21-2-1968 (Coll. A. S. Rajagopal)

**Distribution**—In India: Bombay.

**Elsewhere**: Singapore, New Caledonia.

**Remarks**—The descriptions given by Reeve *(op. cit.)* and Tryon *(op. cit.)* are adequate though both are brief.

Shell small, white, narrow, attenuate, non-umbilicate. Whorls round, scarcely in contact. Varices seven, moderately thick, prominent, subreflexed, distant and transpirally obliquely continuous on spire. Aperture round, peristome lamellate.

A single white shell represents the material for this species.

<table>
<thead>
<tr>
<th>Measurements (in mm.)</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Height</td>
<td>10.65</td>
</tr>
<tr>
<td>Maximum Diameter</td>
<td>4.65</td>
</tr>
<tr>
<td>Minimum Diameter</td>
<td>4.50</td>
</tr>
</tbody>
</table>

* Reference not seen in the original.
Epitonium lamellosum (Lamarck, 1843)


We have followed Tryon (op. cit.), Melvill and Standen (op. cit.), and Schepman (op. cit.) in retaining the above name for this species, keeping in view its well established usage.

Material—(1) 2 exs. (d.), Sta. 1C—Shore about 2.4 Km. (1½ miles) S. of Inspection Bungalow, Tuticorin, 16-4-1955, (2) 1 ex. (d.), Sta. 1J—Shore colIn., N. of Inspection Bungalow, Tuticorin, 24-4-1955 (Coll. H. C. Ray), (3) 1 ex. (d.), Sta. 5—Shore colIn., Mandapam Camp, 31-1-1975, (4) 1 ex. (d.), Sta. 8—Shore colIn. behind Circuit House, Tuticorin, 21-1-1978 (Coll. A. S. Rajagopal & H. P. Mookherjee).

Distribution—In India: Not recorded earlier.


Remarks—Tryon’s (op. cit.) description is adequate though brief. Shell pyramidal, non-umbilicate, dark to light brown between varices. Whorls round, contiguous. Body-whorl with a single spiral rib below middle. Varices laminated broad and connected at suture, continued on spire obliquely or in straight line. Aperture obliquely ovate, outer lip broadly thickened, slightly reflected.

Two small shells and two larger ones represent this species in the collection.

This appears to be the first record of the species from the Indian Coast.

<table>
<thead>
<tr>
<th>Measurements (in mm.)</th>
<th>Range (3 exs.)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Height</td>
<td>11.20—17.05</td>
</tr>
<tr>
<td>Maximum Diameter</td>
<td>5.10— 7.10</td>
</tr>
<tr>
<td>Minimum Diameter</td>
<td>4.70— 6.85</td>
</tr>
</tbody>
</table>

**Epitonium pallasii** (Kiener, 1838-39)

*Scalaria pallasii* Kiener, (1838-39)*, *Cog. Viv.,* 10, Scalaria : 4, 5, pl. 2, figs. 3 (Type-locality: Not given); Sowerby, 1844, *Thes. Conchyl.,* 1 (IV): 83-84, pl. 32, figs. 14, 15 & 16; Reeve, 1873, *Conch. Icon.,* 19, Scalaria, sp. No. 40, pl. 6, figs. 40a & b.

*Scalaria pallasii*: Tryon, 1887, *Man. Conch.,* 9 : 54, pl. 11. fig. 33.


According to Tryon (op. cit.) *S. neglecta* Reeve (not Adams and Reeve) *subpretiosa* Blainville, *notha* Menke and *nicobarica* Beck, MS., are synonyms of this species.

**Material**—1 ex. (d.), Sta. 8—Shore colln., Agasthiampalli, 17-2-1968 (Coll. A. S. Rajagopal).

**Distribution**—In India: Madras.

*Elsewhere*: Persian Gulf, Gulf of Oman, Mekran Coast; Charbar, Karachi Mauritius, Philippines, Catanuan; China.

**Remarks**—The descriptions given by Kiener, (op. cit.) Reeve (op. cit.) and Tryon (op. cit.) are adequate.

Shell pyramidal, umbilicate. Whorls 7 to 8, somewhat disunited. Varices distant on whorls, prominent, regular laminar slightly angular at top of whorls (near suture). Aperture ovate, peristome laminate and reflected.

The material represents a single shell, which is completely bleached and which retains only 3 whorls, rest of the spire having broken off.

**Measurements** (in mm.)

<p>| | |</p>
<table>
<thead>
<tr>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Height</td>
<td>18.80 (Tip of the shell broken)</td>
</tr>
<tr>
<td>Maximum Diameter</td>
<td>13.15</td>
</tr>
<tr>
<td>Minimum Diameter</td>
<td>11.30</td>
</tr>
</tbody>
</table>

**Epitonium pyramidale** (Sowerby, 1844)


Material—(1) 1 ex. (d.), Sta. 3b—Rocky shore of Gulf of Mannar, near Quarantine Camp, Mandapam, 11-5-1955 (Coll. H. C. Ray), (2) 2 exs. (d.), Sta. 8—Shore colln., Agasthiampalli, Tamil Nadu, 17-2-1968 (Coll. A. S. Rajagopal).

Distribution—In India: Madras.
Elsewhere: Singapore, Philippines.

Remarks—Tryon’s (op. cit.) description is very brief and incomplete, while, those of Sowerby (op. cit.), Reeve (op. cit.) and Cernohorsky (op. cit.) are slightly more detailed and adequate.

Shell white, pyramidal. Whorls 9, subventricose, scarcely in contact. Varices laminated, angulated at top of whorl near suture, transpirally connected at suture and continued obliquely on spire. Varices on body-whorl converging below and covering umbilicus. Aperture subcircular, edge laminate. Inner lip touching crests of all varices and produced anteriorly into small beak.

All the three shells in the collection have the apex slightly damaged. One of them has the body-whorl, also slightly damaged.

Measurements (in mm.)

<table>
<thead>
<tr>
<th></th>
<th>Range (3 exs.)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Height</td>
<td>14.40—18.20</td>
</tr>
<tr>
<td>Maximum Diameter</td>
<td>6.40—7.00</td>
</tr>
<tr>
<td>Minimum Diameter</td>
<td>5.95—6.65</td>
</tr>
</tbody>
</table>

Genus *Acrilla* H. Adams, 1860

Type-species: *Scalaria acuminata* Sowerby

*Acrilla acuminata* (Sowerby, 1844)


*Scalaria* sp. No. 74, pl. 10, fig. 74b.


Distribution—In India: Madras.

Elsewhere: Sri Lanka, Malacca, Japan.
Remarks—Adequate, though brief descriptions can be had from Sowerby (op. cit.), and Tryon (op. cit.).


A few shells of different sizes which are collected on shore, from the material for study. In almost all cases, the outer lip and tip of spire are damaged.

Measurements (in mm.)

<table>
<thead>
<tr>
<th>Measurements</th>
<th>Range (6 exs.)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Height</td>
<td>11.85—31.40</td>
</tr>
<tr>
<td>Maximum Diameter</td>
<td>3.60—7.50</td>
</tr>
<tr>
<td>Minimum Diameter</td>
<td>3.35—7.25</td>
</tr>
</tbody>
</table>

Family JANTHINIDAE

A single genus Janthina (Bolten) Roding represent this family.

Shells violet, darker at the base. Spire globular with minimum whorls, smooth or feebly striated. Aperture wide, columellar border angular.

Genus Janthina (Bolten) Roding, 1798

Type-species : Helix janthina Linnaeus.

Janthina roseola Reeve, 1858, Conch. Icon. 11, Janthina, sp. No, 1 pl. 1, figs. la & 1b (Type-locality : Id. of Nicobar).


Material—(1) 1 ex. (d.), Sea shore, 4 Km. (2½ miles) E. of MBS. Porto Novo 22-1-1957, (2) 1 ex. (d.), Sea shore, 4.6 Km. (1 mile) s. of Fort, Tranquebar, 29-1-1957, (3) 2 exs. (d.), Sea Coast near Chinna Tarangapatti, 4.8 Km. (3 miles) N. of Tranquebar, 2-2-1957 (Coll. A. G. K. Menon & G. Ramakrishna), (4) 30 exs. (d.), Sta. 8—Shore colln. Agasthiampalli, 17-2-1968, (5) 23 exs. (d.), Sta. 9—Shore colln., Vedaranyam, 18-2-1968 (Coll. A. S. Rajagopal).

Distribution—In India : Bombay, Krusadai, Pulli Is., Madras, Id., of Nicobar,
Elsewhere: Sri Lanka.

Remarks—Reeve’s (op. cit.) description is adequate though brief. Satyamurti’s (op. cit.) is more detailed.


A large number of shells of different sizes with damaged outer lip forms the collection studied.

As is well known, members of the genus *Janthina* are inhabitants of the open sea being adapted to pelagic life. During stormy weather conditions in sea, they are cast on shore in very large numbers. This happens only occasionally and infrequently. On such occasions the shells which are very fragile suffer much damage because of the force with which the furious waves wash them ashore.

The collection, mentioned above, was made probably sometime after such a stormy weather.

*Janthina globosa* Swainson, 1822

*Janthina globosa* Swainson, 1822, *Zool. Illust. 1 Ser.* 2: 85 (Type-locality: Not given); Reeve, 1858, *Conch. Icon.*, 11, *Janthina*, sp. no. 18, pl. 4, figs. 18a & 18b.


*Distribution*—In India: Bombay, Krusadai Id., Pamban, Madras.

Elsewhere: Singapore, Hongkong, both coasts of United States of America. Cernohorsky (op. cit.) has reported it to be world wide in distribution.

Remarks—Very brief description is given by Swainson (op. cit.). It is adequate though brief in Reeve (op. cit.). Satyamurti (op. cit.) are in greater detail.

A few shells represent the collection and in all of them the outer lip is broken.

V. SUMMARY

A systematic study of the marine molluscs of the order Mesogastropoda found along the Coromandel Coast, Palk Bay and Gulf of Mannar upto Kanya Kumari is presented partly, with 8 families.

The material undertaken for the study comprises the three survey collections of Tamil Nadu Coast made in 1968, 1975, 1978 and the entire unnamed collections from the same area, in the Zoological Survey of India accumulated for over 50 years from the period from 1913 to 1966.

A total of 36 species under 15 genera representing 8 families are dealt with.

Necessary Keys to the identification of families, subfamilies and genera have been provided.

The synonymy, of the species is made brief confining to only important references, the distribution is given as completely as possible for each species. Diagnostic shell characters of description of species are included whenever found necessary. Wherever possible their ecology has also been presented.

Among the species dealt with, three are recorded here for the first time from the Indian Coast, one, for the first time from the coast of mainland India, two are represented in their respective material as topotypes and two others are newly added to the National Zoological collections of the Zoological Survey of India. In all the cases efforts have been made to give the correct identity for all the species.

VI. ACKNOWLEDGEMENTS

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Director, for kindly going through the paper and offering constructive criticism and to Dr. N. V Subba Rao, Officer-in-Charge, Mollusca Section for the help rendered in many ways.

VII. REFERENCES


DAUTZENBERG, Ph. 1932. Mollusques Testaces Marine de Madagascar, Supplement. J. de Conchyl., 76 : 5-119, 1 pl., 6 figs.


SATYAMURTI, S. T 1952. The mollusca of Krusadai Island (in the


