

ON THE COLLECTION OF STROMBIDAE (MOLLUSCA :
GASTROPODA) FROM BAY OF BENGAL, ARABIAN SEA AND
WESTERN INDIAN OCEAN, WITH SOME NEW RECORDS,
I. GENUS—STROMBUS

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THOUGH the land and freshwater molluscs of India have been extensively studied as regards their systematics, distribution and biology, comparatively little has been done on the marine molluscs and the information available is much scattered. There are not many accounts dealing with the individual families occurring in the Indian Seas. A few earlier workers had, however, taken up the study of a few families, such as the Mitridae (Ray, 1956) and the Nuculidae (Prashad, 1933). Considering the abundance of marine molluscs in the Indian seas more of such studies are needed. With this aim in view, the family Strombidae has been selected for study, the collections present in the Zoological Survey of India forming the basis.

Recently Abbott (1960, 1967) made an exhaustive study of the genus *Strombus* in the Indo-Pacific. He gave a census of the strombids of different regions. According to him (1960) there are 16 species and races from the Bay of Bengal, 6 from the Maldives and Chagos Islands, and 11 from Mauritius and Reunion Islands. His (1961) studies on the genus *Lambis* are followed by Jung & Abbott (1967) who have dealt with the genus *Terebellum*. Their excellent contributions have solved many of the nomenclatural problems. The detailed synonymy, excellently illustrated descriptions, ecology and distribution are given in the above-mentioned works.

The material for the present study includes the named and unnamed collections present in the Zoological Survey of India. Unfortunately, for some specimens, data such as locality and date of collection were wanting. In some cases even the identified specimens were found to have been mixed together probably due to the Varuna floods in 1943, necessitating rearrangement of such material. Fortunately, in some cases names of the localities were written in Indian Ink on the shells. The collections of the Zoological Survey of India have a wide geographical coverage of the Indo-Pacific region, from Seychelles and Persian Gulf in the West to New Caledonia in the Pacific.

The family Strombidae is represented in the collections by all the five genera: *Strombus*, *Lambis*, *Terebellum*, *Tibia* and *Rimella*. The material contains 700 examples belonging to 50 species. The genus *Strombus* is by far the largest, with 38 species and 450 examples. Only species occurring in the Indian Seas and adjoining areas like Burma, Maldives, Mauritius etc., are dealt with in this report. There are 10 new records and the distribution of 10 species and 3 subspecies extended beyond the known range.

KEY TO THE SPECIES OF STROMBUS FROM THE INDIAN SEAS AND ADJOINING
AREAS

- I. Columella with fine or broad spiral lirae :
1. Shell generally with strong axial plications, rather narrow, with a strongly elevated and turreted spire.
 - (i) Columella yellowish to reddish orange, with spiral lines of darker colour. The lirae on the inner wall of the body whorl are usually darkly coloured.
.....*labiatus labiatus* (Röding).
 - (ii) Columella light mauve or whitish violet with raised spiral lines of enamel white. The lirae on the inner wall of the body whorl are usually white.
.....*labiatus olydius* Duclos.
 2. Shell without strong axial plications, spire comparatively less elevated.
 - (i) Rose tinted aperture, columella pinkish brown to mauve-brown, over which are 30 to 40 rather broad, raised whitish spiral lirae, which are strongest at the base of columella. Upper end of aperture squarish and bounded at the right by a swollen portion of the outer lip.
.....*mutabilis* Swainson.
 - (ii) Body whorl more globose and less descending thus giving a stunted appearance, spiral lirae on columella brownish-purple. Upper part of the outer lip forms a posterior canal which may be long, arching and attached to the spire.
.....*plicatus siboldi* Sowerby.
- II. Columella smooth in the middle with spiral lirae at the bottom and at the top only.
1. Shell with 3 to 11 or more knobs on the shoulder of the last whorl, posterior siphonal canal absent.
 - (i) Shoulder of the last whorl rounded and bearing about 9 to 11 small, axially lengthened knobs. Base of the columella usually brown. Columella with 24 indistinct spiral lirae.
.....*erythrinus erythrinus* Dillwyn.
 - (ii) Shoulder of the last whorl bearing 3 to 8 knobs.
 - (A) 3 to 8 knobs on the shoulder, the last 2 or 3 on the dorsum being the largest. Siphonal canal drawn out, almost always tipped with bluish black within and without.
.....*urceus* Linnaeus.
 - (B) Only 3 knobs on the shoulder, last is very large and blunt. Aperture squarish at the top, broader below, siphonal canal short and straight without a black stain.
.....*klineorum* Abbott.

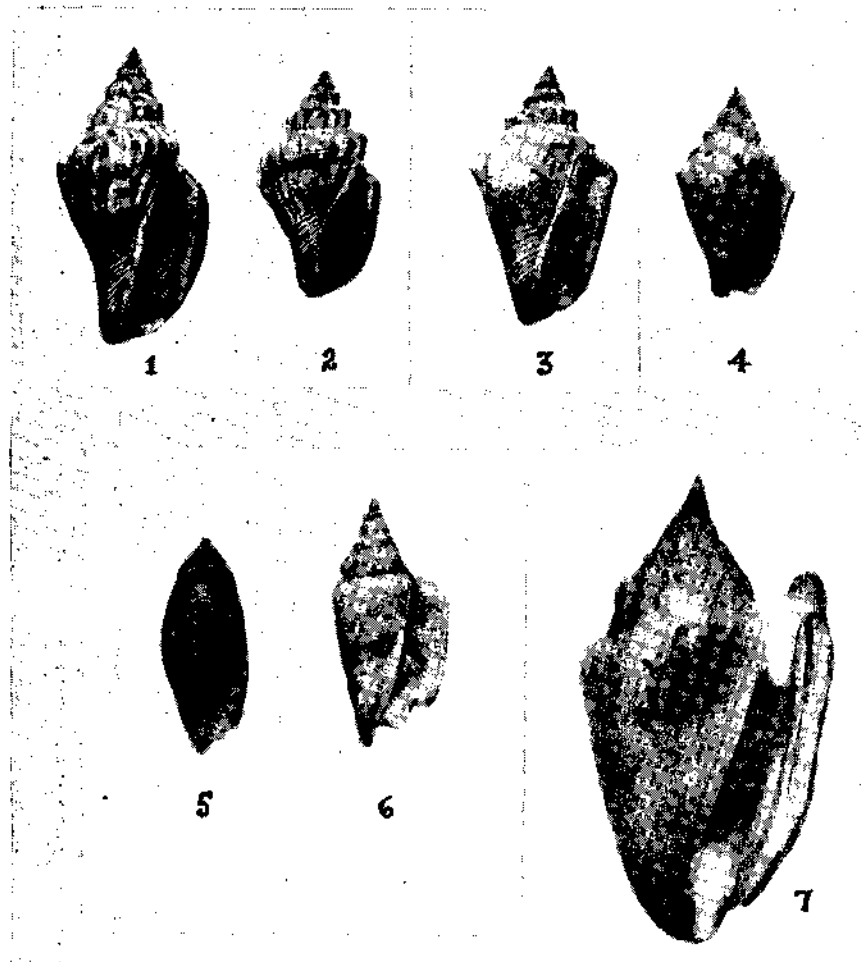


PLATE I: 1. *Strombus (Canarium) labiatus labiatus* (Röding)—From Andamans.
2. *Strombus (Canarium) labiatus olydius* Duclos—From Andamans.
3. *Strombus (Canarium) klineorum* Abbott—From Karachi.
4. *Strombus (Canarium) klineorum* Abbott—From Maldives.
5. *Strombus (Canarium) fragilis* (Röding)—From Andamans.
6. *Strombus (Dolomena) plicatus pulchellus* Reeve.
7. *Strombus (Euprotonus) aurisdianae aurisdianae* Linnaeus—From Andamans.

2. Shell on the ventral side smooth, 17-20 small axial plications on the dorsal side or a single knob or a carina. Posterior siphonal canal present.
- (i) Shell usually small, spire elevated, axially plicated, absence of spiral sculpture on the first five whorls; spiral lirae on the outer lip coarser and fanning out to the very edge; stromboid notch strong.
*plicatus pulchellus* Reeve.
- (ii) Shell generally larger, either a single knob or carina, spiral sculpture present in the spire. Outer lip without prominent spiral lirae. Stromboid notch weak.
- (A) Sharp, narrow, spiral carina or keel on the shoulder of the last 2 or 3 whorls.
*marginatus marginatus* Linnaeus.
- (B) Shell more elongate, a single, rounded distinct knob on the dorsum of the body whorl.
*marginatus succinctus* Linnaeus.

III. Columella smooth throughout.

1. Surface of body whorl smooth without any distinct knobs on the shoulder.
- (i) Stromboid notch weak or shallow, posterior canal short.
- (A) Outer lip thick and winged, and its upper end projecting slightly upward; aperture smooth and with aluminium-like glaze.
*canarium* Linnaeus.
- (B) Outer lip comparatively less thick and not winged; aperture light brown within and with numerous, crowded, low, irregular, fine, brown spiral lirae.
*fragilis* (Röding).
- (ii) Stromboid notch strong and deep:
- (A) Posterior canal not bounded by any white callus on the body wall side; posterior corner of the outer lip protrudes very prominently, inner surface of outer lip smooth, polished, enamel-white with golden tint.
*listeri* T. Gray.
- (B) Posterior canal bounded by a swollen white callus on the body wall side; posterior corner of outer lip not protruding, inner edge of outer lip white, a broad violet or dark-purple axial band crossed by numerous, irregular, whitish spiral lirae.
*gibberulus gibberulus* Linnaeus.
2. Surface of body whorl rough and with distinct knobs on the shoulder.
- (i) Body whorl with 3 to 5 spiral rows of knobs.
- (A) Body whorl with 7 to 9 large, squarish knobs at the shoulder. Below this are 3 to 5 spiral rows of small rounded knobs. Outer lip wavy, the upper end with 2 or 3 tongue-like projections.
*lentiginosus* Linnaeus.

- (B) Body whorl with 5 to 9 small, short knobs. Below are two spiral rows of very obscure nodules. Outerlip moderately sharp with high prong-like extension at the posterior end.

.....*aurisdianae aurisdianae* Linnaeus.

- (ii) Body whorl with 2 to 6 distinct knobs on the shoulder :

- (A) Dorsal side of body whorl with 2 to 4 distinct knobs, the next to last being the largest and the earlier ones being axially elongated. Last whorl with 5 narrow indistinct spiral white bands. Posterior siphonal groove short.

.....*variabilis variabilis* Swainson.

- (B) Shell coniform, dorsal side of body whorl with 4 to 6 prominent knobs. Posterior siphonal notch moderately developed and bordered above by a white tongue-like flap which is adherent to the previous whorl.

.....*decorus decorus* (Röding)

SYSTEMATIC ACCOUNT

Genus *Strombus* Linnaeus, 1758

Subgenus *Laevistrombus* Kira, 1955

1. *Strombus* (*Laevistrombus*) *canarium* Linnaeus, 1758

Strombus canarium Linnaeus, 1758, *Syst. Nat.*, ed. 10, p. 745, no. 438 ; 1767, ed. 12, p. 1211, no. 507

Strombus canarium, Satyamurti, 1952, *Bull. Madras Govt. Mus. Nat. Hist. (NS.)* 1 (2), pt. 6, pp. 100-101, pl. viii, fig. 2

Strombus (*Laevistrombus*) *canarium*, Abbott, 1960, *Indo-Pacific Mollusca*, 1 (2), pp. 48-50, pl. 17, figs. 15-16

Localities : India : Visakhapatnam (Jan-June, 1916, Rev. H. Hoston), Tuticorin (1968—A. S. Rajagopal), Andamans ; Ceylon ; Burma ; Arakan, Mergui Archipelago (J. Anderson) ; Hongkong ; Singapore ; Australia : Queensland.

Range : 'Southern India to Australia and Melanesia, and north to Japan' (Abbot, 1960)

Remarks : The collection contains the netted form, the typical *canarium*, and the plain colour phase, the forms *turturella* (Röding) and *isabella* Lamarck

The species is recorded for the first time from Visakhapatnam, Arakan and Mergui Archipelago.

Measurements (in mm.) :

length	width	no. whorls	
80.0	48.5	11	(large : Andamans)
50.0	32.0	7+	(average : Mergui Archipelago)
26.9	13.5	7+	(small : Andamans)

Subgenus *Canarium* Schumacher, 18172. *Strombus* (*Canarium*) *urceus* Linnaeus, 1758

Strombus urceus Linnaeus, 1758, *Syst. Nat.*, ed. 10, p. 745, no. 440 ; 1767, ed. 12, p. 1212, no. 512.

Strombus (*Canarium*) *urceus*, 1960, Abbott, *Indo-Pacific Mollusca*, 1 (2), pp. 63-66, pl. 20, figs. 26-29.

Localities : Maldives ; Singapore ; Borneo ; Australia.

Range : ' Southeast Asia and the Ryukyu Islands to Australia and Melanesia ' (Abbott, 1960).

Remarks : In all the specimens the siphonal canal is drawn out and in some it is tipped with black. The columella is mostly yellowish orange and always smooth except at the bottom and top fourth. Out of 10 examples from Maldives only one is found with black-rimmed aperture. The specimens from Singapore are with black-coloured columella and aperture representing the form *ustulatus* Schumacher.

One example of *Strombus urceus* subsp. *orrae* Abbott from Australia is also present in the collection.

With its new record from Maldives, the range of this species is now extended to the Western Indian Ocean also.

Measurements (in mm.) :

length	width	no. whorls	
52.5	22.5	10	(large : Singapore)
40.0	16.9	9	(average : Maldives)
35.5	15.5	8	(small : Maldives)

3. *Strombus* (*Canarium*) *labiatus labiatus* (Röding, 1798)

(pl. fig. 1)

Lambis labiatus Röding, 1798, *Museum Boltianum*, pt. 2, p. 63, no. 806.

Strombus dentatus, Satyamurti, 1952, *Bull. Madras Govt. Mus. Nat. Hist.* (N.S.) 1 (2), pt. 6, p. 101, pl. VII, fig. 3.

Strombus (*Canarium*) *labiatus* subsp. *labiatus*, Abbott, 1960, *Indo-Pacific Mollusca*, 1 (2), pp. 67-69, pl. 20, figs. 22-23.

Localities : India : Andamans ; Borneo ; Maldives ; Phillipines : Cebu.

Range : ' Southeast Asia to Japan ; Australia and Melanesia ' (Abbott, 1960).

Remarks : The specimens agree well with the description and figure of *labiatus labiatus* given by Abbott (1960).

The localities Cebu, and Maldives are represented each by a solitary example. In both these examples the spiral whorls are weakly plicated. The body whorl is with a rounded shoulder and with faint indications of axial plications.

The occurrence of this subspecies in Maldives is interesting as it is reported from here for the first time.

Measurements (in mm.) :

length	width	no. whorls	
44.5	19.0	6+	(large : Maldives)
35.0	17.0	7+	(average : Andamans)

4. *Strombus* (*Canarium*) *labiatus olydius* Duclos, 1844

(pl. fig. 2)

Strombus olydius Duclos, 1844 in Chenu's *Illustr. Conch.* 4. *Strombus*, p. 4, pl. 5, fig. 7.

Strombus (*Canarium*) *labiatus* subsp. *olydius* 1960, Abbott, *Indo-Pacific Mollusca*, 1 (2), p. 69, pl. 20, figs. 18-19.

Localities : India : Andamans (G. H. Booley) ; Burma : Mergui Archipelago (J. Anderson).

Range : ' Central East Africa to Mauritius and Ceylon ' (Abbott, 1960).

Remarks : This subspecies shows no striking difference from the previous one in its shell characters. The only difference is in the columella with its tinge of purplish brown colour and the broad, raised, enamel-white spiral lirae.

The two localities mentioned above are new records extending the distribution of the subspecies eastward to the Bay of Bengal.

Measurements (in mm.) :

length	width	no. whorls	
46.1	21.5	9	(large : Andamans)
37.0	18.5	8+	(average : Andamans)
21.1	10.5	8	(small : Andamans)

5. *Strombus (Canarium) klineorum* Abbott, 1960

(pl. figs. 3, 4)

1960 *Strombus (Canarium) klineorum*, Abbott, *Indo-Pacific Mollusca*, 1 (2), p. 70, pl. 20, figs. 20-21.*Localities* : Maldives ; Pakistan : Karachi.*Range* : 'Known only from Ceylon' (Abbott, 1960).

Remarks : The collection agrees with the description and figures given by Abbott (1960). In some, the colouration cannot be distinctly made out. The body whorl bears 3 distinct knobs, but in two small specimens there are only 2 knobs, the third one being indistinct. The last one is always large and blunt. Columella bears a few raised spiral lirae at the top. Upper end of outer lip shouldered by a large swelling. Excepting a few small specimens the shoulder of the outer lip extends to the shoulder above.

This species was so far known from its type locality in Ceylon. Its occurrence at Karachi and Maldives extends its range of distribution further into the Arabian Sea.

Measurements (in mm.):

length	width	no. whorls	
40.5	22.0	8	(large : Maldives)
33.5	18.0	8	(average : Karachi)
25.9	15.0	6+	(small : Maldives)

6. *Strombus (Canarium) mutabilis* Swainson, 1821*Strombus mutabilis* Swainson 1821, *Zool. Illustr.*, (1) 2, pl. 71.*Strombus (Canarium) mutabilis*, Abbott 1960, *Indo-Pacific Mollusca*, 1 (2), pp. 72-74, pl. 20, figs. 15-17, pl. 50.

Localities : Aden ; Seychelles ? ; Mauritius ; Maldives ; Pakistan : Karachi ; India : Andamans (Colls. H. C. Ray, K. K. Tiwari & A. Daniel), Tuticorin (Coll. A. S. Rajagopal) ; Ceylon ; Burma : Mergui Archipelago ; Singapore ; Annam.

Range : 'The entire tropical Indo-Pacific exclusive of Hawaii, the Line Islands, Marquesas and Easter Islands' (Abbott, 1960).

Remarks : As the collection is very old, colouration cannot be made out in most of the specimens. Almost all of them are characterised by 'somewhat quadrate shape'. The pinkish nature of the aperture can be discerned in some specimens. In a single specimen labelled as from the Seychelles, the spire is proportionately higher.

One specimen from 'Mauritius' possesses long, dark-brown, axial, narrow, zigzag stripes. This is evidently the rare form, *zebriolatus* Adam and Leloup. This

form was noticed by Abbott (1960) in the Pacific region and now it is being reported from the Indian Ocean.

Karachi and Tuticorin are the new locality records for this species.

There are 2 examples from Mauritius (Reg. No. ZSI 2547) which agree to a large extent with the description and figures given by Abbott (1960) for his new subspecies *ochroglottis ochroglottis*. The specimens are only with faint indication of nodules.

Measurements (in mm.):

length	width	no. whorls	
40.0	21.4	7+	(large : Singapore)
33.0	18.6	6+	(average : Andamans)
18.5	10.0	8	(small : Indian Seas)

7. *Strombus (Canarium) erythrinus erythrinus* Dillwyn, 1817

Strombus erythrinus 'Chemnitz' Dillwyn 1817, *Descriptive Cat. Recent Shells*, London, 2, p. 673.

Strombus (Canarium) erythrinus subsp. *erythrinus*, Abbott 1960, *Indo-Pacific Mollusca*, 1 (2), pp. 79-81, pl. 20, fig. 1.

Localities : India : Andamans, Nicobars ; Ceylon ; Mauritius ; New Caledonia.

Range : 'For the species as a whole : Red Sea and East Africa to South Japan and to Hawaii and Ellice Islands' (Abbott, 1960).

Remarks : In general shape and structure the shell resembles fig. 1 (pl. 20) given by Abbott (1960). The aperture is purple-brown. The weak and brownish teeth on the inner half of the columella, sometimes extend even on to its outer half. In some shells the columella is smooth in the middle portion.

Nicobars and Ceylon are the new locality records.

Measurements (in mm.):

length	width	no. whorls	
38.5	16.5	9+	(large : Nicobars)
31.5	13.0	9	(medium : Indian Seas)
22.0	9.5	9	(small : Andamans)

8. *Strombus (Canarium) fragilis* (Röding, 1798)

(pl. fig. 5)

Lambis fragilis Röding 1798, *Museum Boltenianum*, pt. 2, p. 62.

Strombus (Canarium) fragilis, Abbott 1960, *Indo-Pacific Mollusca*, 1 (2), pp. 86-87, pl. 14, fig. 30.

Locality : Andamans (ZSI Reg. No. 2527).

Range : 'Southwest Pacific : Ryukyus and Indonesia to Hawaii and Samoa' (Abbott, 1960).

Remarks : Shell is oval elongate, without ribs, smoothish, strong and solid, cream coloured with irregular patches of orange-brown ; colour of the aperture has faded out. Columella is solid brown and smooth. Stromboid notch is very weak.

This species was so far known to have been confined to Southwest Pacific. The present record of its occurrence in Andamans extend the geographical range of its distribution further westwards, into the Bay of Bengal.

Measurements (in mm.):

length	width	no. whorls	
35.5	13.5	5+	(large : Andamans)
33.5	13.0	9	(medium : Andamans)
25.0	10.0	9	(small : Andamans)

Subgenus *Dolomena* Iredale, 1931

9. *Strombus (Dolomena) plicatus pulchellus* Reeve, 1851

(pl. fig. 6)

Strombus pulchellus Reeve 1851, *Conch. Icon*, 6, *Strombus* sp. & fig. 52.

Strombus (Dolomena) plicatus subspecies *pulchellus*, Abbott 1960, *Indo-Pacific Mollusca*, 1 (2), p. 92, pl. 18, fig. 3, pl. 63, fig. 2.

Localities : India : Andamans ; Ceylon : 18 kms. west of Colombo ('Investigator'); Burma : Akayab.

Range : 'Southern Japan to Micronesia and Melanesia' (Abbott, 1960).

Remarks : This species can be easily distinguished 'by the absence of spiral sculpture on the first five whorls, smoothness of the central part of the columella, diffused brownish orange colouring inside the aperture' and by the coarser spiral lirae fanning out to the very edge of the outer lip.

Melvill & Sykes (1908) reported it from Andaman Islands. Its occurrence at Ceylon and Akayab gives a further proof to its existence in Bay of Bengal. Thus it can be said with certainty that the distribution of this West Pacific subspecies extends into the Bay of Bengal.

Measurements (in mm.):

length	width	no. whorls	
39.5	20.0	10	(large : Colombo)
29.5	15.0	9	(medium : Andamans)
24.0	12.5	9	(small : Andamans)

10. *Strombus (Dolomena) plicatus siboldi* Soweby, 1842

Strombus siboldi Soweby 1842, *Thesaurus Conchyl.*, 1, p. 28, p. 6, figs. 10, 11.

Strombus (Dolomena) plicatus subspecies *siboldi*, Abbott 1960, *Indo-Pacific Mollusca*, 1 (2), pp. 91-92, pl. 18, figs. 15, 16.

Localities: India: Malabar coast (45 fms.), Coromandel coast (41 fms.),
Burma: Arakan ('Investigator' Colln.).

Range: 'Gulf of Aden to Ceylon.'

Remarks: The body whorl is very much globose and less descending thus giving the shell a stunted appearance. The spiral lirae on the columella are brownish purple.

Malabar coast and Arakan are the new records for this subspecies, extending its distribution eastward into the Bay of Bengal.

Measurements (in mm.):

length	width	no. whorls	
40.0	23.0	10+	(large : Coromandel coast)
36.5	22.0	11	(medium : Malabar coast)
27.5	17.5	9	(small : Coromandel coast)

11. *Strombus (Dolomena) dilatatus dilatatus* Swainson, 1821

Strombus dilatatus Swainson 1821, *Zool. Illustr.*, (1) 2, pl. 71.

Strombus (Dolomena) dilatatus subsp. *dilatatus*, Abbott 1960, *Indo-Pacific Mollusca*, 1 (2), pp. 93-94, pl. 14, fig. 25.

Localities: Andamans? & Loyalty Islands (ZSI Reg. No. M 2535).

Range: 'Singapore to Solomon Islands, Phillipines to Queensland, Australia.'

Remarks: The collection consists of five shells, out of which two are definitely *S. dilatatus dilatatus*. The other three shells bearing the abbreviation 'And' indicating Andamans, do not seem to belong to this species and its occurrence in Andamans is doubtful. The three shells from Andamans resemble *S. variabilis*.

In the two shells which seem to be from Loyalty Islands the outer lip is smoothly rounded, flaring and tongue-shaped, white and smooth along the inner border, columella smooth, white and glossy with 6 very faintly marked teeth at the basal portion. A purple-brown patch of colour is found within the throat of aperture.

Measurements (in mm.):

length	width	no. whorls	
46.0	28.0	9	(larger : Loyalty Islands)
46.0	25.0	9	(smaller : Loyalty Islands)

12. *Strombus (Dolomena) marginatus marginatus* Linnaeus, 1758

Strombus marginatus Linnaeus 1758, *Syst. Nat.*, ed. 10, p. 744, no. 430; 1767, ed. 12, p. 1209, no. 499.

Strombus (Dolomena) marginatus subsp. *marginatus*, Abbott 1960, *Indo-Pacific Mollusca*, 1 (2), pp. 98-99, pl. 18, figs. 6, 7.

Localities : India : Tuticorin (Pearl & Chank Exploratory Survey, 1963);
Burma : Akayab, Mergui Archipelago (J. Anderson), Maungmagan (F. J. Meggitt);
Maldives ; Diego Garcias.

Range : 'Known only from the areas surrounding the Bay of Bengal (Abbott, 1960).'

Remarks : The shell is characterised by the presence of a sharp, narrow, spiral carina or keel on the shoulder of the last two whorls. The keel disappears in the area behind the outer lip. In one young specimen the keel assumes a moniliform structure instead of being continuous and sharp.

The localities Tuticorin, Maldives and Diego Garcias are new records for this species extending its range of distribution to the Indian Ocean.

Measurements (in mm.) :

length	width	no. whorls	
53.0	30.5	6+	(large : Diego Garcias)
46.5	23.0	8 $\frac{1}{2}$	(average : Diego Garcias)
23.0	14.5	7	(small : Diego Garcias)

13. *Strombus (Dolomena) marginatus succinctus* Linnaeus, 1767

Strombus succinctus Linnaeus 1767, *Syst. Nat.*, ed. 12, p. 121, no. 509.

Strombus (Dolomena) marginatus subsp. *succinctus*, Abbott 1960, *Indo-Pacific Mollusca*, 1 (2), pp. 99-100, pl. 18, figs. 13, 14.

Localities : Pakistan : Karachi ; Ceylon ; Singapore ; Seychelles (ZSI Reg. No. M 2396).

Range : 'Ceylon to Madras, India.'

Remarks : The shell is more elongate and characterised by a single rounded, distinct knob on the dorsum of the body whorl.

The localities Singapore, Seychelles and Karachi are new records for this subspecies. Its occurrence in such widely separated places may be taken as a proof that it is not a localised subspecies.

Regarding the locality reports, Singapore and Seychelles it may be stated that the label in the container shows the locality as Seychelles but one shell contains the

abbreviation 'sing' which is taken as indicating Singapore, while on some of the remaining shells only the letter 'S' is found, which may be for Seychelles.

Measurements (in mm.):

length	width	no. whorls	
53.9	25.5	10	(large : Seychelles ?)
47.5	21.3	9+	(average : Seychelles ?)
43.5	21.0	7+	(small : Karachi)

14. *Strombus (Dolomena) variabilis variabilis* Swainson, 1820

Strombus variabilis Swainson 1820, *Zool. Illustr.*, (1) 1, pl. 10.

Strombus (Dolomena) variabilis subsp. *variabilis*, Abbott 1960, *Indo-Pacific Mollusca*, 1 (2), pp. 103-104, pl. 14, figs. 21, 22, pl. 79, fig. 2.

Localities : India : Andamans (Colls. H. C. Ray, K. K. Tiwari, & A. Daniel), Mandapam, Madras (Colls. V. K. Premkumar & P. K. Chakraborti), Point Calimere, Madras (Colls. V. K. Premkumar & P. K. Chakraborti).

Range : 'Sumatra and Thailand, eastward through Micronesia, Melanesia, Northern Australia to Samoa.'

Remarks : The outer surface of shell is enamel white in a few, but some are with dark-brown zigzag axial lines. The last whorl has 3 or 4 narrow white bands. The dorsal side of the body whorl with two knobs and in a few shells only with one prominent knob. Some specimens do not possess the characteristic dark-brown colour patch in the centre of the columella. In some the outer margin of the outer lip is strongly swollen.

A series of shells are collected from Andamans which prove beyond doubt its existence there as recorded by Melvill and Standen (1898 see Abbott, 1960, p. 104).

Mandapam and Point Calimere are the new records and the distribution is extended further westward beyond the known range.

Measurements (in mm.):

length	width	no. whorls	
59.0	32.5	10	(largest : Andamans)
48.2	29.5	9	(average : Andamans)
31.5	17.0	9	(smallest : Andamans)

Subgenus *Euprotomus* Gill, 1870

15. *Strombus (Euprotomus) listeri* T. Gray 1852

Strombus listeri T. Gray 1852, *Ann. Mag. nat. Hist.*, (2) 10, p. 429.

Strombus (Doxander) listeri, Abbott 1960, *Indo-Pacific Mollusca*, 1 (2), p. 115, pl. 92.

Strombus (Euprotomus) listeri, Okutani 1965, *Indo-Pacific Mollusca*, 1 (6), pp. 399-400, pl. 296.

Localities : India : Sandheads, Calcutta (Coll. 'Lady Fraser'); Burma : Gulf of Martaban (Coll. 'Investigator').

Range : 'Gulf of Oman, Northwest Indian Ocean and the Bay of Bengal' (Okutani, 1965).

Remarks : The collection consists of one adult shell and two young ones. The adult agrees in all respects with the figures and description given by Okutani (1965).

Sandheads (Calcutta) is a new locality record.

Measurements (in mm.):

length	width	no. whorls	
105.0	45.0	10+	(large : Sandheads)
100.9	32.5	12+	(average : Sandheads)

16. *Strombus (Euprotomus) vomer vomer* (Röding, 1798)

Lambis vomer Röding 1798, *Museum Boltenianum*, pt. 2, p. 64, no. 821 [(no locality) Refers to *Conchyl. Cab*, Vol. 10, figs. 1485-6.].

Strombus (Euprotomus) vomer subsp. *vomer*, Abbott 1960, *Indo-Pacific Mollusca*, 1 (2), pp. 130-132, pl. 14, figs. 7-8.

Localities : Andamans ? New Zealand ?

Range : 'Ryukyu Islands and New Caledonia' (Abbott, 1960).

Remarks : This species is represented by two shells which agree in all respects with the description and figure given by Abbott (1960). But there is a doubt regarding the locality of these two shells. The register and one label in the container bear the locality as 'Andamans, New Zealand'. There is another label, in the same container, with the locality as 'Pacific'. It is difficult to say to which of these three localities the shells belong, although, to-date, no New Zealand worker have reported this species from their Country.

17. *Strombus (Euprotomus) aurisdianae aurisdianae* Linnaeus, 1758

(pl. fig. 7)

Strombus aurisdianae Linnaeus 1758, *Syst. Nat.*, ed. 10, p. 743, no. 429 ; 1767, ed. 12, p. 1209, no. 497.

Strombus (Euprotomus) aurisdianae subsp. *aurisdianae*, Abbott 1960, *Indo-Pacific Mollusca*, 1 (2), pp. 125-127, pl. 14, figs. 3, 4.

Localities : India : Andamans ; Ceylon ; Burma ; Arakan ; Singapore ; Fuladu Island, Goifurfehendu Atoll ('Investigator').

Range : 'Central East Africa to the Solomon Islands, and the Ryukyu Islands, south to Queensland, Australia.'

Remarks : The shell is characterised by rough exterior, pinkish interior of aperture, the single wing-like extension at the top of the outer lip, the strongly recurved siphonal canal and by 7 shoulder knobs on the dorsal side of the body whorl. In many shells the aperture is smooth.

Fuladu Islands is the new locality record.

Measurements (in mm.) :

length	width	no. whorls	
67.5	36.6	11	(large : Andamans)
60.5	30.0	10	(average : Andamans)

Subgenus *Lentigo* Jousseau, 1886

18. *Strombus (Lentigo) lentiginosus* Linnaeus, 1758

Strombus lentiginosus Linnaeus 1758, *Syst. Nat.* ed. 10, p. 743, no. 427; 1767, ed. 12, p. 1208, no. 495.

Strombus (Lentigo) lentiginosus, Abbott 1960, *Indo-Pacific Mollusca*, 1 (2), pp. 117-119, pl. 17, figs. 11, 12, pl. 94, fig. 4.

Localities : India : Andamans ; Ceylon ; Mauritius.

Range : 'East Africa to the Marshall and Tuamotu Islands.'

Remarks : The shell agrees in all respects with the description and figure given by Abbott (1960). Outer lip tan with 4 to 7 distinct or indistinct light brown bars.

Though it is a widely distributed species in the Indo-Pacific, it is recorded now for the first time from the Andamans.

Measurements (in mm.) :

length	width	no. whorls	
103.0	66.0	7+	(large : Mauritius)
95.5	59.5	7+	(medium : Andamans)
60.0	40.0	6+	(small : Andamans)

Subgenus *Conomurex* P. Fischer, 1884

19. *Strombus (Conomurex) decorus decorus* (Röding, 1798)

Lambis decora Röding 1798, *Museum Boltenianum*, pt. 2, p. 62, no. 777.

Strombus (Conomurex) decorus subsp. *decorus*, Abbott 1960, *Indo-Pacific Mollusca*, 1 (2), pp. 137-138, pl. 14, fig. 13.

Localities : Maldives ; Ceylon ; Burma : Mergui Archipelago, Pilai Bay (Coll. J. Anderson) ; Indian Ocean : Mauritius, Diego Garcias.

Range : 'Durban, South Africa to the Gulf of Bengal.'

Remarks : The shells are somewhat conic and smooth on the shoulder of the body whorl. Spire moderately raised or very low and pointed. Colour of outer shell cream with zigzag streaks or indistinct spiral bands of yellowish orange. The shells from Mergui Archipelago are covered with brownish periostracum and those from Diego Garcias are uniformly cream coloured without any sparse mottlings or nettings.

Melville & Sykes (1908) reported it from Andamans

Measurements (in mm.):

length	width	no. whorls	
69.5	35.0	10	(large : Mauritius)
49.0	27.5	9	(average : Mergui Archipelago)
30.0	15.9	9	(small : Mauritius)

Subgenus *Gibberulus* Jousseaume, 1888

20. *Strombus* (*Gibberulus*) *gibberulus gibberulus* Linnaeus, 1758

Strombus gibberulus Linnaeus 1758, *Syst. Nat.*, ed. 10, p. 744, no. 443; 1767, ed. 12, p. 1210, no. 501.

Strombus (*Gibberulus*) *gibberulus* subsp. *gibberulus*, Abbott 1960, *Indo-Pacific Mollusca*, 1 (2), pp. 141-143, pl. 14, fig. 28, p. 114, figs. 5-7.

Localities : Pakistan : Karachi; India : Andamans, Nancouri Harbour; Ceylon; Maldives; Laccadives; Mascarene; Singapore.

Range : 'Indian Ocean exclusive of South Africa, Red Sea and Australia.'

Remarks : Shell is somewhat fusiform with distorted whorls. Columella smooth with a faint flush of violet. In some it is of very dark colour. Inner edge of outer lip with a dark purple, axial band crossed by numerous, whitish spiral lirae. The short posterior canal is with dark brown colour at its base.

Measurements (in mm.):

length	width	no. whorls	
65.0	31.5	10	(large : Mascarene)
55.0	28.0	8	(average : Andamans)
29.5	16.0	8	(Small : Singapore)

SUMMARY

The species of *Strombus* occurring in the Bay of Bengal, Arabian Sea and Western Indian Ocean are dealt with in this report. The named and unnamed collections present in the Zoological Survey of India have formed the basis for this study. There are altogether 38 species of *Strombus* present in the collection. But only 20 species

are included in this paper, the remaining, being either from far off places in Indian Ocean or Pacific Ocean do not fall within the scope of the present paper. There are two new records of species from Andamans Islands, three from Maldive Islands and another five from other localities in the Bay of Bengal and Arabian Sea. 10 species and 3 subspecies have been found to extend beyond their known ranges of distribution.

A key to the identification of species occurring in the Indian Seas is also provided.

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