Proc. Symp. Coral Reef Environ. Red Sea, Jeddah, Jan.,1984: 417-470.

STUDIES ON SOME PELECYPODS AND GASTROPODS OF SHALLOW WATER IN THE REGION OF NORTH JEDDAH (RED SEA)

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ABSTRACT

More than 100 different species of Gastropods and Pelecypods were collected from the shallow water of the Red Sea North of Jeddah, especially the sandy lagoon and the reef flat of the fringing reef 25 kilometers to the North from the Faculty of Marine Science in Obhur. Taxonomical and Zoogeograhpical studies were done for the first time on the collected specimens of Molluscs. 27 different specimens are registered as new records for the shallow water in the region of North Jeddah (Red Sea).

INTRODUCTION

In spite of the intensive scientific work which is merely based upon some molluscan families in the Indo-West-Pacific (Abbott, 1960; Burgess, 1970; Cernohorsky, 1967; Habe, 1964; Kira, 1962; Powell, 1964; Rosewater, 1965; Kay, 1979). There is comparatively scarce information for the Red Sea, especially in the field of Taxonomical studies of Molluscs.

In recent times, few studies were published on the faunal composition of Molluscs in this region, namely that of Cypraeids (Foin, 1972; Mienis, 1971b; O'Malley, 1971; Schilder, 1965).

Further knowledge about the Zoogeography of littoral molluscs in the Red Sea zones is given for Strombids (Mienis, 1971; Conids (Khon, 1965), Terebrids (Bratcher and Burch. 1967; Mienis, 1970) and many families of Pelecypods (Lamy, 1916-1930), besides the collections and observations of the Marine Molluscan assemblages of Port Sudan, Red Sea which are done by M. Mastaller (1978) and also of Saudi Arabia Doreen Sharabati (1981). Also, former extensive surveys and descriptions were done in this field, especially that of Issel (1969), Hall and Standen (1907); Jickell (1874); Shopland (1902) and Sturany (1901,1903).

Therefore, an investigation had been carried out in the Old King's Palace area North of Jeddah (Fig.1) to throw some light upon the taxonomy and zoogeography of Pelecypods and Gastropods which are existing in this region.

THE STUDY AREA

The area selected for the Coral Reef Ecosystem Study by the FMS (Fig.1) encompasses a transect of 25 square kilometers, i.e. 1 km. long. One fixed point of the transect area in the North corner of the Old King's Palace which is situated at the Northern Coastal part of Jeddah in Saudi Arabia Red Sea, the other a point on the shore 1 km. to the South. The topography of the study area shows a number of distinct features.

Starting out from the shore, the first part encountered is a back reef lagoon of the fringing reef. This reef, usually, follows the coast very closely. In front of the Palace, however, the shore forms a bay, while the fringing reef continues in a straight line thus creating a lagoon.

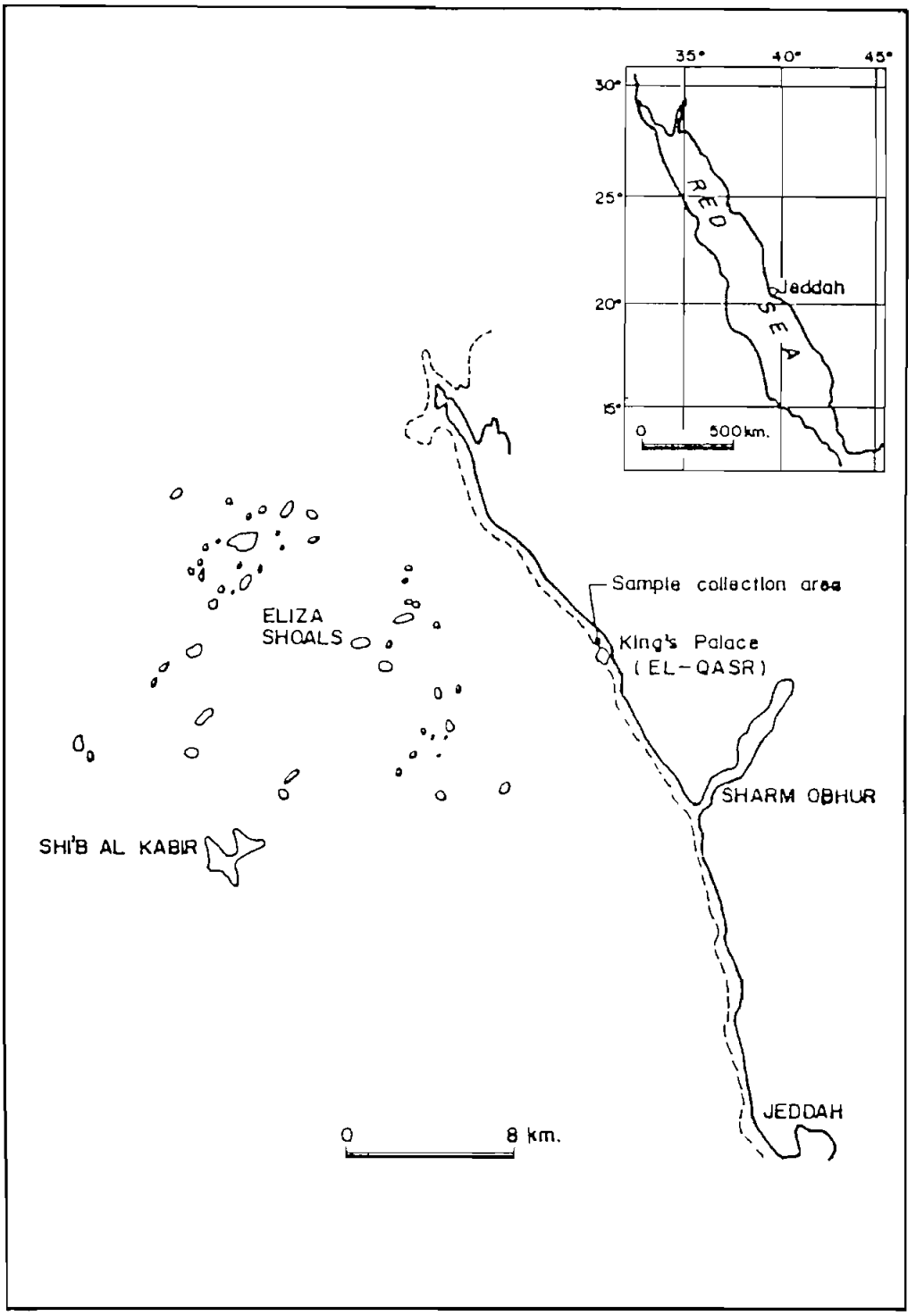


Fig.1. Location of the study area

This lagoon is about 400 m. wide and its centre up to 4 m. deep. The bottom is sandy without any overgrowth. At the rear side of the fringing reef, there is a very shallow back reef with a layer of rubble over hard coral rock, reading a moderate depth of about 20-80 cm.

The lagoon and reef flat are mainly sites of Molluscan collection.

MATERIAL AND METHODS

Ten field trips were carried out to the study area, using a motor-boat, during the period 15-9-1981 to 6-5-1982.

Some Gastropods were collected by hand nets. Many kinds of specimens were collected from depths exceeding one metre, using a dredge of heavy steel frame with a non-flexible "bridle" of steel rods and a bag of heavy-duty nylon settting with a finer-meshed inner lining.

The dredge used has an aperture about 20 x 45 cm. and a bag about 1 m. deep.

Sampling time was between 10.30 A.M. and 1.30 P.M. at every trip. Specimens collected alive from the study area, generally contract and withdrew their tentacles and will die in this state unless, they are carefully narcotised.

The specimens were narcotised by adding a saturated solution of Epsom ($MgSo_4$) to the sea water in which the specimen is contained and leave the preparation for 2 hours, after the time the specimens were preserved in 4% formalin. Larger specimens were left in narcotising solution from 2 to 4 hours. More than 200 specimens were collected and preserved.

PHYLUM: MOLLUCSA

I- CLASS: GASTROPODA

A- SUBCLASS: PROSOBRANCHIA

1- ORDER: ARCHAEOGASTROPODA

FAMILY: Fissurellidae (Keyhole limpets)

The keyhole limpets have shells which are flat and round, oval or shield-shaped, like true limpets, but generally have a hole in the dorsum. Sometimes keyhole-shaped and often a slit in the margin. They cling to rock and corals, mostly in warm seas and are vegetarians.

Diodora rupelli (Sowerby, 1834) (Fig.2).

FAMILY: Neritidae

They have shells which are generally small with large body whorl, depressed spire, semi-circular aperture. Columella has two or more teeth; callous parietal area is smooth, pustulate or ribbed. Operculum is close-fitting with small projection locking behind columella, holding it in place. They live in tropical and subtropical areas, in deep or brackish water in mangrove swamps, rivers and seas, on rock coral and seaweed and they are vegetarians.

Nerita albicilla (Linnaeus, 1758) (Fig.2)

Nerita polita (Linnaeus, 1758) (Fig.2).

Nerita undata (Linnaeus, 1758) (Fig.2).

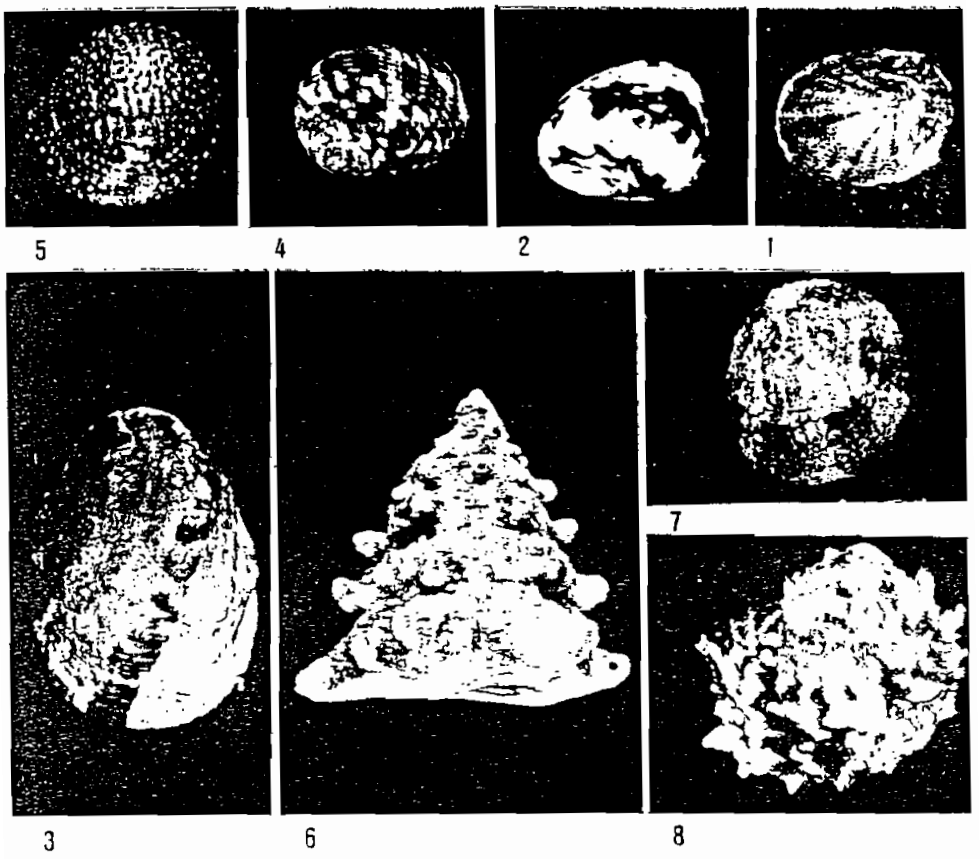


Fig.2

1. Diodora rupelli
2. Nerita albicilla
3. Nerita polita
4. Nerita undata
5. Clanculus pharaonius
6. Tectus dentatus
7. Trochus erythraeus
8. Turbo argyrostomus.

FAMILY: Trochidae (Top shells)

They have flat-based conical shells found in tropical and temperate waters. They have a horny operculum and a nacreous interior. They inhabit the intertidal zone and shallow water and are vegetarians.

Clanculus pharaonius (Linnaeus, 1758) (Fig.2)
Tectus dentatus (Forskal, 1775) (Fig.2).
Trochus erythraeus (Brocchi, 1823) (Fig.2)

FAMILY: Turbinidae (Turban shells)

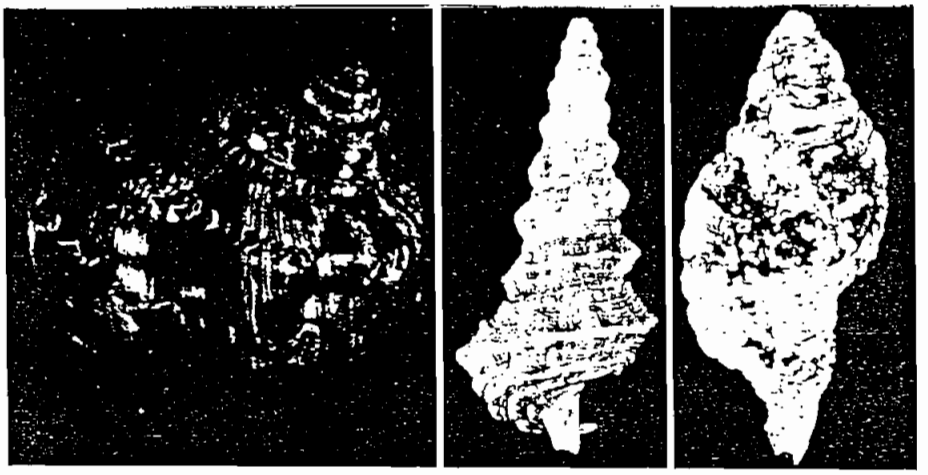
They have thick, often heavy turban-shaped shells, with low spire and rounded nacreous aperture, an umbilicus is sometimes present; Sculpture is spiral or nodular; Periostracum is absent. Operculum is thick and calcareous. Inner surface has a horny layer, usually showing spiral coiling. They inhabit rocky shores and in shore reefs, although some groups inhabit soft substrates in deep water.

Turbo argyrostomus (Linnaeus, 1758) (Fig.2).
Turbo petholatus (Linnaeus, 1758) (Fig.3).

2. ORDER: MESOGASTROPODA

FAMILY: Cerithiidae (Horn Shells)

They have drab, tapering shells with many whorls, a small aperture and a distinct to long siphonal canal, outer lip somewhat expanded, varices usually present; Sculpture mainly is spiral or tubercular. No periostracum. Operculum is thin,horny with a few spiral turns. They are predominantly tropical and



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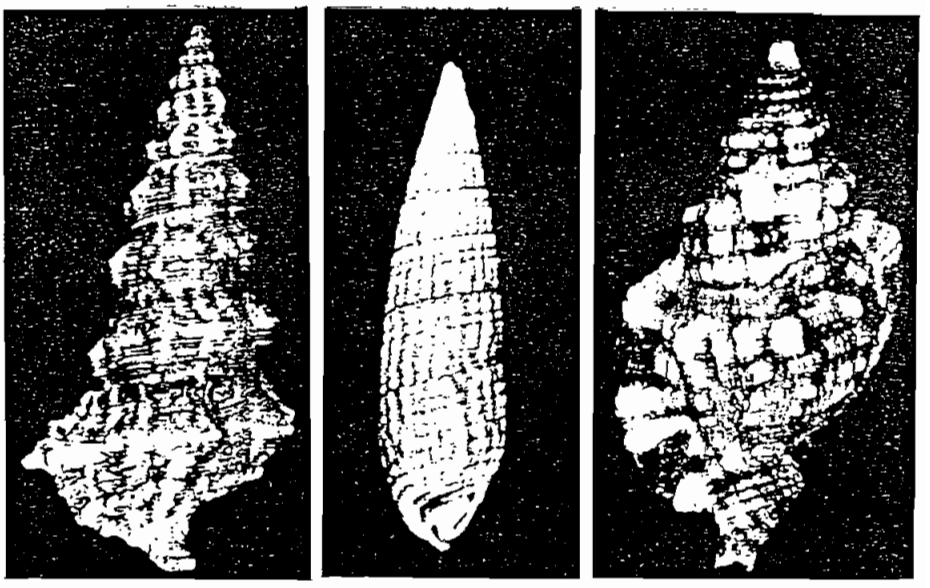

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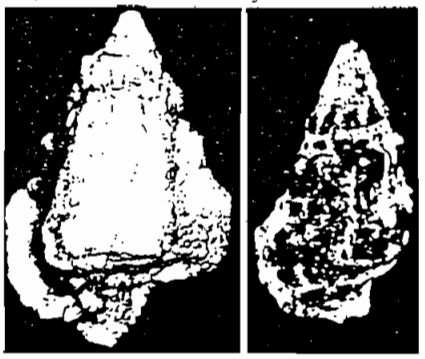

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Fig.3

9. Turbo petholatus
10. Cerithium carbonarium
11. Cerithium erythraeonense
12. Cerithium nodulosum
13. Rhinoclavis asper
14. Cymatium labiosum
15. Cymatium pileare
16. Cymatium rubeculum

prefer sheltered, silted situations such as occur in large lagoons or protected bays. They are herbivorous, grazing on some algae and on organic debris.

Cerithium carbonarium (Philippi) (Fig.3) (New Record).

Range: Red Sea (North Jeddah), Indo-Pacific.

Habitat: It is found in shallow water in the sandy bottom of the lagoon and the reef platform. (10 specimens).

Description: The length of the shell varies between 2.5 to 3.0 cm. The shell is thick, solid and ovate-fusiform with slightly impressed suture. The outer lip is thickened and the spiral rows are strong and have blunt tubercles. There are two rows on each spire whorl and fine rows on the body whorl. The tubercles vary considerably in size and in some specimens that are turned upwards. There are fine spiral lines between the rows of tubercles. The apical whorls are often eroded. The shells has a yellowish or greyish color with tubercles stained light or dark brown, but the aperture is greyish white.

Cerithium erythraeonense (Lamarck, 1822) (Fig.3).

Cerithium nodulosum (Bruguiere, 1792) (Fig.3).

Rhinoclavis asper(Linne, 1758) (Fig.3).

FAMILY: Cymatiidae (Tritons)

They have small to large shells, usually roughly sculptured; with a moderate to long siphonal canal, but no posterior (anal) canal; Outer lip thick and toothed, lips usually retained as varices on former whorls, inner lip wrinkled. Periostracum is frequently conspicuous, sometimes very thick and bristly.

Operculum is horny, thick, sometimes smaller than aperture. They are carnivores and tropical.

Cymatium labiosum (Wood,1828) (Fig.3) (New Record).

Range: Red Sea (North Jeddah), Florida keys to West Indies, Indo-Pacific and Caribbean.

Habitat: It is found in shallow water under rocks, coral heads and also in the cave system of the reef platform. (3 specimens).

Description

The shell has a length of about 30 mm. with fine beaded spiral threads and six spiral cords. It has 4 axial ribs between the varices forming blunt nodules where the cords cross. The lip has a well-developed varix and the aperture has six blunt teeth. The columella has a blunt tooth posteriorly and anteriorly. The columellar shield edge is faintly plicate. The shell is red-brown in color and the aperture is inside the lip while the columella is white.

Cymatium pileare (Linnaeus, 1758) (Fig.3)

Cymatium rubeculum (Linnaeus, 1758) (Fig.3)

Cymatium tabulatum (Menke) (Fig.4) (New Record).

Range. Red Sea (North Jeddah), Australia, Japan, Indo-Pacific, New Zealand.

Habitat: It is found in shallow water under the rocks and coral heads and also in the cave system of the platform. (4 specimens).

Description

The length of the shell varies between 3.5 to 7.0 cm. It is thick and fusiform and has a tall spire with strong varices and an impressed suture. The outer lip is thick, while the siphonal canal is long and slightly recurved. The whorls are ornamented with heavy nodules between the varices and crossed by strong granulose spiral ribs. The aperture is white with purplish brown streaks deep inside.

Distorsio anus (Linnaeus, 1758) (Fig.4).

FAMILY: Cypraeidae (Cowries) They have oval shells, well inflated, with spire usually covered by the body whorl, the aperture lined with teeth on both sides, running and full length of the shell. There is no operculum. This is predominantly a tropical family,with scores of richly colored representatives distributed all around the world.

Cypraea carneola (Linne, 1758) (Fig.4).

Cypraea caurica (Linne, 1758) (Fig.4)

Cypraea gracilis (Gaskoin, 1849) (Fig.4).

Cypraea grayana (Schilder, 1930) (Fig.4).

Cypraea lynx (Linne, 1758) (Fig.4).

Cypraea miliaris)Gmelin, 1791) (Fig.4).

Cypraea nebrites (Melvill, 1888) (Fig. 5).

Cypraea turdus (Lamarck, 1810) (Fig.5).

Cypraea xanthodon (Sowerby, 1832) (Fig.5) (New record).

Range: Red Sea (North Jeddah), East Australia from Sydney northward.

Habitat: It is found in shallow water under dead coral plates. (2 specimens).

Description

The length of the shell varies between 2 to 4 cm. It is an ovate shell with coarse teeth. The dorsum is creamy to bluish with many small and brownish orange patches often forming broad bands. Margins are mushroom to pinkish with small and dark brown spots, while the base and the teeth are pinkish. One variety is voilet with brown bands on the dorsum and the base and teeth are white in color.

FAMILY: Littorinidae (Periwinkles)

They have small, thick or fairly thin shells. Short and squat, or tall and conical spire, rounded or nearly straight sided whorls, suture usually slightly impressed. No umbilicus. Peristome discontinuous. Smooth, or ornamented with spiral ridges or rows of strong or weak nodules. Columella without

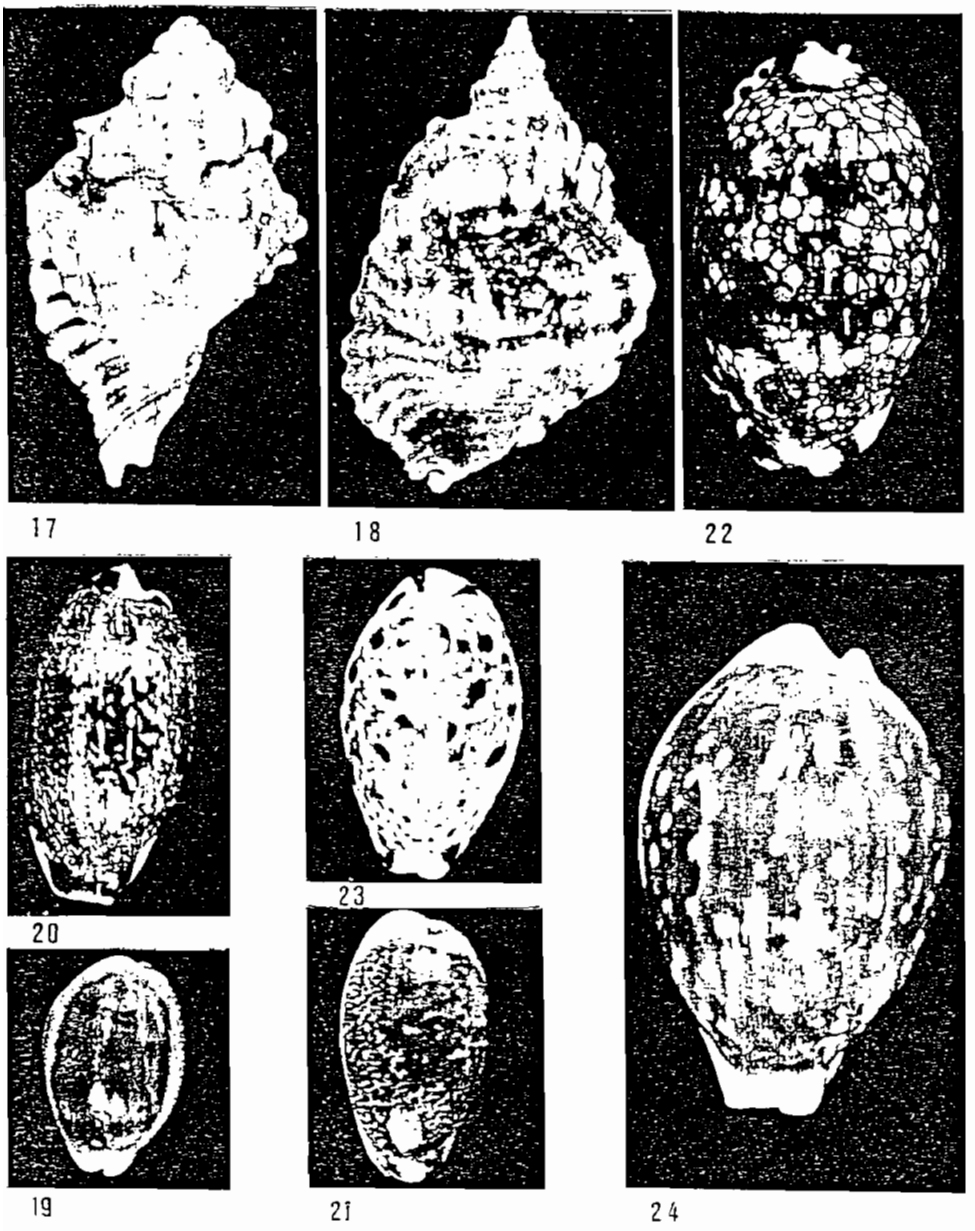

Fig.4

17. Cymatium tabulatum
18. Distorsio anus
19. Cypraea carneola
20. Cypraea caurica
21. Cypraea gracilis
22. Cypraea grayna
23. Cypraea lynx
24. Cypraea miliaris

processes. Corneous operculum, they inhabit shore between tide marks and also in mangrove swamps.

Littorina scabra (Linne, 1758) (Fig.5).

FAMILY: Planaxidae

They have small to medium-sized shells, thin to solid, elongate ovate. Columella truncate at base. Aperture is usually lirate internally. Operculum is corneous, thin and pauci-spiral. Although the shells bear some resemblence to members of the Littorinidae, the distinct notch below the truncated columella immediately distinguishes them. They inhabit tropical and warm seas.

Planaxis sulcatus (Born, 1780) (Fig.5).

FAMILY: Strombidae

They have thick, heavy shells, often large with conical spire which may be ornamented. Usually a thick lip often broad and winglike, typically with a notch near the anterior and occasionally bearing long projections.

Lambis truncata Sabae (Kiener, 1834) (Fig.5).

Strombus erythrinus (Dillwyn, 1817) (Fig.5).

Strombus fasciatus (Born, 1780) (Fig.5).

Strombus gibberulus albus (Morch, 1850) (Fig. 6)

Strombus tricornis (Humphrey, 1786) (Fig. 6)

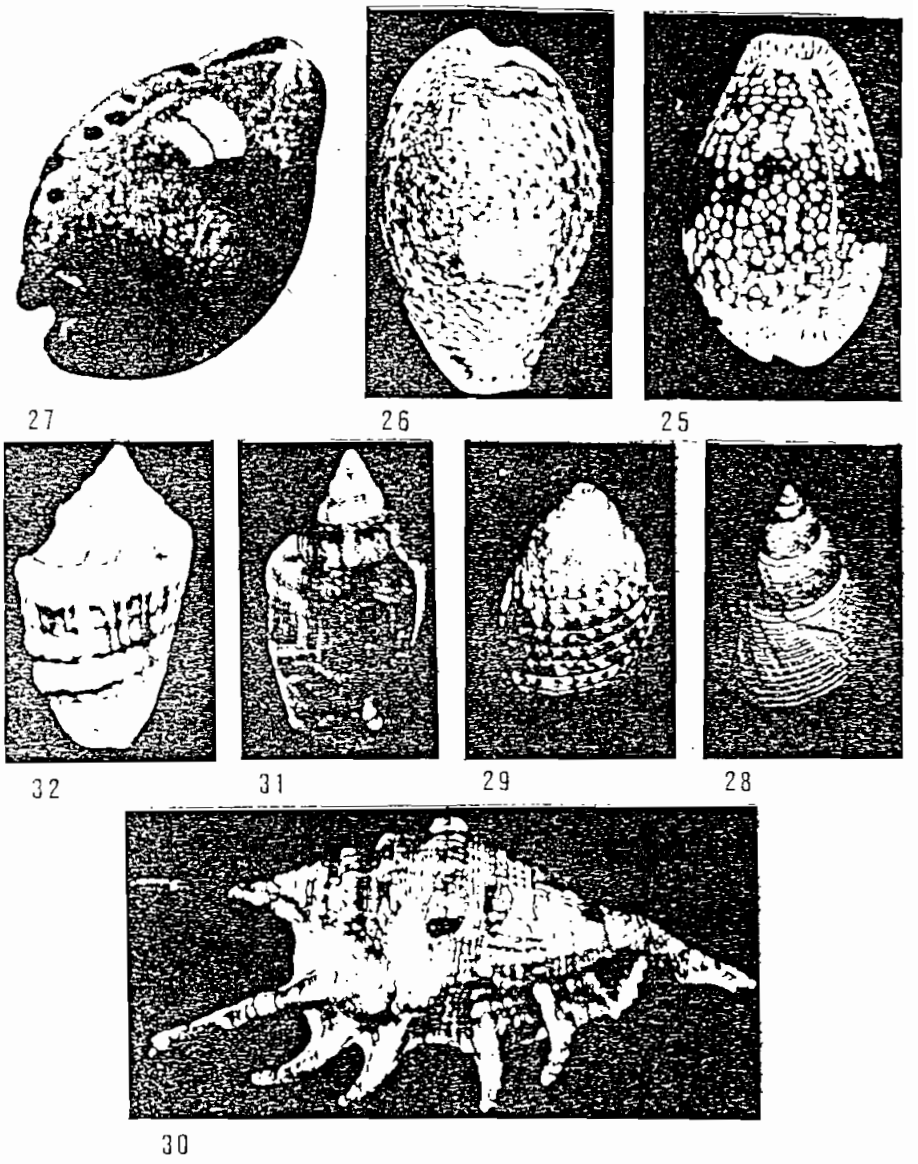

Fig.5

25. Cypraea nebrites
26. Cypraea turdus
27. Cypraea xanthodon
28. Littorina scabra
29. Planaxis sulcatus
30. Lambis truncata Sabae
31. Strombus erythrinus
32. Strombus fasciatus

FAMILY: Naticidae

They have small to medium-sized shells which are thick, globular or flattened, smooth and glossy. Small, few-whorled spire and large aperture. Umbilicus open and usually with a large, thick callus occupying most of it. Some species are colorful. Operculum corneous or calcareous.

Polinices melanostoma (Gmelin, 1791) (Fig.6).

Polinices tumidus (Swainson, 1840) (Fig.6) (New record)

Range: Red Sea (North Jeddah), Hawaii, East Africa, West Pacific.

Habitat: It is found in shallow water between the sea-grasses of the lagoon, the reef flat and the reef face. (7 specimens).

Description: The height of the shell is about 3.0 cm. and its diameter is 2.3 cm. The shell is globose, oval and somewhat flattened. The umbilicus is covered by a thick and heavy callus pad. The shell has a white color. The spire has 5 whorls where the last one is the largest. The suture is appressed. The sculpture is smooth and polished with the growth of striae only. The aperture is semi-ovate but the columella is slightly sinuous. The operculum is horny, light yellow or orange brown.

FAMILY: Tonnidae (Tun shells)

They have shells usually thin, large and globose. Short spire and deep suture. No varices, no thickening of outer lip (with exception of genus Malea). Operculum absent. They live in tropical and temperate seas.

Malea pomum (Linne, 1758) (Fig.6)

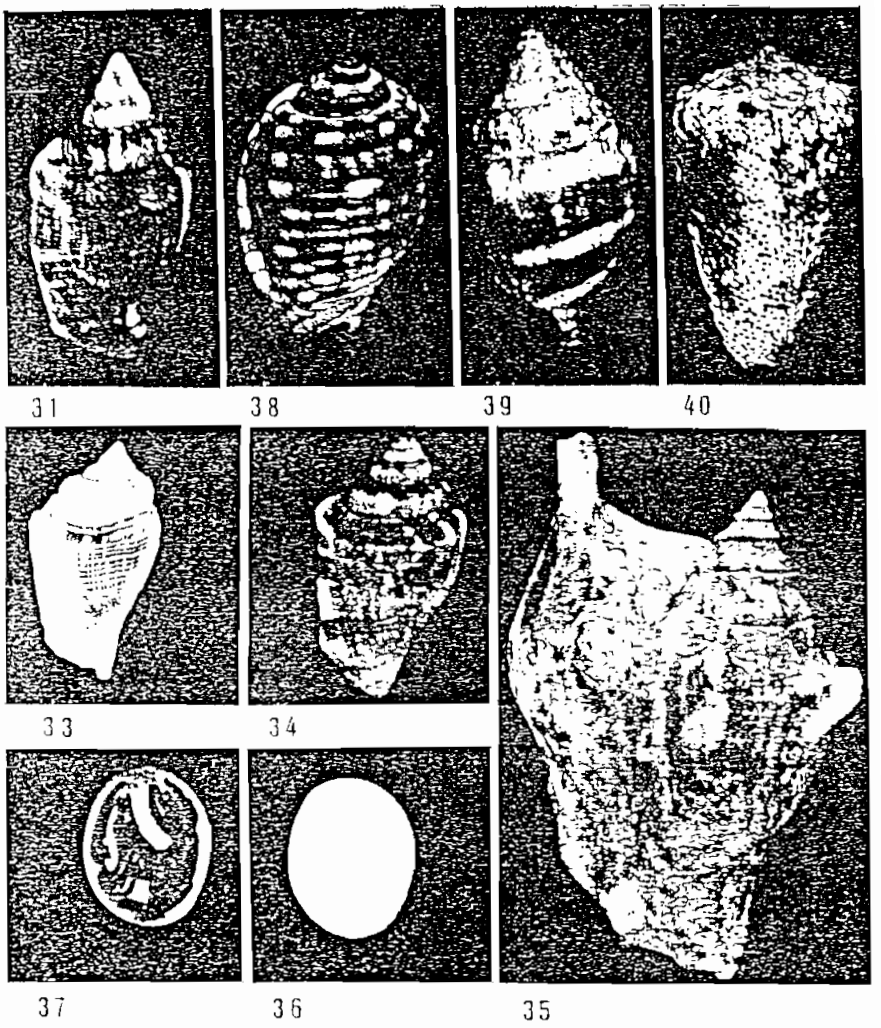

Fig.6

33. Stromous gibberulus albus
34. Strombus mutabilis
35. Strombus tricornis
36. Polinices melanostoma
37. Polinices tumidus
38. Malea pomum
39. Engina mendicaria
40. Conus arenatus

3- ORDER: NEOGASTROPODA

FAMILY: Buccinidae

They are ovate, pyriform, globular or elongate shells, usually thick but some very Fragile. No folds on columella. Variously ornamented or smooth. They include large and medium-sized shells. Corneous operculum with lateral or terminal nucleus. They inhabit shallow water of intertidal zones under rocks and in pools. Tropical forms are considered to be rock and coral dwellers.

Engina mendicaria (Linne, 1758) (Fig.6).

FAMILY: Conidae (Cone shells).

They are small to large shells, many thick and heavy. Flat-topped or conical spire,usually long and narrow aperture. Smooth, or ornamented with striae, ridges, beaded cords or grooves. Many species coronated at suture. Color and color pattern very variable within species. Small operculum usually present. Widely distributed in tropical seas.

Conus arenatus (Hwass, 1792) (Fig.6).

Conus episcopus (Hwass, 1792) (Fig.7) (New Record).

Range: Red Sea (North Jeddah), East Africa, Indo-Pacific.

Habitat: It is found in shallow water on the dead coral slabs of the reef flat. (3 specimens).

Description

The length of the shell is 48-50-65-114 mm. It is a thick and high cone torpedo-shaped. The shell is faint with axial growth lines. The glossy shell is reddish brown with white tents concentrated in three axial and two spiral bands, while the aperture is white in color.

Conus excavatus (Sowerby, 1866) (Fig.7) (New Record).

Range: Red Sea (North Jeddah), Western Indian Ocean.

Habitat: It is found in shallow water upon the reef crest. (2 specimens).

Description: The length of the shell varies between 3.5 to 5.5 cm.

It is light in weight, with a low gloss and is less conical. The body whorl is smooth except for the numerous fine axial threads and a few scattered ones, plus the growth marks. The shoulder is broad and sharply angled. It is concave above and with only traces of axial and spiral threads and a low spire. The body whorl is dark brown to yellow, it is usually with a broad pure white mid-body band and occasionally a white band more posteriorly. The area below the shoulder is white with axial dark brown lines continued on the shoulder. The shoulder and the

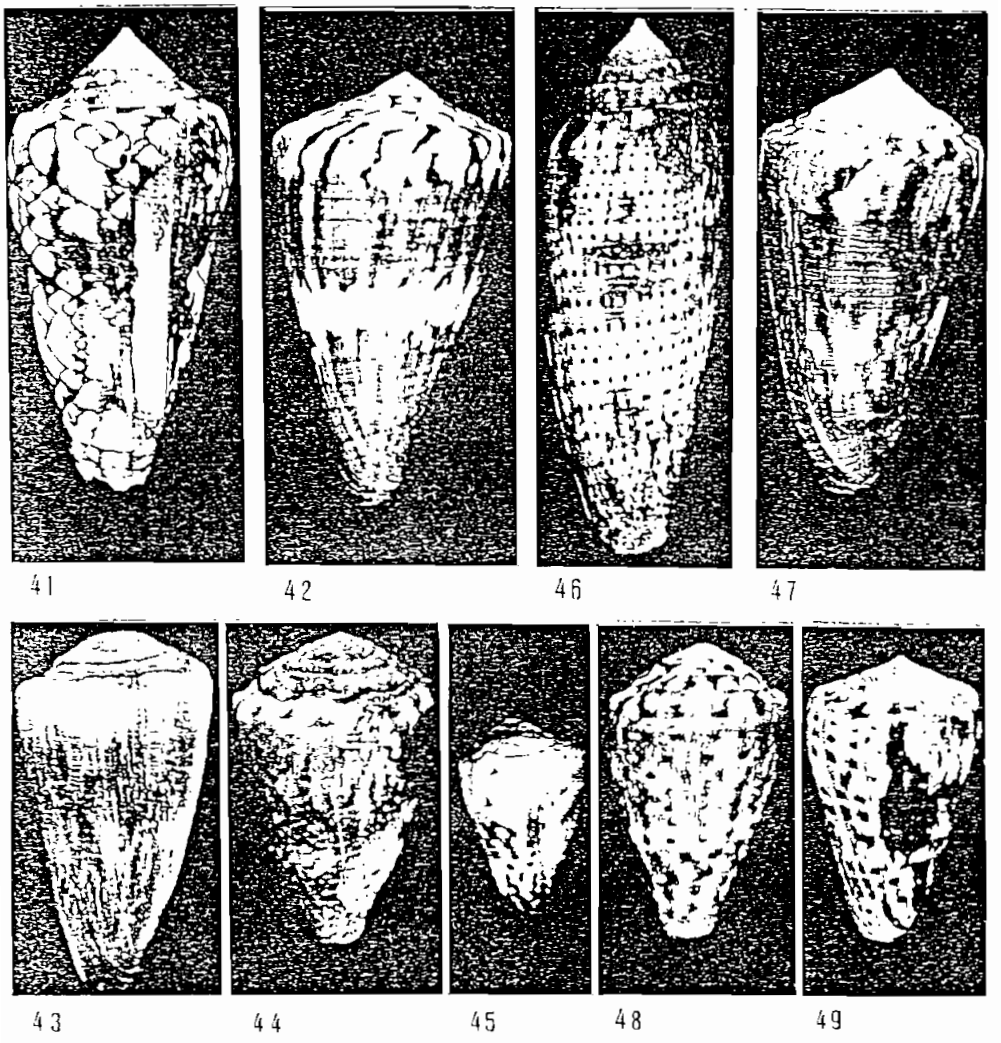

Fig.7

41. Conus episcopus
42. Conus excavatus
43. Conus flavidus
44. Conus gladiator
45. Conus musicus
46. Conus nussatella
47. Conus planorbis
48. Conus taeniatus
49. Conus tessulatus

spire are white with heavy spots of dark brown in revolving pattern. The aperture is moderately wide and slightly widened anteriorly. The outer lip is straight or slightly convex and sharp and the mouth is white with dirty violet tinge.

Conus flavidus (Lamarck, 1810) (Fig.7).

Conus gladiator (Broderip, 1833) (Fig.7)

Conus musicus (Hwass, 1792) (Fig.7)

Conus nussatella (Linne, 1758) (Fig.7)

Conus planorbis (Linne, 1758) (Fig.7) (New Record).

Range: Red Sea (North Jeddah), from Eastern Africa to French Polynesia.

Habitat: It is found in shallow water in between the sea-grasses and brown algae of the back reef. (3 specimens).

Description

The length of the shell varies between 4.0 to 7.0 cm. It is thick with a depressed spire a sharply angled shoulder. It has axial growth lines and the basal spiral ridges may have heads. It is a dull white shell with 2 wide and orange to dark brown spiral bands on the body whorl. The white part of the whorl is crossed by an axial and dark brown stripes. The axial has dark brown markings on the white spire and the aperture is white.

Conus teaniatus (Hwass in Bruguiere, 1792) (Fig.7).

Conus textile (Linnaeus, 1758) (Fig.8)

Conus tessulatus (Born, 1778) (Fig.7)

Conus vexillum (Gmelin, 1791) (Fig.8).

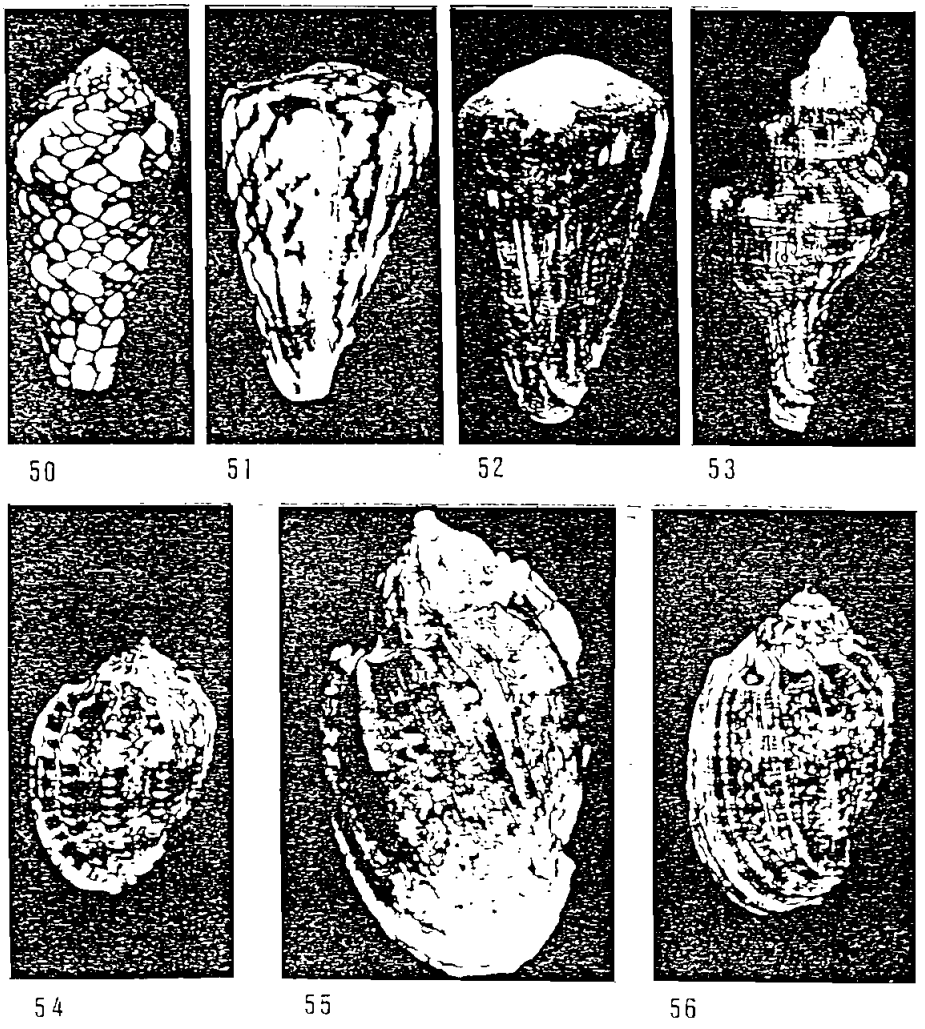

Fig.8

50. Conus textile
51. Conus vexillum
52. Conus virgo
53. Fasciolaria trapezium
54. Harpa amouretta
55. Harpa crenata
56. Harpa harpa

Conus virgo (Linnaeus, 1758) (Fig.8)

FAMILY: Fasciolariidae (Tulip shells)

They have medium-sized to large shells, more or less fusiform with a short to long siphonal canal; Columella usually with 17 small pleats basally; Base sometimes with a narrow false umbilicus; Sculpture usually nodular or consisting of axial ribs and spiral threads. Periostracum varies from very thin to thick. Operculum thick and horny, more or less claw-shaped with terminal nucleus. Most of the species inhabit protected sandflats, bottoms of sand, mud or rubble, and in shallow waters are often associated with sea-grasses.

Fasciolaria trapezium (Linne, 1758) (Fig.8).

FAMILY: Harpidae

They have shells which are easily distinguished by their well defined axial ribs and usually bright color patterns. Shells are ovate with large body whorl and small conical spire. Points which terminate the ribs form a coronet around spire. Aperture is wide. Operculum is missing.

Harpa amouretta (Roding, 1798) (Fig.8).
Harpa crenata (Swainson, 1822) (Fig.8) (New Record).

Range: Red Sea (North Jeddah), South Gulf of California, West Tropical America, Panama, Mexican West coast.
Habitat: It is found in shallow water under the dead stony corals and in the sandy bottom of the lagoon. (4 specimens).

Description

The shells has a length varying from 4.0 to 9.0 cm. The ribs are narrow and low, each is bearing 3 to 4 callused points. The outer lip may be dentate and it is usually pale violet and brown with a fine brown line on the ribs. There are variable blotches near the aperture.

Harpa harpa (Linnaeus, 1758) (Fig.8)

Harpa ventricosa (Lamarck, 1822) (Fig.9)

FAMILY: Melongenidae

They have medium-sized to very large, fusiform to pyriform shells. Siphonal canal is usually short; Inner lip is smooth; Externally smoothy or spirally ridged, sometimes with shoulder nodules. Operculum is horny, thick, with apical nucleus. They inhabit intertidal sand or mudflats.

Volema pyrum nodosa (Lamarck, 1822) (Fig. 9).

FAMILY: Mitridae (Mitres)

They are small to medium-sized shells which are more or less fusiform with a high spire and short, shallowly notched siphonal

canal; Columella almost always with 3-6 strong, transverse pleats, strongest posteriorly; Sculpture predominantly spiral; Periostracum thin or absent. Operculum is missing.

Mitra annulata (Reeve, 1845) (Fig. 9)

Mitra isabella (Swainson, 1831) (Fig.9).

Mitra maui (Kay, 1979) (Fig.9) (New Record).

Range: Red Sea (north Jeddah), Hawaii.

Habitat: It is found in shallow water in between the sand particles of the lagoon and the reef platform. (2 specimens).

Description

The length of the shell is about 3.5 cm. The diameter reaches about 12 mm. The length of the aperture is about 2 cm. The shell fusiform and ovate with flat spiral cords. Its color is cream and is axially blotched with red brown.

Spire: The protochonch is of 3 and one quarter glossy and conical whorls. The teleoconch is of 7 slightly convex whorls. The suture is prominent, impressed and the shoulder is barely angulate.

Sculpture: It has flat spiral cords about 20 on the last whorl and seven on the penultimate whorl. The width of the interspaces between the spiral cords is variable. The 4 apical grooves on the last whorl is about equal in diameter to the cords and the last whorl is about equal in diameter to the cords and the abapical grooves are very narrow.

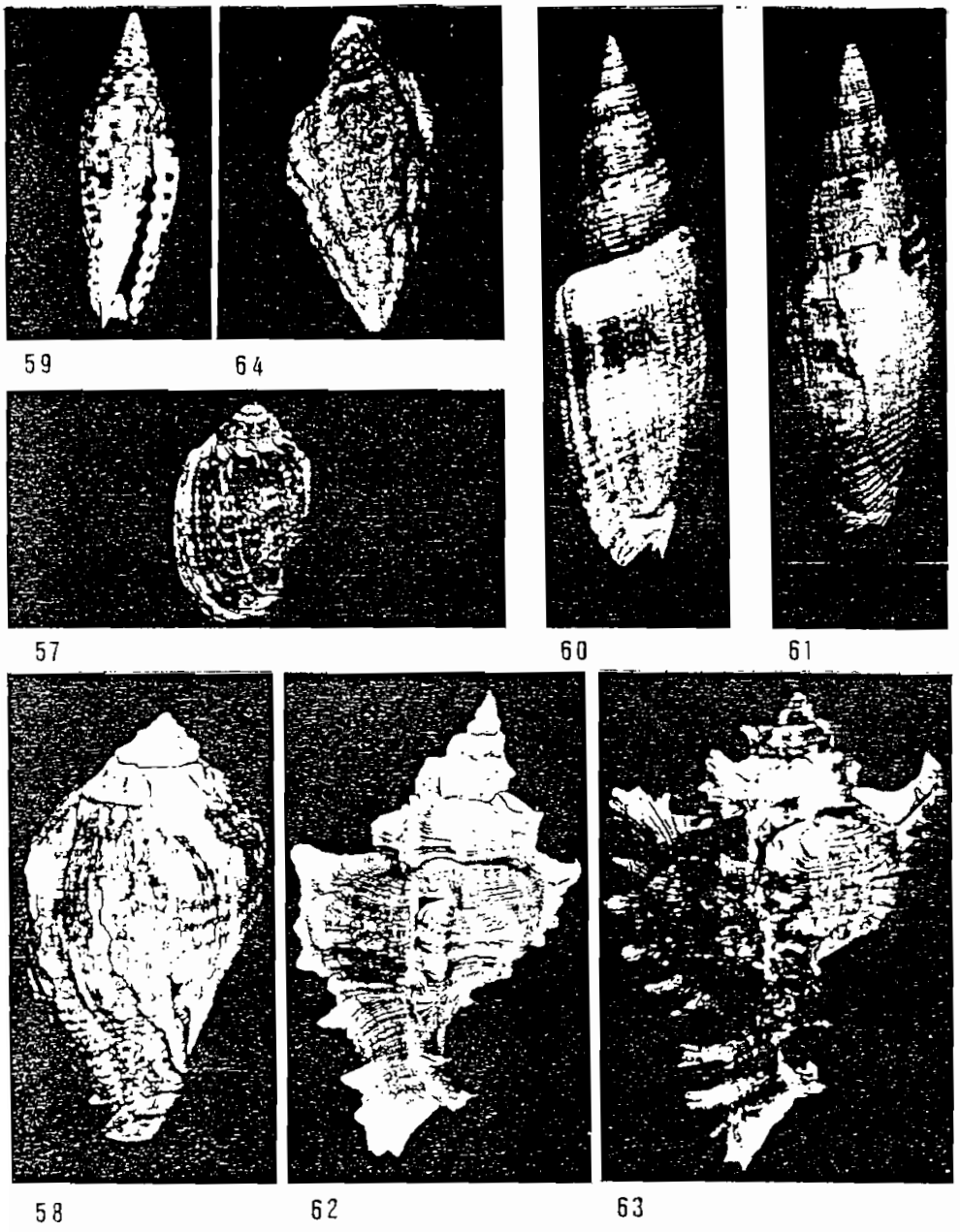

Fig.9

57. Harpa ventricosa
58. Volema pyrum nodosa
59. Mitra annulata
60. Mitra isabella
61. Mitra maui
62. Chicoreus ramosus
63. Murex brevifrons
64. Urosalpinx cinerea

Aperture: It is moderately wide and longer than the spire. The outer lip is thin and barely crenulate. The columella possesses 4 oblique folds. The siphonal canal is recurved and the siphonal notch is distinct.

FAMILY: Muricidae

The family contains small to large-sized shells, with a raised spire and well-developed siphonal canal; Varices (sometimes bearing spines) are often present; Columella is more or less smooth, sometimes weakly ridged; Periostracum is absent. Operculum is thick, horny, position of nucleus variable.

Chicoreus ramosus (Linne, 1758) (Fig.9)

Murex brevifrons (Lamarck, 1822) (Fig. 9) (New Record).

Range: Red Sea: North Jeddah, Caribbean, Brazil.

Habitat: It is found in shallow water in between the brown algae (sargassum) and on the reef platform and also in the sandy lagoon (2 specimens).

Description

The length of the shell ranges between 50 to 149 mm. It is thick, ovate and moderately long. The siphonal canal is broad and the spire is moderately long. The three varices with numerous frond-like spines are alternate with axial rows of nodules. The open siphonal canal has spiral ridging. The shell has dull, cream with reddish brown and brown interstices or many brown bands and the aperture is white in color.

Urosalpinx cinerea (Say) (Fig. 9) (New Record)

Range: Red Sea (North Jeddah), Nova Scotia to Florida.

Habitat: It is found in shallow water and in between the fine and coarse sandy particles of the lagoon. (3 specimens).

Description

The shell is about 1 inch high. It is a rugged shell of approximately 5 whorls and are rather convex. The shell is coarse and quite solid and its surface is sculptured with raised revolving lines that are made wavy by rounded vertical folds. The aperture is oval and the lip is thin and sharp. The canal is short but the operculum is horny and its color is dingy grey while the aperture is dark purple.

FAMILY: Nassariidae

The family contains small to medium-sized shells; Spire is usually fairly high and conical; aperture is small; Inner lip is often with a strong callus deposit, sometimes forming an extensive shield; Siphonal canal is short; Outer lip is usually thin. Foot is large to very large, usually with two tiny tails at the hind end. Operculum is small and horny with a more or less apical nucleus, edges often serrated.

Nassarius arcularius (Linne, 1758) (Fig.10)

FAMILY: Thaididae (Dog whelks).

They are small to medium-sized, solid, more or less roundish-ovate to spindle-shaped, without varices, but with

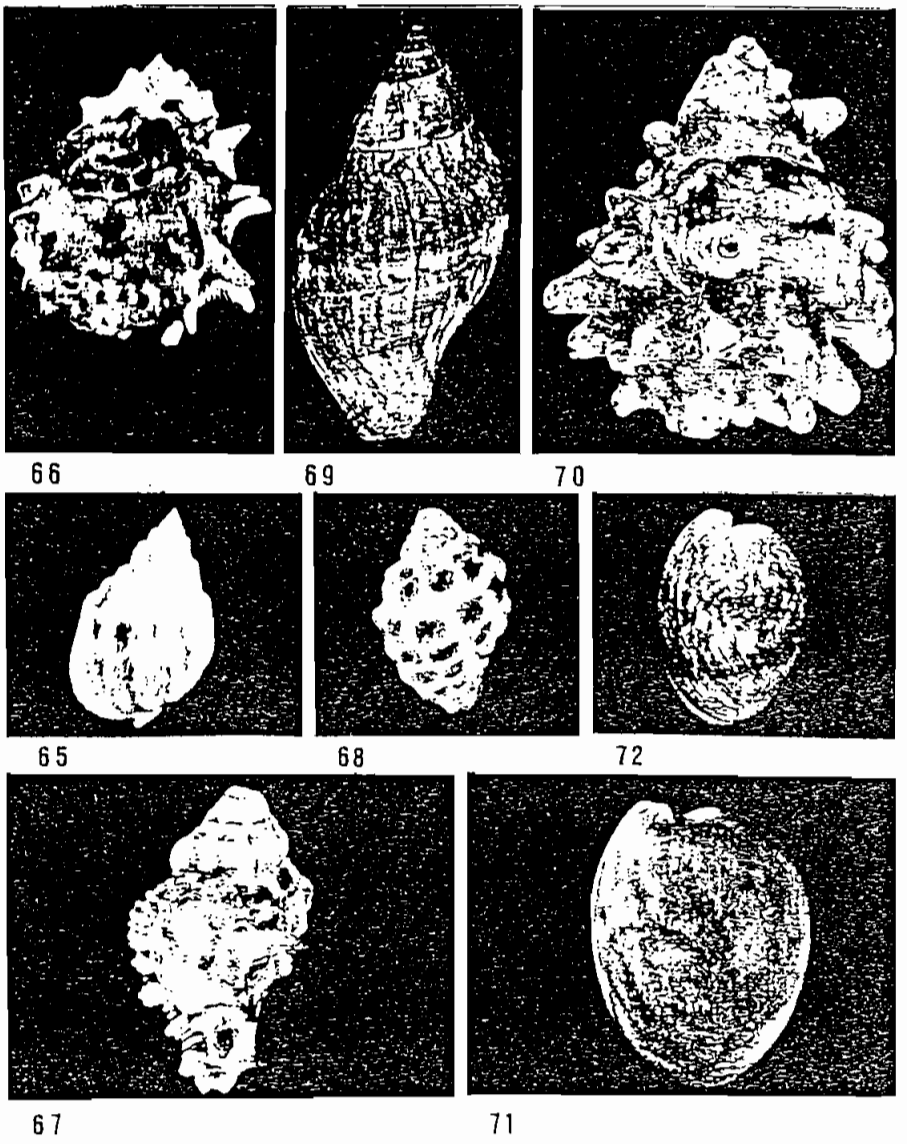

Fig.10

65. Nassarius arcularius
66. Drupa ricinus hadari
67. Morula fiscella
68. Morula granulata
69. Nassa francolina
70. Vasum turbinellus
71. Atys cylindricus
72. Bulla ampulla

variable tuberculate or spiny spiral ornament, and usually with only a short siphonal canal.

Drupa ricinus hadari (Emerson and Cernohorsky, 1973)(Fig.10)

Morula fiscella (Gmelin, 1791) (Fig.10) (New Record).

Range: Red Sea (North Jeddah),Indian Ocean, West Pacific, Hawaii.

Habitat: It is found in shallow water on the reef platform and under the dead coral blocks. (3 specimens).

Description

The shell has a length of about 1.5 to 2.5 cm. in diameter. It is fusiform, triangular, clathrate and grey. The spire has 5 whorls plus the protoconch. The shoulders of the whorls are angulated and the suture is obscure. The sculpture is low and has rounded axial ribs with narrower interspaces crossed by sharply imbricated spiral threads with narrower channeled interspaces. The axial and the spiral sculpture produce a clathrate effect. The aperture is narrow and channeled at the suture and the outer lip is crenulated by the sculpture and by 6 denticles within. The shell has a grey brown and the aperture has a purple color.

Morula granulata (Duclos, 1832) (Fig.10).

Nassa francolina (Bruguiere, 1789) (Fig.10).

FAMILY Vasidae (Vase-shells).

They have thick to very thick heavy shells. Short or tall spired with moderately long, or long siphonal canal. Usually three or four folds on columella. Weakly or strongly tuberculated and sometimes spiny. They inhabit tropical and warm seas.

Vasum turbinellus (Linnaeus, 1758) (Fig. 10).

B- SUBCLASS: OPISTHOBRANCHIA

1- ORDER:CEPHALASPIDEA

FAMILY: Atyidae (Glassy bubble shells)

They have thin, ovate, small to medium-sized shells with a sunken spire and a large body whorl. They are sand dwellers.

Atys cylindricus (Hinds, 1779) (Fig.10)

FAMILY: Bullidae

They have fairly large solid oval shells, with a deeply sunken spire, posterior end of the lip raised, aperture fairly narrow, widening anteriorly; exterior smooth and mottled, brown with a thin, transparent periostracum. No operculum. They live shallowly buried in sand or mud, often among marine grasses and in protected lagoons and bays.

Bulla ampulla (Linnaeus, 1758) (Fig.10).

2- ORDER:ANASPIDEA

FAMILY: Aplysiidae (Sea-hares).

They are sea-slugs, with or without a plate-like internal shell, often uncalcified. Head with 2 anterior tentacles and 2 well developed rhinophores; Mantle opening dorsal protected by 2 flap-like parapodia. They inhabit shallow waters, rocky pools or grass flats, where they brouse on soft algae.

Aplysia oculifera (Reeve, 1848) (Fig.11).

Stylocheilus longicaudus (Quoy & Gaimard, 1824) (Fig.11) (New Record)

Range: Red Sea, North Jeddah, Baja, California, Brazil, West Indies, Tropical Western Atlantic and Indo-West Pacific (Engel, 1936).

Habitat: It is found in shallow water living upon the brown algae (Sargassum sp. and Cystoseira sp.) in the back reef and the platform. (4 specimens).

Description

The length of the animal reaches about 27 mm. It is elongate and cylindrical. Parapodia are short and the skin has numerous scattered Villi which stud the parapodia, rhinophores and cephalic tentacles. The head is small and retractile into the body. Cephalic tentacles and rhinophores are long and slender. It has small sparse filaments. It is greenish in color with numerous grey pencil lines and occasionally very small blue ocellar spots surrounded by orange circles, while the penis and its sheath are spiny.

II- CLASS:PELECYPODA (BIVALVIA).

1. ORDER:ARCOIDA.

FAMILY: Arcidae

They have small to large, ovate to quadrate shaped shells. Valves are sometimes slightly unequal, often gabing narrowly ventrally to allow passage of the flattened byssus; Two equal-

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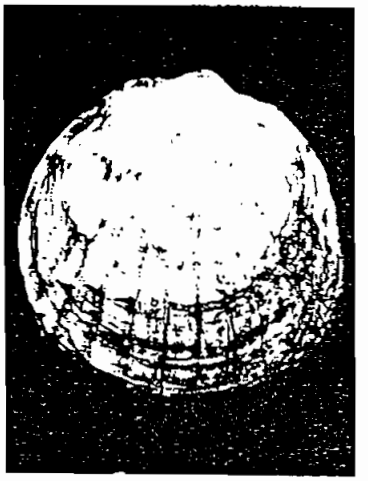

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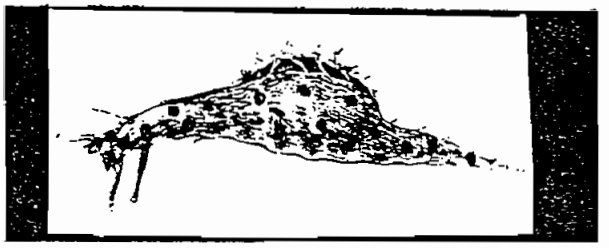

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Fig.11

73. Aplysia oculifera
74. Stylocheilus longicaudus
75. Anadara antiquata
76. Arca barbata
77. Arca noae
78. Barbatia domingensis
79. Barbatia nivea
80. Glycymeris ambionensis

sized adductor muscles; Pallial sinus is absent. Hinge is taxodont, with numerous small teeth which increase in size towards each size; Ligament is situated on a wide cardinal area, often in V-shaped grooves. Periostracum is usually thick and fibrous. They are tropical.

Anadara antiquata (Linne, 1758) (Fig.11) Arca barbata (Linnaeus, 1758) (Fig.11) (New Record).

Range: Red Sea (North Jeddah), Florida to West Indies and Caribbean is common.

Habitat: It is found in shallow water in the sandy bottom of the lagoon. (3 specimens).

Description: The length of the shell varies from 3.0 to 7.0 cm. It is an inflated equivalve, inequilateral and elliptical to rectangular. The shell has a low concentric and radial ridge and it is somewhat compressed.It has a brownish purple periostracum.

Arca noae (Linnaeus, 1758) (Fig.11) (New Record).

Range: Red Sea (North Jeddah), West Europe, Mediterranean and Senegal.

Habitat: It is found in shallow water in the sandy bottom where seagrasses and brown algae grow in the back reef. (4 specimens).

Description

The shell has a length varying between 4.0 to 10.0 cm. It is elongate and rectangular with inflated radially ribbed valves and interior. it has domed umbones and has a brown color with darker concentric bands cover with a brown periostracum bearing short hairs.

Barbatia domingensis (Linnaeus, 1758) (Fig.11)

Barbatia nivea (Chemnitz, 1784) (Fig.11)

FAMILY: Glycymerididae (Dog cockles)

They have medium-sized to large more or less orbicular shells; umbo is prominent and central; valves are heavy, not gaping. Hinge line is curved, taxodont, with numerous curved teeth, ligament external;Pallial sinus absent; Adductor muscle scars nearly equal. Periostracum fibrous or velvety, sometimes thick. They inhabit offshore burrowing very shallowly in coarse sand or gravel, often between submerged reefs.

Glycymeris ambionensis (Linnaeus and Gmelin) (Fig.11)

2. ORDER:MYTILOIDA

FAMILY: Mytilidae

They have wedge-shaped, equivalve, inequilateral shells. Nacreous inside. Adductor scars unequal. Teeth few or absent. Pallial line simple or with a shallow embayment posteriorly. Periostracum thick, strong and often hairy. Species mostly attach themselves by a byssus to hard surfaces. They are widely distributed in most seas in shallow water.

Brachidontes exustus (Linnaeus, 1758) (Fig.12) (New Record)

Range: Red Sea (North Jeddah), Cape Hatteras, West Indies.

Habitat: It is found in shallow water in the sandy bottom of the lagoon and on the rocky parts of the reef flat. (2 specimens).

Description

The length of the shell varies between 1.5 to 2.0 cm. The shell is thin, inflated and triangular with terminal umbones and final radial ribs. The shell has brownish yellow to dark brown

color. The 2 valves have violet to white color and the teeth at the hinge are purple in color.

Brachidontes variabilis (Krauss, 1848) (Fig.12).

3- ORDER: PTERIODA

FAMILY: Limidae

They have equivalve shells, usually slightly or strongly oblique in orientation of valves. Two small ears on hinge line. Ligament internal and triangular. Anterior gape near to or far from hinge margin. Sometimes posterior gape. Hinge teeth weak or absent. Obscure adductor muscle impressions. Surface smooth or ornamented with radial, often scaly ribs.

Ctenoides scabra (Born, 1778) (Fig.12).

Lima lima (Linnaeus, 1758) (Fig.12).

FAMILY: Ostreidae

They have medium to large, irregularly shaped shells, with the left valve cemented to the substratum and often deeper than the right; Ligament in a broad, shallow pit; Hinge toothless, but lateral margins usually with pleats or denticles termed Chomata; Adductor muscle scar single, usually central. Most live in the intertidal zone and in shallow water.

Lopha cristagalli (Linnaeus, 1758) (Fig.12)

FAMILY: Pectinidae (Scallops).

They are equivalve or inequivalve, nearly circular or fan-shaped shells, usually ribbed and with equal or unequal

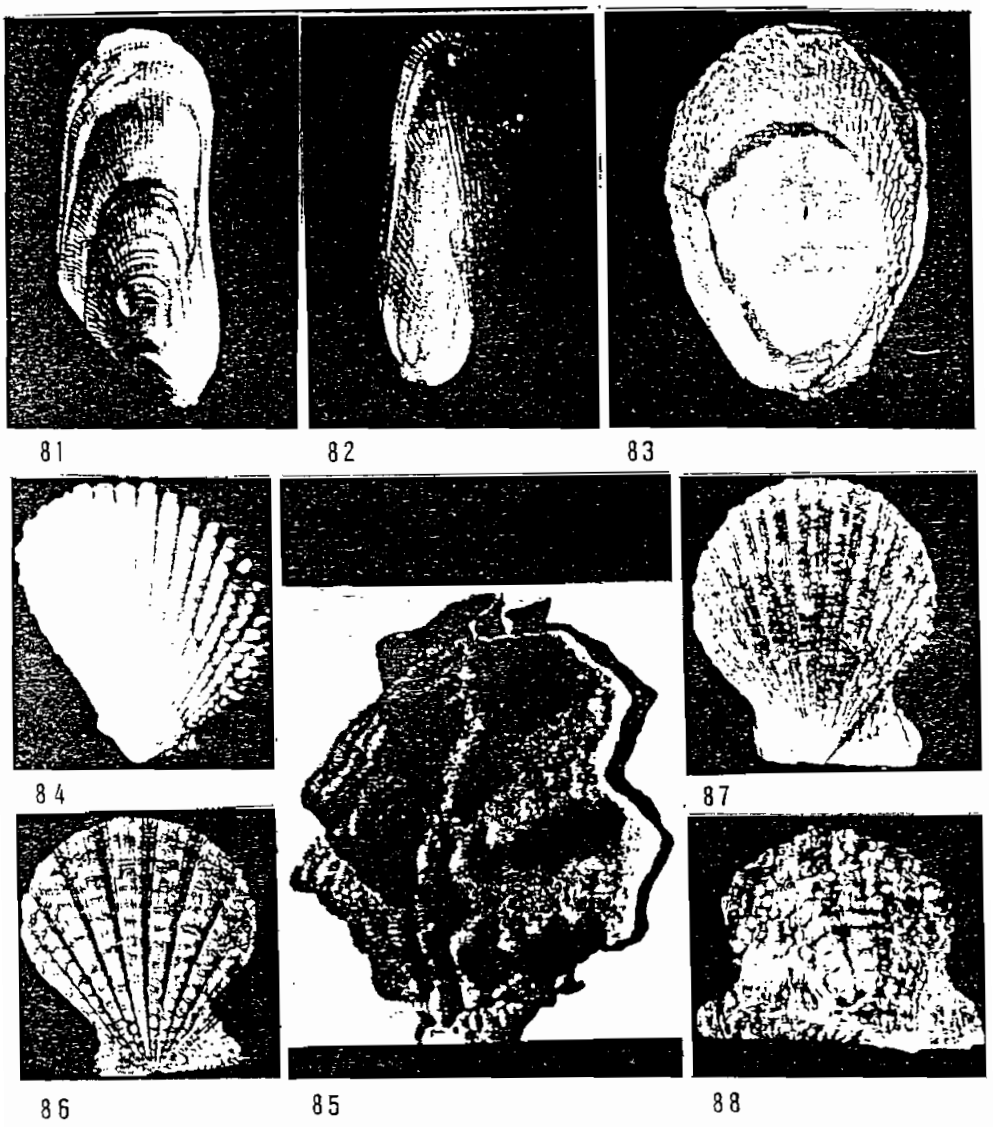


Fig.12

81. Brachidontes exustus
82. Brachidontes variabilis
83. Ctenoides scabra
84. Lima lima
85. Lopha cristagalli
86. Chlamys sanguinolentus
87. Chlamys senatorius
88. Pinctada radiata

auricles or ears. One valve usually more inflated than the other. Anterior ear usually has a distinct byssal notch or indentation below it. One adductor muscle impression. Attached to other objects by a byssus, or cemented to them by right valve, or both valves free. Upper (left) valve usually more brightly colored than right valve.

Chlamys sanguinolentus (Gmelin, 1791) (Fig.12).

Chlamys senatorius (Gmelin, 1791) (Fig.12).

FAMILY: Pteriidae

The family contains moderate to large-sized shells with one valve usually more inflated than the other; The right ear is either short or prominently extended in a wing-like manner along the straight hinge-line, the greater part of the interior is pearly and one valve has 1-2 denticles which fit into depressions in the opposite valve. It includes the pearl-oysters and the wing-oysters.

Pinctada radiata "Scaly pearl oyster" (Leach, 1972) (Fig.12)

4. ORDER: VENEROIDA

FAMILY: Cardiidae

It contains small to large shells which are mostly thin and light more or less inflated and usually radially ribbed. Rounded, trigonal, elongated or oval. Umbones are usually rounded and produced above dorsal line. Two cardinal teeth exist in each valve; Two anterior teeth and one posterior tooth in right valve. Pallial is missing.

Americardia media (Linne, 1758) (Fig.13) (New Record).

Range: Red Sea (North Jeddah), Hatteras to West Indies.

Habitat: It is found in shallow water and in between the upper and middle reef face and in the coarse sandy bottom of the lagoon (3 specimens).

Description: The length of the shell is 1 inch and sometimes a bit more. The shell is creamy white in color and is more or less checkered with buff and purple. It is solid and somewhat triangular. The anterior margin is regularly rounded and the posterior margin is partially truncated forming a distinct slope on that end. The sculpture has a strong and rounded radiating rib.

Leavicardium mortoni (Conrad) (Fig.13).

FAMILY: Carditidae

The family contains small to large shells, usuallly trapezoidal or rounded; with strong radial ribs and crenulate margins; External ligament is present; Anterior muscle impressions are raised up; Pallial is missing; Shells are usually thick and solid.

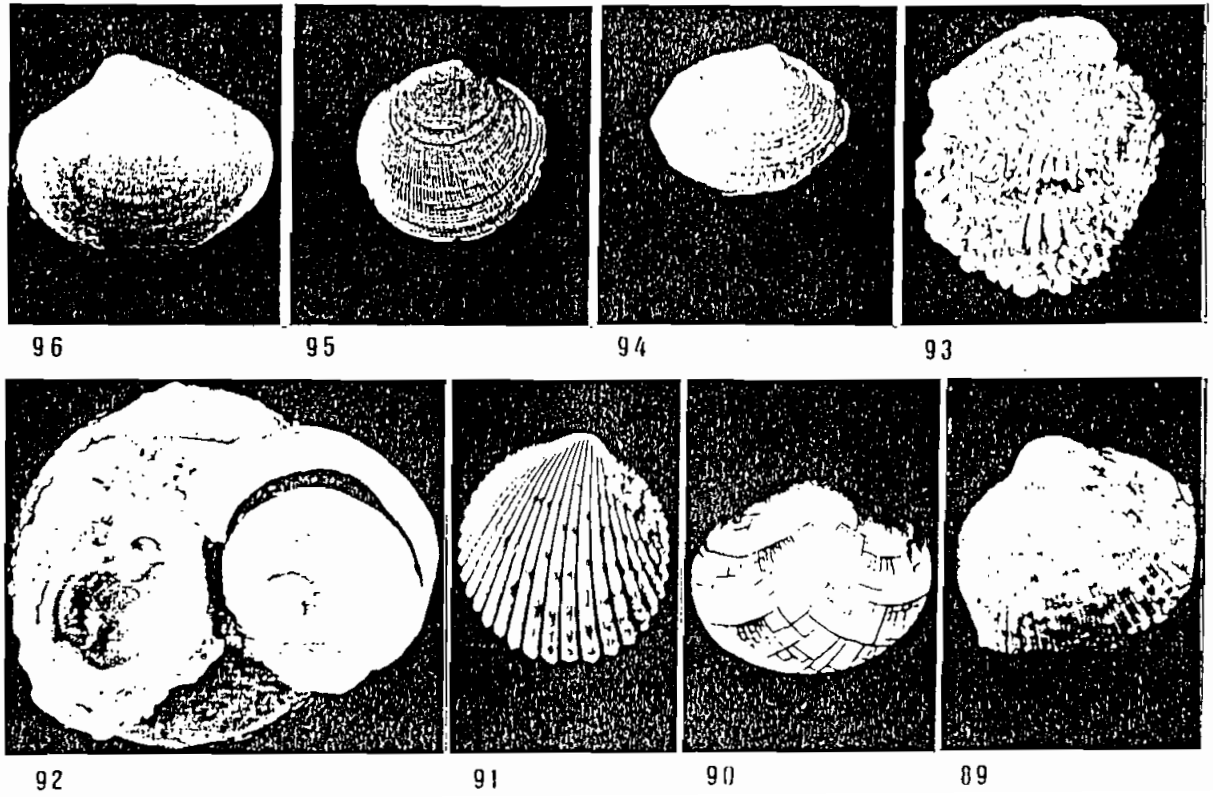
Trachycardium pectiniforme (Born, 1780) (Fig.13)

FAMILY: Chamidae (Jewel boxes)

The family contains small to medium-sized, thick irregularly rounded shells, permanently or temporarily cemented to substrate by one valve. Umbones are usually strongly curved. Hinge-plate thick, with two cardinal teeth in each valve, those of the lower valve are separated by a trench; the anterior cardinal tooth broad and crenulated; A small posterior lateral tooth may be

Fig.13

89. Americardia media
90. Laevicardium mortoni
91. Trachycardium pectiniforme
92. Chama crenulata
93. Chama sinuosa
94. Codakia orbiculata
95. Codakia tigerina
96. Diplodonta nucleiformis



present. Two adductor muscle scars are present; Pallial sinus is absent.

Chama crenulata (Lamarck, 1822) (Fig.13) (New Record)

Range: Red Sea (North Jeddah), Muritania, Gabon.

Habitat: It is found in shallow water and on the rocky parts of the reef flat. (3 specimens).

Description: The shell has a length varying between 3.5 to 5.0 cm. It is thick, heavy and irregular with unequal valves. The fixed valve is being the larger and the more convex. The shell has a yellowish white color.

Chama sinuosa (Broderip, 1832) (Fig.13) (New Record)

Range: Red Sea (North Jeddah),South Florida to West Indies.

Habitat: It is found in shallow water in the reef platform and in the middle of the reef face fixed on rocky parts. (2 specimens).

Description: The length of the shell varies between 5.0 to 7.0 cm. The inner margins are not crenulate. A pallial line runs only to the anterior and posterior muscle scars. The shell has a white color but the anterior is often green in color.

FAMILY: Lucinidae (Platter shells).

The family contains small to medium-sized, ovate or circular shells; Umbones are more or less central and curved slightly forward; Each ends frequently with a radial fold or groove delimiting two dorsal areas; Valves are usually equal; Lunule is asymmetrical; Ligament is posterior, sometimes internal; Hinge typically with 2 cardinal teeth per valve, plus 2 lateral teeth in the right valve, 4 in the left, although some or all of these

elements may be absent; Pallial line without a sinus; Anterior adductor scar long and narrow, posterior one shorter and rounder.

Codakia orbiculata (Montagu) (Fig.13) (New Record).

Range: Red Sea (North Jeddah), North Carolina to the West Indies.

Habitat: It is found in shallow water in the fine sandy bottom of the lagoon and in the middle of the reef face. (3 specimens).

Description: The length of the shell is ½ to 1 inch, very much like a small edition of the great white Lucine but the Lunule is elongate instead of heart-shaped. The shell is sturdy and circular and the surface bears distinct radiating ribs crossed by numerous fine concentric lines. The valve is a pure white color externally and internally.

Codakia tigerina (Linnaeus, 1758) (Fig.13).

Diplodonta nucleiformis (Wagner, 1838) (Fig.13) (New Record).

Range: Red Sea (North Jeddah), Florida to West Indies.

Habitat: It is found in shallow water in the coarse sandy bottom of the lagoon and the reef flat and in the middle part of the reef face. (3 specimens).

Description: The length of the shell is about ½ inch. It is an orbicular shell with beaks that are somewhat swollen. Its surface is shiny with minute concentric lines. Its color is white.

Diplodonta verrilli (Dall, 1900) (Fig.14)

FAMILY: Tellinidae

The family contains small to fairly large-sized shells,

ovate or oblong; Valves usually slightly unequal and gaping narrowly behind; mostly compressed with weak sculpture. Ligament is external, posterior-hinge has always two cardinal teeth, lateral teeth are present or absent. Pallial sinus is large and deep; Adductor muscle scars are equal, cruciform muscles are present. They are usually white or pink.

Tellina pharaonis (Hanley, 1844) (Fig.14).

Tellina radiata (H.Adams, 1870) (Fig.14)

Tellina rostrata (Linnaeus, 1758) (Fig.14) (New Record).

Range: Red Sea (North Jeddah), Malaysia.

Habitat: it is found in shallow water and in the sandy bottom of the reef flat. (3 specimens)

Description

The shell has a length of 3.0 to 8.0 cm. It is elongate, flattened and strongly twisted posteriorly. It has a pointed posterior and concentric fine ridges which become oblique at the posterior. Each valve has a low and spined ridge running from the back to each extremity and below each ridge there is a furrow. The shell has a white color.

FAMILY: Tridacnidae (Giant clams)

They have medium-sized to very large shells (largest bivalves in the World) with prominent radial ornament. The front part of the hinge is reduced, so that only one cardinal tooth and the posterior lateral tooth are present. The shell is longish-triangular, very large, thick, the ribs and large folds with scales. They live on coral reefs.

Tridacna maxima (Roding, 1798) (Fig.14)

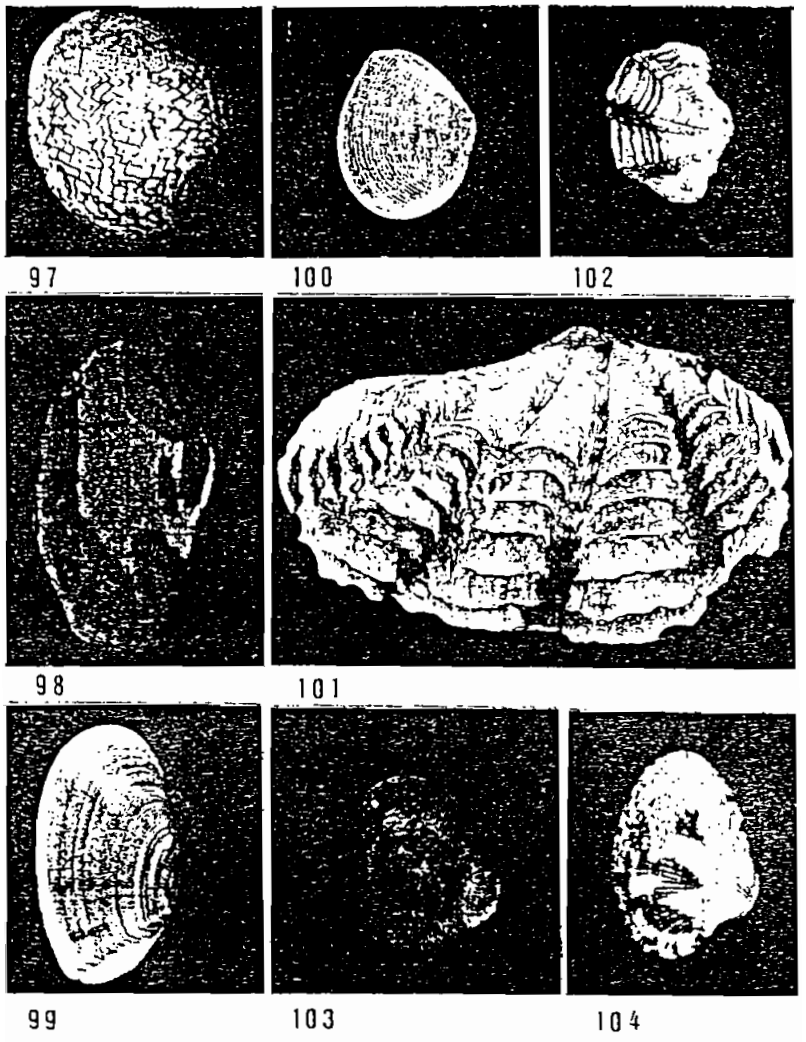


Fig.14

97. Diplodonta verrilli
98. Tellina pharaonis
99. Tellina radiata
100. Tellina rostrata
101. Tridacna maxima
102. Tridacna squamosa
103. Circe crocea
104. Chione subimbricata

Tridacna squamosa (Lamarck, 1819) (Fig.14)

FAMILY: Veneridae (Venus clams)

They have equivalve, ovate to ovate-trigonal, or nearly circular shells which are porcelaneous in texture. Umbo lies median to anterior. Lunule and escutcheon are usually well-developed. Ligament is external, on a raised nymph. Hinge plate with 3 cardinal teeth and sometimes an interior lateral tooth. Adductor muscle scars more or less equal. Pallial sinus is usually present.

Circe crocea (Gray, 1838) (Fig. 14)

Chione subimbricata (Sow) (Fig.14) (New Record).

Range: Red Sea (North Jeddah) Gulf of California, Peru.

Habitat: It is found in shallow water and in the muddy bottom of the reef flat. (3 specimens).

Description: The length of the shell varies between 20 to 40 mm. It is ovate trigonal, inequilateral and thick. The solid shells with or without lunule and escutcheon are ornamented with usually bold concentric ridges and with much weaker radial riblets. The shell has a short pallial sinus and well developed cardinal teeth. It usually has a deep umbonal cavity in each valve.

Gafrarium divaricatum (Gmelin, 1791) (Fig.15)

Gafrarium pectinatum (Linnaeus, 1758) (Fig.15)

Lioconcha fastigiata (Sow) (Fig.15) (New Record).

Range: Red Sea North Jeddah, Indian Ocean, West Pacific especially West Australia.

Habitat:It is found in shallow water and in the fine coarse sandy bottom of the lagoon and in the middle part of the reef flat. (3 specimens).

Description

The length of the shell is 2.5 cm. It is thick, round ovate smooth or concentrically ribbed. The shell resembles Pitar in shape with a prominent elevated lunule. It has a shallow pallial sinus. Its color is yellowish white with pale brown zigzag streaks.

PHYLUM: Mollusca

CLASS: Pelecypoda

ORDER: Mytiloida

SUPERFAMILY: Mytilacea

FAMILY: Mytilidae

Modiolus tulipa (Lamarck) (Fig.15)

PHYLUM: Mollusca

CLASS: Gastropoda

SUBCLASS: Prosobranchia

ORDER: Neogastropoda

SUPERFAMILY: Buccinacea

FAMILY: Pyrenidae

They have shells which are small and thick, mostly spindle-shaped, short spire. Narrow aperture with denticulate and often incurved outer lip. Operculum is corneous and minute. They are widely distributed in warm seas, and sandy places.

Pyrene flava (Bruguiere) (Fig.15) (New Record).

Range: Red Sea (North Jeddah), Indo-Pacific, East Africa, Polynesia.

Habitat: it is found in shallow water upon and in between the

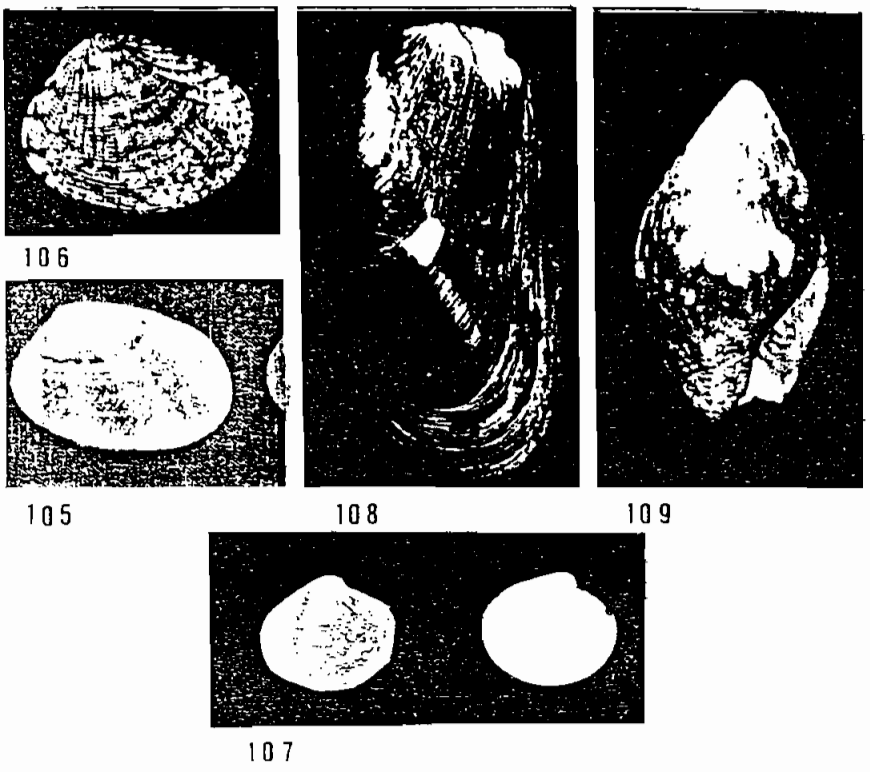


Fig.15

105. Gafrarium divaricatum
106. Gafrarium pectinatum.
107. Lioconcha fastigiata
108. Modiolus tulipa
109. Pyrene flava.

fine and coarse sandy bottom of the lagoon and on the reef platform. (3 specimens).

Description

The shell has a length ranging between 1.5 to 2.5 cm. It is fusiform and swollen. The spire is tall and the apex is pointed while the suture is impressed. The shell is smooth with anterior spiral threads and dentate outer lip. The columella is usually voilet and the color of the shell is brown with irregular white spots.

CONCLUSION

This taxonomic study shows a general survey of the Molluscan fauna especially Gastropods and Pelecypods in the region North of Jeddah. A total of 109 identified and described species of Gastropods and bivalves indicated the high species diversity in this shallow reef zone.

It is interesting that many of the Red Sea "Littoral" mollusks occur in Jeddah region and alternatively in other shallow water zones. 27 different specimens of these mollusks are considered to be new records of the Jeddah Zone in the Red Sea. They are as follows:-

Cerithium carbonarium (Philippi) (Fig.3).

Cymatium labiosum (Wood, 1828)

Cymatium tabulatum (Menke) (Fig.4)

Cypraea xanthodon (Sowerby, 1832) (Fig. 5)

Polinices tumidus (Swainson, 1840) (Fig.6)

Conus episcopus (Hwass, 1792) (Fig. 7)

Conus excavatus (Sowerby, 1866) (Fig.7)

Conus planorbis (Born, 1778) (Fig.7)

Harpa crenata (Swainson, 1822) (Fig.8)

Mitra maui (Kay, 1979) (Fig.9)

Murex brevifrons (Lamarck, 1822) (Fig.9)

Urosalpinx cinerea (Say) (Fig.9)

Morula fiscella (Gmelin, 1791) (Fig.9)

Stylocheilus longicaudus (Quoy and Gaimard, 1824) (Fig.11)

Arca barbata (Linnaeus, 1758) (Fig.11)

Arca noae (Linnaeus, 1758) (Fig.11)

Barbatia domingensis (Linnaeus, 1758) (Fig.11).

Brachidontes exustus (Linnaeus, 1758) (Fig.12)

Americardia media (Linne, 1758) (Fig.13)

Chama crenulata (Lamarck, 1822) (Fig.13)

Chama sinuosa (Broderip, 1832) (Fig.13)

Diplodonta nucleiformis (Wagner, 1838) (Fig.13)

Tellina rostrata (Linnaeus, 1758) (Fig.14)

Chione subimbricata (Sow) (Fig.14)

Lioconcha fastigiata (Sow) (Fig.15)

Pyrene flava (Bruguiere) (Fig.15)

ACKNOWLEDGEMENT

I wish to thank Eng. Ahmed Adel Abdullah, Mr. Al-Sawy Ali,Mr. M. El Saghir, the sailors Mr. Awad Salem and Mr. Jeelani Soliman of the Faculty of Marine Science, Jeddah,for their assistance at various stages of the work.

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