6

CORAL REEFS AND THEIR ENVIRONS

C. S. GOPINADHA PILLAI[1]

INTRODUCTION

The coral formations of Andaman and Nicobar Islands extend from 92°30' to 94°E Long. and 7° to 14° N Lat. flanking several large and small continental islands. This Indo-Pacific reef province, which is separated from the Sri Lanka and Southeast Indian coral formation by nearly one thousand km—a significant gap in the coral growth of the Indo-Pacific, is more or less contiguous with that of Strait of Malacca, Arakan coast and the East Indies. The absence of reef development and growth of hermatypes in the vast stretches of Bay of Bengal is probably due to the great influx of rain water through the large rivers of the Indian subcontinent, that causes deposition of large quantities of terrigenous mud as well as a lowering of salinity, particularly in the upper reaches of the bay during rainy seasons. The waters of Ganges-Brahmaputra river system are reported to be acidic in monsoon that may impose restrictions on skeletogenis of scleractinia (Sewell, 1935). Coral planulae will not settle and grow on muddy, soft bottoms with heavy silting and this may be the primary physical parameter that does not favour colonisation of corals in several areas of the Bay of Bengal.

During the present survey many stations in both Andaman and Nicobar Islands were studied in shallow nearshore waters with the aid of SCUBA, resulting in some information on the community structure of the reefs. The results are mainly based on field notes of the survey teams supplemented by discussion and examination of specimens collected at different stations. Most of the available information on the reef ecology and the various habitats, with their dominant marine fauna is summarised.

The author is obliged to Shri S. Mahadevan, scientist, for his valuable help in shaping the text by providing many details based on his experience during the survey.

Present address :
[1] CMFRI, Research Centre, Minicoy, Lakshadweep.

RESUME OF EARLIER WORKS

As early as 1847, Rink gave a short account of the Nicobar Islands. He also found evidences of a Recent geological disturbance in this area in elevated limestone deposits along the shores. A relative change in the levels of land and sea to a tune of 6-8 feet has taken place here in the Recent time. In 1858, the Austrian frigate *Novara* surveyed the area and charted the islands but no major biological study was carried out. Alcock (1893) with IMS *Investigator* visited Port Blair during 1888 and gave a very short description of the reef, also pointing out the adverse effect of silting in the inshore waters on coral growth. Sewell (1922), on board *Investigator*, described the morphology, community ecology and formation of the reefs of Nicobar in some detail. Exactly a century after the visit of *Novara*, another Austrian ship *Xarifa*, with a team of German scientists, laid anchor in Great Nicobar with a view to investigating the reefs and the reef corals. Many stations in Great Nicobar and Tillanchong (Scheer, 1971) were studied and a fairly good collection of corals was made. This still remains to be the only documented coral collection from the Nicobar waters (Scheer and Pillai, 1974). Based on collections in the Indian Museum, Calcutta, Matthai (1924) gave an account of some families of corals from Andaman Islands (only one species *Hydnophora exesa* from Nicobar). The deep-sea corals are mainly known from the *Investigator* collections (Alcock, 1893). During the last decade, several small but valuable collections from Andamans made by the scientists of CMFR Institute have furthered our knowledge of the coral fauna of Andaman Islands and these were reported by Pillai (1969, 1972).

PHYSICAL CONDITIONS

Temperature and salinity

Published data on regular monitoring of temperature and salinity year round of this area is scanty. According to Sewell (1925 *a*), the surface temperature of the waters of the Andaman Sea ranged from 27.1° to 28.1°C during October to March. Daily variation in salinity was minimum ; only a range of 0.46 to 1.21 ‰. The mean monthly value of salinity was about 33 ‰.

Sedimentation

The inshore waters of Andaman and Nicobar Islands, particularly along the unprotected shores are often turbid due to the presence of terrigenous mud and sand. During rainy season large quantities of fine silt from the mangrove soil seems to be washed into the sea by rain water. The wind generated waves, especially during the monsoon seasons, stir up shore sand and get them suspended and later deposited at the nearshore areas. The nearshore areas of most of the islands are with a sandy or muddy bottom sometimes with a cover of sea-grass. To a depth of 1 m or so and upto a distance of nearly 100 m from the shore, coral growth, in general, is scarce and whatever corals are found in this situation are those capable of combating the effect of silting (Pillai, 1971). Away from the shore the effect of silting is less felt and, hence, corals start growing in profusion intermittent with sandy areas. In protected bays and shores the effect of silting is comparatively less. The major limiting factor to coral growth and many filter feeders in the shallow nearshore areas here seems to be the deleterious effect of silting.

Surface radiation and relative brightness of waters

Studies on radiation conditions and relative brightness of water at different depths in Great Nicobar (Ganges harbour) by Scheer during 1958 (Scheer, 1966; Scheer and Pillai, 1974) showed that nearly 40% of the surface brightness on a clear day was cut in the first metre of the water column both during fore and afternoons. Only 13.8% of the surface brightness was found to reach a depth of 10 m. This observation is in agreement with that made at Addu Atoll in Maldives during forenoon (Fransisket, in Scheer, 1966) with clear atoll waters and luxuriant growth of corals. It seems that, though turbidity is of a higher magnitude nearshore, in deeper waters it is less and primary production is not much affected due to turbid conditions that cut radiant light.

Productivity and nutrient supply

Generally speaking, coral growing areas are centres of high primary production (1500 to 3000 $gC/m^2/yr$) mainly due to the concentration of *Zooxanthellae* in the polyps of hermatypes, alcyonarians and giant clams in the form of imprisoned algae. Free living algae and phytoplankters in the ambient waters also contribute their share. Determination of primary production on an inshore reef near Port Blair by flow respirometry (Nair and Pillai, 1972) has shown a total annual production of only 1200 gC/m^2, which is of a lower order compared to other reef regions such as Gulf of Mannar (2500 $gC/m^2/yr$) and Minicoy (3000 $gC/m^2/yr$) (Nair and Pillai, 1972). These authors pointed out that the reef of Andaman studied is non-autotrophic in the sense that the respiratory requirements of the organisms on the reef far exceed the total production. Gordon and Kelley (1962) reported a similar situation from a Hawaiian reef and Stoddart (1969) felt that such non-autotrophic conditions of reefs along large masses of land may simply reflect the basic difference in metabolism of reefs near large land masses and oceanic atolls. However, this remains to be further tested and proved. The possibility of the Nicobar reefs being more productive than those of the Andaman was suggested by Nair and Pillai (1972).

Though the major part of the oxygen production measured on reefs is from the imprisoned algae and the resulting carbon being deposited on skeleton-building reef organisms, in many parts of the Indo-Pacific large concentrations of zooplankton were observed on reef areas. The role of particulate carbon as a source of nutrient energy to plankton and its role in the bottom level of food chains in the reef ecosystem is now being better understood (Qasim and Sankaranarayanan, 1970). The mucus secreted by corals as a reaction to wave action and grazing of coral-eating animals like reef fishes, is believed to aid in the production of particulate carbon which may be available to plankters. Laboratory experiments with the nauplii of *Artemia* reared with coral mucus have shown that these nauplii grow faster and live longer than the control ones (Johannes, 1967). This suggests that coral mucus certainly aid as a source of food to small plankters. Another source of nutrient enrichment in reef sites is *Tridacna*. The faeces of *Tridacna* was found to enhance the protein contents of the surrounding waters. A medium sized *T. maxima* releases 17.3 to 26.1g of protein per year in French Polynesia, according to Richard and Salvat (1977). Further, the faeces contain large quantities of symbiotic algae that are released into the water, enriching the chlorophyll content. Since *Tridacna* is very common, and at some sites abundant, in Andaman-Nicobar area, they certainly should contribute significantly to the reef productivity. Studies on the planktological aspects of this area are of limited nature. Sewell (1925) stated that during southwest monsoon there is a heavy flow of oceanic waters from the open Bay of Bengal to the west coast of Andamans which brings a rich supply of plankton and nutrients that helps a better growth of corals on the west coast of Andaman-Nicobar Islands than on the east coast.

Morphology of Reefs

The reefs of Andaman and Nicobar Islands, in general, are of fringing type with a series of patch reefs along the shores, particularly in embayments. Along the west coast of Andamans, there is a chain of interrupted banks that might be homologous with a barrier reef (Alcock, 1902). Between these banks and the shore, the sea (lagoon) is nearly 40 fm deep and the outer edges of these banks steep suddenly to a depth of 250 to 300 fm. In essence we have here a barrier reef to a length of nearly 320 km (Sewell, 1925). The following details on the reefs are based on the present survey.

Reefs of Nancowry area

Fringing the west coast of Nancowry Island in Spiteful Bay from Mayo Point to the extreme south there are coral patches. Corals grow in isolated colonies or in dense assemblages, intermittent with sandy areas. In certain places there was a profuse growth of ramose corals of *Acropora formosa* and *A. nobilis* but the area was found with a recent deposit of mud that has killed many colonies. Some of the specimens were found lying loose and only their top branches living (Pl. I, A). At a depth of 2 m and below the growth of corals becomes very profuse. Large colonies of faviids and *Porites* thrive here in luxuriant condition mixed with ramose corals of *Acropora* and *Pocillopora*. Alcyonarians are also found in good numbers. There is a concentration of *Fungia* (*F. echinata* and *F. fungites*) at certain sites on hard and sandy surfaces. On the sandy bottom *Holothuria* and *Stichopus* are the most dominant animals.

The shores of the north and northeastern sides of the Octavia Bay have mangroves chiefly of *Sonnertia* and *Rhizophora*. Corals are found from 50 m from the shore but significant growth occurs only at a depth of 1.5 m and below, about 100 m from the shore line. Massive colonies include those of *Favia, Favites, Platygyra* and *Porites*. *Acropora* and *Pocillopora* also occur but they dominate in deeper waters at the outer side of the reef. There is a heavy concentration of the blue coral *Heliopora coerulia* (Pl. I, B). The soft corals include many alcyonarians along with *Isis hippuris*. The area was found to be a very rich ground for reef associated fishes such as carangids, lethrinids, lutjanids, pomacentrids and pomadasyds.

In the East Bay in Katchall Island there is a well developed reef with an elevated flat almost continuous with the shore. The reef is mostly consolidated, level and is approximately 500 m wide. The exposed part of the flat at the higher zones is generally devoid of corals. But many crinoids were observed.

At the southern east coast of the Katchall Island (at Hoinipoh) there is a well developed patch reef. The bottom is with fine sand where corals grow in fair numbers. Both massive and ramose corals are found on the inner side. This zone is followed by a zone of alcyonarians which covers most of the available bottom. On the outer side, beyond the zone of soft corals, again scleractinians dominate. *Acropora hyacinthus, A. millepora* and *A. humilis* along with *Pocillopora damicornis* constitute the dominant ramose forms. *Porites lutea, Goniastrea retiformis* and *Platygyra lamellina* are the major massive forms. Reef fishes are very rich. Found among the corals are very many gastropods. Sea cucumbers form the dominant epifauna of the bottom sand.

The information given below on the Tillanchong Island is mainly based on Scheer (1971) and Scheer and Pillai (1974). The Castle Bay on the south has a rich growth of coral, the reef starting from the nearshore line. The bottom is sandy with a seagrass bed that harbours holothurians in large numbers. The reef flat is fissured and the first corals to appear on the flat are *Pocillopora damicornis* and *Acropora* spp. Large sized colonies of *A. palifera* are found in deep waters. Beyond the reef front the bay bottom is covered with a fine ooze supporting large number of solitary corals *Heterocyathus* and *Heteropsammia* along with free lying colonies of *Goniopora stokesi*.

The reefs of Andamans

This area has been poorly covered for reef studies. At Rangat the reef is thickly populated by massive corals, mainly *Porites lutea*. In sandy bottom *Pocillopora* spp. and *Acropora* spp. are found. *Montipora foliosa* and *Echinopora horrida* are found to cut foliaceous coralla. There is an accumulation of coral shingle over which several specimens of *Crassostrea cucullata* are seen at the littoral zone. Below the zone of *Crassostrea, Tridacna* were common along with gastropods. In Havelock Island the major reef builders are *Porites* spp. and among them *Tridacna* is found in abundance. In Long Island also dominant corals comprise massive types and the bottom coverage by live corals is about 75%. In Hut Bay large number of recently dead coral colonies were observed over which calcareous algae started growing. The area is muddy and the death of corals may be due to silt.

In general, the protected bays of these islands have a better coral growth along the nearshore areas than the open coasts. This might be due to less interference from silt by wave action. Between the Andamans and the Nicobars the latter have a comparatively richer growth of corals.

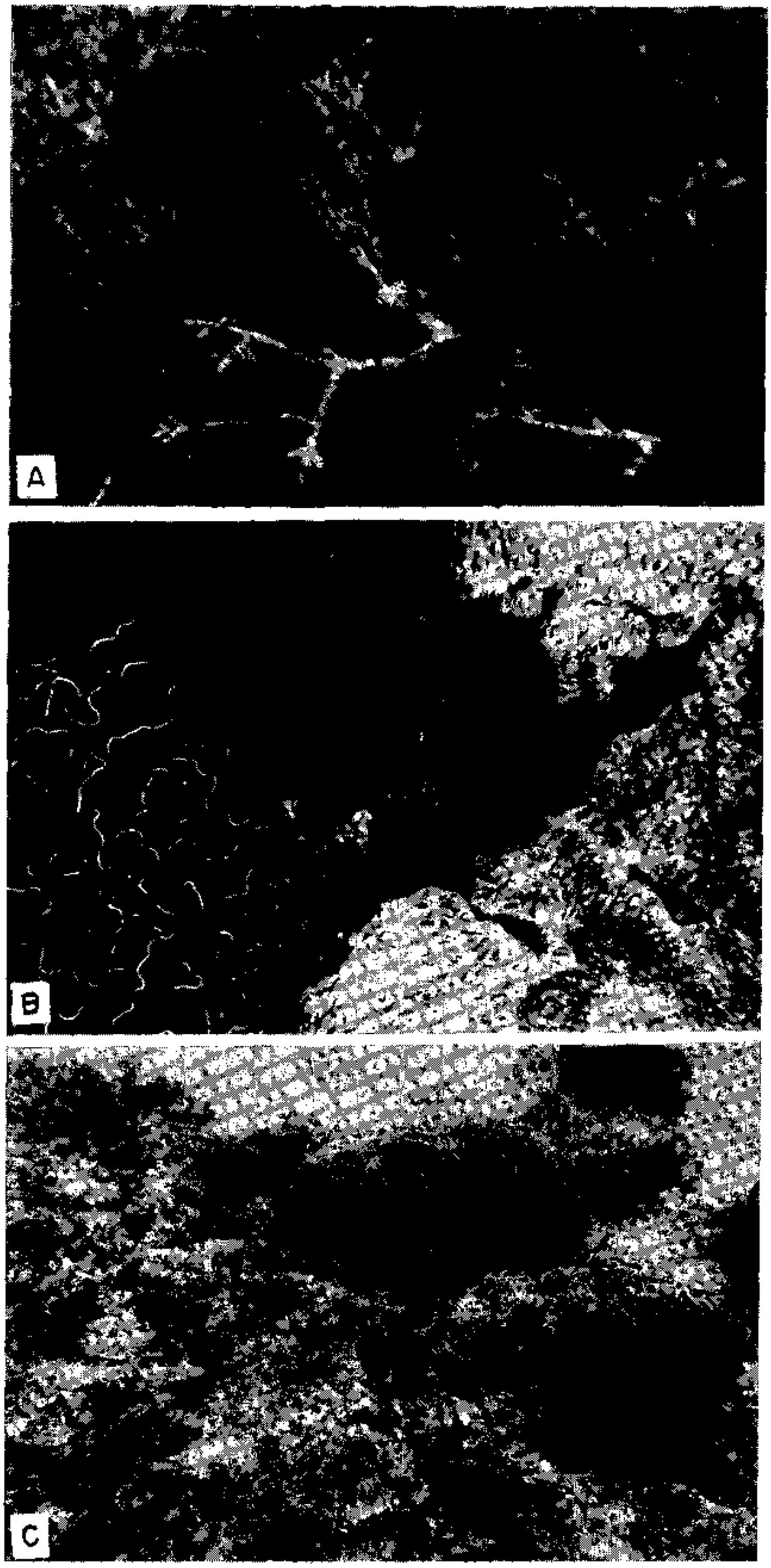

PLATE I. A—*Acropora* thicket at Wandoor, South Andaman Is. The lower parts of many specimens (*A. nobilis*) are dead. B—Reef area in Trinkat Is. Bottom right *Heliopora coerulia;* Centre top *Goniastrea pectinata;* Centre *Tridacna maxima*; Left half *Montipora*. C—Ramose corals in south-east Katchall with a concentration of *Heliopora coerulia, Acropora, Seriatopora hystrix* (top left) and alcyonarians. (Photographs by Shri K. Nagappan Nayar).

Andaman and Nicobar Reefs as Biotope

The zonation of hermatypes in this area, if any, has not been studied in detail. However, two major patterns can be derived *viz.* the massive forms and the ramose forms, each with a set of reef-building and reef-swelling species. The massive corals of this area, just like any other major Indo-Pacific coral provinces, include *Favia*, *Favites*, *Platygyra*, *Symphyllia*, *Goniastrea*, *Diploastrea* and *Porites*. The branching forms are represented by *Pocillopora*, *Stylophora*, *Seriatopora*, *Acropora* and *Montipora* spp. (Pl. I, C). A third assemblage is locally made of foliaceous forms like *Montipora foliosa*, *Echinopora lamellosa* or *E. horrida* and *Pavona* spp. The non-scleractinian corals are abundant in Andaman and Car Nicobar islands at certain localities and these are chiefly *Heliopora coerulia*. *Millepora platyphyllia* is often found. *Tubipora musica* is in great profusion in shallow waters in Car Nicobar.

The coral fauna of this area has been listed by Pillai (1972) from Andamans and Scheer and Pillai (1974) from Nicobars. Since then a few more species were obtained from this area and, to-date, a total of 135 species divided among 59 genera is known for both Andaman and Nicobar together, of which 110 species of 45 genera are hermatypes and 25 species of 14 genera are ahermatypes. A checklist of corals from Andaman and Nicobar Islands is given in the Annexure. *Madracis* sp., *Stylophora pistillata*, *Echinopora horrida* and *Physophyllia lichstensteini* were reported from Andaman and Nicobars for the first time though all are widely spread Indo-Pacific species.

Major Reef Habitats with Notes on Dominant Fauna

The sand and shingles of the upper eulittoral

This habitat is present along several shores. The beach sand in this zone is ideal habitat for burrowing clams like *Donax* spp. and *Actactodea*. A few crustaceans like *Hippa* are seen at the lowest water mark. The dead coral shingle harbours *Crassostrea cucullata* at higher levels at many sites in Car Nicobar and lower down gastropods like *Nerita*, *Thais*, *Drupa*, *Trochus* and *Cerithium* grow. In certain places *Tridacna* was noticed at the lowest level where the exposure time is minimum.

Sea-grass beds, subtidal lagoon and inshore sand

Cymodocea and *Thalassia* often cover considerable areas of the bottom in the nearshore waters. The sandy areas and the sea-grass beds are ideal habitats for sea-cucumbers such as *Holothuria atra*, *H. scabra* and *Stichopus* sp. Though the inshore area is with a high degree of sediments, the washout into the sea, particularly from the mangrove soil, during the rains brings lot of organic rich silt that provide food to these detrital feeders.

Subtidal dead shingle

The subtidal, loose or intact dead corals are very suitable dwelling places for many bivalves such as *Arca*, *Tridacna* and pearl oysters. Since this is a more stable habitat than the littoral shingle, species diversity is high here, though the population within a species is of a lesser magnitude than the eulittoral shingle. In Andaman-Nicobar Islands *Tridacna* is very common in this situation. Work elsewhere (Jaubert, 1977, p. 490) has shown that this genus has a tendency to live on the surface and sides (not underneath) of boulders and corals and it flourishes within a depth of 1 to 5 m. Beyond 15 m it does not thrive well since the radiant light is not sufficient for the symbiotic algae to photosynthesise.

The reef flats and subtidal reefs

The elevated parts of the reef flats are subject to much exposure and give extreme conditions for many animals. Only a few animals such as *Crassostrea*, mytilids, *Trochus* and other gastropods that are capable of surviving prolonged exposure and temperature fluctuations can thrive here.

The dead and living corals in the subtidal zones are excellent living situations for many molluscs, crustaceans, sponges and many worms. Among the gastropods *Drupa*, *Pyrene* and *Cerithium* are found to concentrate among the branches of ramose corals. Pearl oysters live attached to the top and sides of ramose and massive corals. Many bivalves like *Arca* and borers like *Lithophaga* are in plenty on dead and living corals.

References

Alcock, A. 1893. On some newly recorded corals from the Indian Seas. *J. Asiat. Soc. Beng.*, **62** (2) : 138-149.

Alcock, A. 1902. A naturalist in Indian Seas. Or *Five years with the Royal Indian Marine Survey Ship Investigator.* John Murray, London 328 pp.

Gordon, M. S. and A. M. Kelley. 1962. Primary production of an Hawaiian coral reef. A critique of flow respirometry in turbulent waters. *Ecology*, **43** : 473-480.

Jaubert, Jean. 1977. Light metabolism and distribution of *Tridacna maxima* in a South Pacific Atoll : Tokapoto (French Polynesia). *Proc. IIIrd Internat. Symp. on Coral Reefs*, Vol. I, 490-494, Univ. Miami.

Johannes, R. E. 1967. Ecology of organic aggregates in the vicinity of a coral reef. *Limnol. Oceanogr.*, **12** : 189-195.

Matthai, G. 1924. Report on the Madreporarian corals in the collection of the Indian Museum Pt. 1. *Mem. Indian Mus.*, **8** : 1-59. Calcutta.

Nair, P. V. R. and C. S. G. Pillai. 1972. Primary productivity of some coral reefs in the Indian Seas. *Proc. Symp. Corals and Corals Reefs, Mar. biol. Ass. India*, 33-42.

Pillai, C. S. G. 1969. Studies on Indian corals-5. Preliminary records of bermatypic corals of the suborder Astrocoeniina. *J. mar. biol. Ass. India*, **9** : 412-422.

Pillai, C. S. G. 1971. Distribution of corals on a reef at Mandapam, Palk Bay, South India. *J. mar. biol. Ass. India*, **11** (1 and 2) : 62-72.

Pillai, C. S. G. 1972. Stony coral of the seas around India. *Proc. Symp. Corals and Coral Reefs, Mar. biol. Ass. India*, 191-216.

Qasim, S. Z. and V. N. Sankaranarayanan. 1970. Production of particulate organic matter by the reef on Kavaratti Atoll (Laccadives). *Limnol. Oceanogr.*, **15** (4) : 574-578.

Richard, M. and B. Salvat. 1977. Faeces of *Tridacna maxima* (Mollusca, Bivalvia) composition and coral reef importance. *Proc. IIIrd Internat. Symp. Coral Reefs*, Vol. 1 : 495-501. Univ. Miami.

Rink, P. K. 1847. *Die Nikobaren Insel.* Kobenhagen. (Cited after Sewell, 1925).

Scheer, G. 1966. Remarks on radiation conditions and brightness measurements in water. part. 2. *Jena Review, 11th year* Nos. 4 and 5 : 263-267.

Scheer, G. 1971. Coral reefs and coral genera in the Red Sea and the Indian Ocean. In : *Regional variation in Indian Ocean Coral reefs. Symp. zool. Soc. Lond.*, **28** : 329-367.

Scheer, G. and C. S. G. Pillai. 1974. Report on the scleractinia from the Nicobar Islands. *Zoologica Stutt.*, **122** : 1-75, pls. 1-33.

Sewell, R.B.S. 1922. A survey season in Nicobar Islands on the RIMS 'Investigator', October 1921 to March, 1922. *J. Bombay Nat. Hist. Soc.*, **28** : 970-989.

Sewell, R. B. S. 1925. The geography of the Andaman Sea Basin. *Mem. Asiat. Soc. Beng.*, 9 (1) : 1-26.

Sewell, R. B. S. 1925 *a.* Temperature and salinity of the coastal waters of the Andaman Sea. *Mem. Asiat. Soc. Bengal*, 9 (1) : 133-198.

Sewell, R. B. S. 1935. Studies on corals and coral formations in Indian waters. *Mem. Asiat. Soc. Bengal*, 9 (2) : 461-540.

Stoddart, D. R. 1969. Ecology and morphology of recent coral reefs. *Biol. Rev.*, **44** : 433-498.

ANNEXURE

CHECKLIST OF SCLERACTINIAN CORALS FROM ANDAMAN AND NICOBAR ISLANDS

The various species under different genera are listed according to their taxonic affinities.

Class ANTHOZOA
Order SCLERACTINIA

Family **Thamnasteriidae**

PSAMMOCORA Dana, 1846.

P. contigua (Esper), 1797.
P. profundacella Gardiner, 1898.

Family **Pocilloporidae**

STYLOPHORA Schweigger, 1819.

S. pistillata (Esper) 1797.

SERIATOPORA Lamarck, 1816

S. hystrix (Dana), 1846
S. crassa Quelch, 1886
S. stellata Quelch, 1886

POCILLOPORA Lamarck, 1816

P. damicornis (Linnaeus), 1758
P. brevicornis Lamarck, 1816
P. verrucosa (Ellis and Solander), 1786
P. meandrina var. *nobilis* Verrill, 1864
P. ankeli Scheer and P llai, 1974
P. eydouxi Milne Edwards and Haime, 1860

MADRACIS Milne Edwards and Haime, 1849
Madracis sp.

Family **Acroporidae**

ACROPORA Oken, 1815

A. formosa (Dana), 1846
A. virgata (Dana), 1846
A. gravida (Dana), 1846
A. efflorescens (Dana), 1846
A. conigera (Dana), 1846
A. secale (Studer), 1878
A. hyacinthus (Dana), 1846
A. millepora (Ehrenberg), 1834
A. pinguis Wells, 1950.
A. palifera (Lamarck), 1816.
A. nobilis (Dana), 1846.
A. plantaginea (Lamarck), 1816. (= *A. humilis* (Dana)
A. diversa (Brook), 1893.
A. variabilis (Klunzinger), 1879.
A. rambleri (B. Smith), 1880.
A. dumosa (Brook), 1893.
A. multiacuta Nemenzo, 1967.

MONTIPORA Quoy and Gaimard, 1830

M. tortuosa (Dana), 1846.
M. digitata (Dana), 1846.
M. cocosensis Vaughan, 1918.
M. turgescens (Dana), 1846
M. peltiformis Bernard, 1896
M. foliosa (Pallas), 1766.
M. composita Crossland, 1952.

ASTREOPORA de Blainville, 1830

A. listeri Bernard, 1896.

Family **Agariciidae**

PAVONA Lamarck, 1801

P. explanulata (Lamarck), 1816.
P. xarifae Scheer and Pillai, 1974.
P. varians Verrill, 1864.
P. decussata (Dana), 1846.
P. praetorta (Dana), 1846.
P. clavus (Dana), 1846.
P. duerdeni Vaughan, 1907.

PACHYSERIS Milne Edwards and Haime, 1849

P. rugosa (Lamarck), 1801.
P. speciosa (Dana), 1846.

LEPTOSERIS Milne Edwards and Haime, 1849

L. papyracea (Dana), 1846.
L. fragilis Milne Edwards and Haime, 1849.

COELOSERIS Vaughan, 1918

C. mayeri Vaughan, 1918.

Family **Siderasteridae**

PSEUDOSIDERASTREA Yabe and Sugiyama, 1935

P. tayami Yabe and Sugiyama, 1935.

Family **Fungiidae**

CYCLOSERIS Milne Edwards and Haime, 1849

C. cyclolites (Lamarck), 1816.
C. sinensis Milne Edwards and Haime, 1860.
C. distorta (Michelin), 1843.
C. hexagonalis Milne Edwards and Haime, 1849.
C. costulata (Ortmann), 1889.

FUNGIA Lamarck, 1801

F. scutaria Lamarck, 1801.
F. paumotensis Stutchberry, 1833.
F. somereville Gardiner, 1909.
F. echinata (Pallas), 1766.
F. repanda Dana, 1846.
F. danai Milne Edwards and Haime, 1851.
F. fungites (Linnaeus), 1758.
F. horrida Dana, 1846.

FUNGIACYATHUS Sars, 1872

F. symmetrica (Pourtales), 1879.

HERPOLITHA Eschscholtz, 1826

H. limax (Esper), 1797

HERPITOGLOSSA Wells, 1966

H. simplex (Gardiner), 1909.

POLYPHYLLIA Quoy and Gaimard, 1833

P. talpina (Lamarck), 1909.

Family **Poritidae**

GONIOPORA de Blainville, 1830

G. stokesi Milne Edwards and Haime, 1851
G. tenuidens (Quelch), 1886.
G. planulata (Ehrenberg), 1834.

PORITES Link, 1807

P. solida (Forskal), 1775.
P. lobata Dana, 1846.
P. lutea Milne Edwards and Haime, 1851.
P. eridani Umbgrove, 1941.

ALVEOPORA de Blainville, 1830

A. daedalea (Forskal), 1775.

Family **Faviidae**

PLESIASTREA Milne Edwards and Haime, 1848

P. versipora (Lamarck), 1816.

FAVIA Oken, 1815

F. stelligera (Dana), 1846.
F. pallida (Dana), 1846.
F. speciosa (Dana), 1846.
F. favus (Forskal), 1775.
F. rotumana Gardiner, 1898.
F. valenciennesi (Milne Edwards and Haime), 1848.

FAVITES Link 1807

F. abdita (Ellis and Solander), 1786.
F. complanata (Ehrenberg), 1834.
F. flexuosa (Dana) 1846.

GONIASTREA Milne Edwards and Haime, 1848

G. retiformis (Lamarck), 1816.
G. pectinata (Ehrenberg), 1834.

PLATYGYRA Ehrenberg, 1834

P. lamellina (Ehrenberg), 1834.

LEPTORIA Milne Edwards and Haime, 1848

L. phrygia (Ellis and Solander), 1786.

OULOPHYLLIA Milne Edwards and Haime, 1848

O. aspera (Quelch), 1886.

HYDNOPHORA Fischer de Waldheim, 1807

H. exesa (Pallas), 1776.
H. microconos Lamarck, 1816.
H. laxa (Dana), 1846.

DIPLOASTREA Matthai, 1914

D. heliopora (Lamarck), 1816.

OULASTREA Milne Edwards and Haime, 1848

O. crispata (Lamarck), 1816.

LEPTASTREA Milne Edwards and Haime, 1848

L. purpurea (Dana, 1846.

CYPHASTREA Milne Edwards and Haime, 1848

C. microphthalma (Lamarck), 1816.

ECHINOPORA Lamarck, 1816

E. lamellosa (Esper), 1797.
E. horrida (Dana), 1846.

TRACHYPHYLLIA Milne Edwards and Haime, 1848

T. geoffroyi (Audouin), 1826.

Family **Rhizangiidae**

CULICIA Dana, 1846

C. rubeola (Quoy and Gaimard), 1833.

Family **Oculinidae**

GALAXEA Oken, 1805

G. fascicularis (Linnaeus), 1758.
G. clavus (Dana), 1846.

Family **Merulinidae**

MERULINA Ehrenberg, 1834

M. ampliata (Ellis and Solander), 1786.

SCAPOPHYLLIA Milne Edwards and Haime, 1848

S. cylindrica (Milne Edwards and Haime, 1848.

Family **Mussidae**

LOBOPHYLLIA de Blainville, 1830

L. corymbosa (Forskol), 1775.

SYMPHYLLIA Milne Edwards and Haime, 1848

S. nobilis (Dana), 1846.
S. radians Milne Edwards and Haime, 1849.

Family **Pectinidae**

MYCEDIUM Oken, 1815

M. elephantotus (Pallas), 1766.

PECTINIA Oken, 1815

P. lactuca (Pallas), 1766.

Family **Caryophylliidae**

CARYOPHYLLIA Lamarck, 1801

C. arcuata Milne Edwards and Haime, 1848.
C. clavus Scacchi, 1835.
C. (Acanthocyathus) grayi Milne Edwards and Haime, 1848.

DELTOCYATHUS Milne Edwards and Haime 1848

D. andamanicus Alcock, 1898.

PARACYATHUS Milne Edwards and Haime, 1848

P. indicus Duncan, 1889.

POLYCYATHUS Duncan, 1876

P. verrilli Duncan, 1889.
P. andamanensis Alcock, 1893.

HETEROCYATHUS Milne Edwards and Haime, 1848

H. aequicostatus Milne Edwards and Haime, 1848.

EUPHYLLIA Dana, 1846

E. glabrescens (Chamisso and Esynhardt), 1821.

PLEROGYRA Milne Edwards and Haime, 1848

P. sinuosa (Dana), 1846.

PHYSOGYRA Quelch, 1884

P. lichtensteini (Milne Edwards and Haime), 1851.

Family **Flabellidae**

PLACOTROCHUS Milne Edwards and Haime, 1848

P. laevis Milne Edwards and Haime, 1848.

Family **Dendrophylliidae**

BALANOPHYLLIA Wood, 1844

B. affinis (Semper), 1872.
B. scabra Alcock, 1893.

HETEROPSAMMIA Milne Edwards and Haime, 1848

H. michelini Milne Edwards and Haime, 1848.

TUBASTREA Lesson, 1834

T. coccinea (Ehrenberg), 1834.

DENDROPHYLLIA de Blainville, 1830

D. arbuscula Horst, 1922.
D. minuscula Bourne, 1905.
D. micranthus (Ehrenberg), 1834.

ENALLOPSAMMIA Micheloti, 1871

E. amphelioides (Alcock), 1902.
E. marenzelleri Zibrowius, 1973.

TURBINARIA Oken, 1818

T. crater (Pallas), 1766.
T. peltata (Esper), 1797.
T. veluta Bernard, 1896.