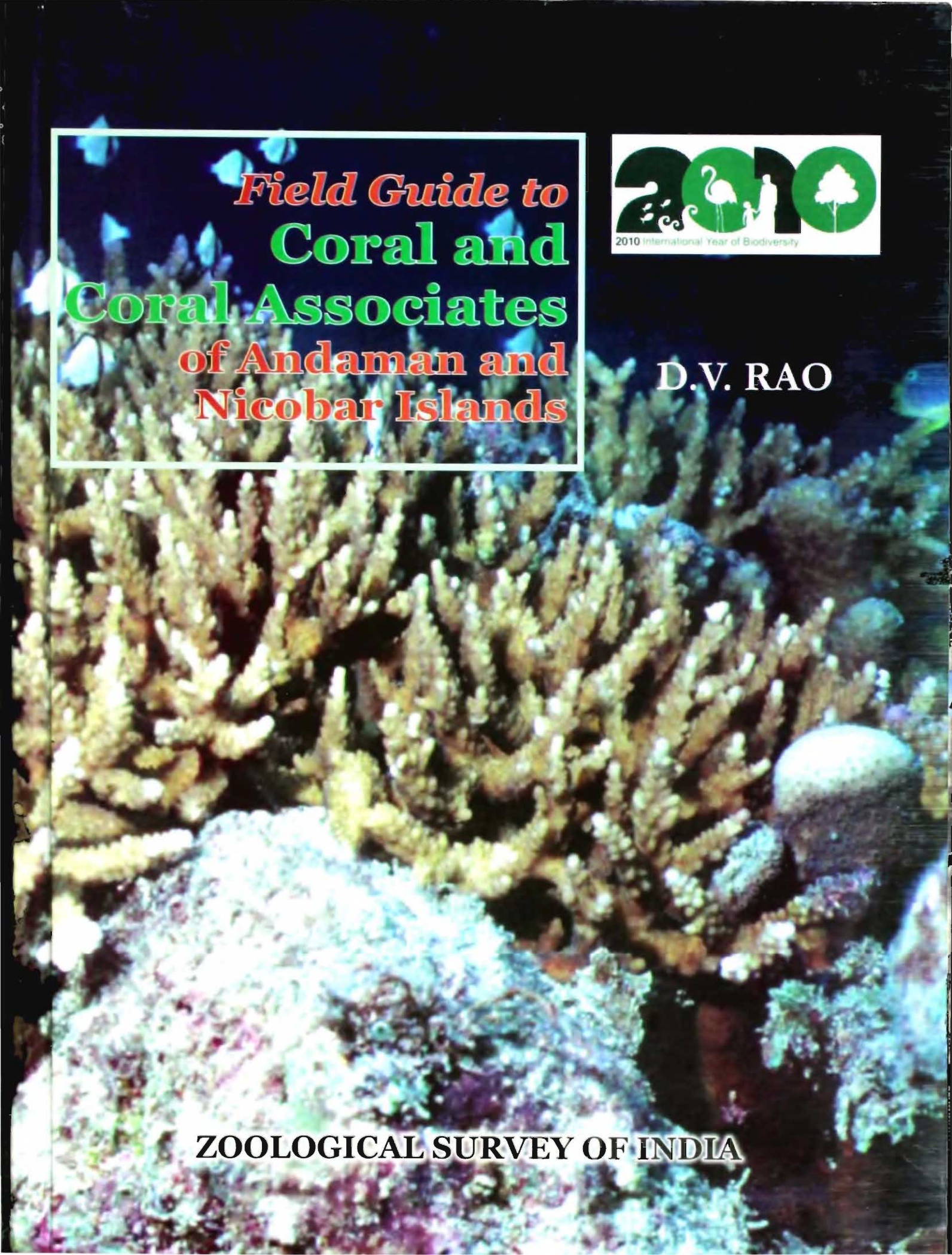
Field Guide to Coral and Coral Associates of Andaman and Nicobar Islands



D.V. RAO

ZOOLOGICAL SURVEY OF INDIA

Field Guide to
Corals and Coral Associates
of Andaman and Nicobar Islands

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FOREWORD

The coral reefs are one of the Nature's marvelous gift to human kind existing in the shallow to deep waters of tropical seas. Since centuries their beauty with their bewildering variety of associated creatures fascinated both the scientific and common man. For sheer colouration, exuberance and in huge diversity of plant and animals they support, they are second only to the rainforests. The glorious scene of a reef is the culmination of hundreds of species of corals and thousands of variety of animal species living together harmoniously and sharing the environment judiciously. Since the dawn of humanity, the biological abundance of coral reefs ha provided sustenance for coastal communities, yielding a bountiful harvest of food as well as several precious products like jewelry, medicines, building materials and recreation in addition an invaluable function as natural breakwaters, harbours and protecting the coasts from the violent ocean wave.

We are fortunate, certain pockets of the seas around Indian subcontinent *viz.* Gulf of Kachchh, Gulf of Mannar, Palk Bay, Lakshadweep and A & N Islands are bestowed with these reefs as elsewhere in the world waters. Of these, the Andaman & Nicobar Island are one of the best coral reefs sites in the world supporting hundreds of corals and large number of animal species pertaining to sponges, cnidarians, a marine worms, crustaceans, molluscs, echinoderms, fish, marine reptiles and mammals. Research on the coral reefs was initiated from 18th century in India and huge amount of information on taxonomy, biology and ecology of these reefs and their associate fauna and flora have been documented to cater to the needs of scientific community, managers, conservationists and policy makers alone will not serve the purpose of conservation and sustainable utilization of resources at best. The common man who is the ultimate stakeholder should know their ecological significance, beauty and value of the reefs and their resources in nature state.

No doubt, the scientific community, a swimmer, a snorkeler or a SCUBA diver always enjoy the beauty of the underwater reef. But a common man, a researcher, a student or a tourist who do not know the swimming, snorkeling or diving will deprive of experiencing the beauty underwater coral gardens. In this direction, the efforts made by the author to bring out a field guide on coral and coral associate fauna of A & N Islands with over 570 colour photographs to bring awareness and appreciate the underwater beauties. This has been a long felt requirement to fill the gap This guide has thrown light on formation of corals and their associate faunal groups with brief information on biology and ecology of each group and threats to reefs of A & N Islands. A list of corals and their associates is also appended at the end for the benefit of researchers and managers. I am glad that Dr. D.V. Rao could

translate the scientific jargon on corals and their associates into an easily understandable style. I hope this valuable compilation will be extremely useful to the ecologists, reef managers, policy makers, researchers, students, tourists, snorkelers, divers and local communities and motivate all of us to develop an holistic approach towards sustainable utilisation of our reefs and their resources.

Dr. Ramakrishna
Director
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November, 2009
Kolkata

PREFACE

No doubt, the coral reefs are one of the true and amazing natural resources on our earth. They are home for a variety of life forms, often comparable with tropical rainforests. Coral reefs are a complex system of myriad micro-living spaces. In addition to the macro plant and animal forms, there are millions of invisible, microscopic organisms that inhabit the micro-caves and crevices of the coral blocks. The tiny life forms called 'zooplankton' also live directly above the reef and influence it. These components act as vital link in the reef food webs. These reefs are supporting one of the richest resources of fishes in the sea, in addition to a fascinating array of large number of associate animal groups like crustaceans, cnidarians, sponges, echinoderms, molluscs, worms, aquatic mammals, reptiles, wetland birds etc. Many of the reef associates are the best indicators of biodiversity richness and health of coral reefs.

The facts such as possessing amazing colour patterns, sizes and shapes, numerical abundance, value as food and medicine have made these reef associates a favoured subject for education, research and recreation throughout the world. At global level, several international initiatives have been taken up to preserve the coral reef ecosystems. During the last two decades the reefs all over the world become victims in the hands of human beings due to ruthless and indiscriminate exploitation of corals and their associates.

As elsewhere, the archipelago of Andaman and Nicobar Islands located between Bay of Bengal and Andaman Sea are unique in supporting extensive coral reefs, reputing the Andaman Sea as a coral paradise. The reefs of these islands with over 200 species of corals are harbouring more than 1000 species of colourful fish, in addition to a large number of animal groups. According to expert workers on this region, there still exists a great number of undiscovered marine life including corals. To enjoy the beauty of these marvelous reef denizens, one should have a basic knowledge on various marine groups and their components. It is not easy to identify the corals and their associate animals unless one is an expert in the various fields. There is always a possibility of miss identification of faunal groups by common people.

Lack of any guide books on the corals and their associates of this region and over a decade of exploration of reef areas of these islands prompted the author to bring out this volume. Keeping in view of the uniqueness of the reefs of these islands, an effort has been made to expose the underwater life through this illustrated guide on "Corals and Coral Associate Fauna" It is hoped that this guide book help in understanding and appreciate the marvels of reef ecosystem by amateur naturalists, experts, researchers, swimmers, snorkelers and SCUBA divers.

It is a difficult task to present in this guide all the corals and their associate fauna that inhabit this region. Therefore, brief information on corals and coral formation, biology and ecology of associate animal groups with more than 550 colour photographs of common species which are frequently encountered are provided to convey the veracity of underwater world of reefs.

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Dedicated to the
Primitive Tribes,
Naturalists and Conservationists
of Andaman & Nicobar Islands

CONTENTS

INTRODUCTION

A living coral reef is one of the most glorious and fantastic sights on our planet. For their spectacular colour pattern and exuberance, absolute beauty of form and design, large number of plants and animals they support and great ecological complexity, they are frequently compared to the rainforests. Their beauty has fascinated generations, both scientific and laymen, since centuries. One need not to be an expert, diver or trained observer to have a glimpse of exotic life forms on a coral reef, even a first-time snorkeler will be absolutely overwhelmed by seeing these animals.

Coral reefs have existed for 450 million years, probably the oldest and constitute one of the earth's most productive and diverse ecosystems on the earth. Coral reefs cover an estimated area of 600,000 km^2 in tropical waters and thrive between latitude 30° north and south of the equator. The reefs are unique among marine communities and they are built up solely by biological activity. They are basically massive deposits of calcium carbonate that have been produced by tiny coral polyps (Phylum CNIDARIA, Class ANTHOZOA, Order SCLERACTINIA) with additions from calcareous algae and other organisms that secrete calcium carbonate. These coral reefs receive their primary energy from solar radiation, and therefore survive in areas where maximum sunlight is available. The minimum temperature is 20° centigrade, which is considered for constant coral reef growth. The other conditions essential for the development of reefs include clear and clean water, shallow depths of less than 50 m, constant salinity between 30 and 36 ppt, low sedimentation and hard substrate. The correlation of coral growth and clear water is quite evident along the most tropical shorelines and islands. Very poor growth of corals can be seen in turbid waters. For example, reef development along the coasts of India is very poor in comparison to the luxuriant growth of corals around islands of Andaman and Nicobars and Lakshadweep. The same pattern is evident elsewhere in reef areas of the world. Usually the coral growth is meager adjacent to the shores, but gradually increases towards seaward.

Even today one can witness one of the best coral reefs of the world in Andaman and Nicobar Islands. They are located between lat. 6° and 14° N and long. 91° and 94° E in the Bay of Bengal. There are about 350 islands along with a number of islets and rock out crops. The estimated coral reefs and their associated habitats are spread over an area of about 2000 sq.km in the islands (Subba Rao, 1998). The reefs are mainly fringing characterized by reef platforms which extends to about 500 m from the shore in Andaman group and over 1000 m width in Nicobar group interrupted with wide and deep surge channels. Besides fringing reefs, extensive coral banks were also reported off the west coast of Islands. The reefs of the Islands are classified into two types *viz.* recent or sub-recent reefs and modern reefs. The modern reefs comprise windward reefs, channel reefs, bay reefs, knolls and patch reefs or coral pinnacles. These reefs may rise from about 20 m depth. The sub-recent reefs, rising 2 m above the sea level mostly found along the shores of Car Nicobar. These reefs are providing shelter to a bewildering variety of plants and animals.

However, the fishes, molluscs, echinoderms, crustaceans and worms are the major groups of animals associated with the reef ecosystem. The stunning beauty of coral reefs is due to the presence of these multicoloured fascinating associates. One has to witness himself/herself the underwater dreamland on reefs to understand and appreciate the amazing creation of the nature. But it is not possible every one to have glimpse of this magnificent world of coral reefs. Hence an effort has been made by the author to bring out an illustrated field guide to corals and coral associates of A & N Islands with basic information on each group. Over 560 colour illustrations are provided to make possible identification in the field. A list of reef associate faunal groups of the Islands is also provided in Annexure at the end.

REEF FORMATION

The early corals have long been extinct, but just until the past 25 million years that modern coral forms evolved. The coral reefs what we are witnessing today have developmental history of over 5,000 years or so. In addition to the physical limits like water temperature, transparency, depth etc., the other most important factor controlling reef development is the relationship between the rate of reef growth and the rate of sea level change along with localized effects due to the subsidence or uplift of the land under the reef. Such changes are ongoing over tens of thousands of years. Sea level rose by about 120 meters or so between 15,000 and 5,000 years before the present level, leaving many reefs submerged or simply growing upward. Thus, the modern-day reefs are the result of growth over the past 5,000 years. Charles Darwin was the first to formulate a theory that is widely accepted regarding the origin and structure of coral reefs. He proposed that atolls develop due to gradual subsidence of high islands beneath the sea. The coral reefs which begin as fringing reefs around islands gradually become more and more distant from land and when the land submerges totally, what is left is an atoll, nothing but a circle of reefs enclosing a lagoon. Continental landmasses and offshore islands may support a variety of coral structures including fringing reefs, platform reefs and barrier reefs. Barrier reefs originate from fringing reefs, in a process that is similar to atoll formation and gradually separated from main land due to submergence of land mass (Veron, 1986) (Fig. 1). The reefs what we see today are the outcome of layers of coral and coralline algae growing upon the rocks and valleys of ancient times. These eroded substrate, coral growth and subsequent erosion of earlier substrata together govern the shapes of modern reefs. Fringing reefs are by far the most common type found around many islands of Indo-Pacific and Atlantic Oceans. The barrier type reefs are rare. One of the world's most spectacular barrier reef systems occurs in the northern Great Barrier Reef where the reef extended to a distance of more than 2000 kilometers.

Regardless of the reef types as determined by its original formation, the scheme of zonation is common to most reefs (Fig. 2). Most of the reefs are similar in structure and support almost similar plant and animal communities. Usually seashores are fringed with sandy beaches, mangroves and rocky intertidal areas. Sloping gently away from this shore is a shelf like reef flat with different depth and width parameters. The reef flat consists of sand, mud, rocks, algae, seagrass and corals. The water depth of the reef flat often will not be more than one meter, and

during extreme low tides large areas of the flat will be exposed. The outer edge of reef flat is the reef crest, the most productive zone, exposed to waves, currents. Below this crest is the reef slope.

The coral reef is a most complex ecosystem. The fine relationship between the individual coral animals (polyps) and the minute single-celled algae, known as zooxanthaellae belonging to a group of unicellular plants, which live symbiotically within the cells of polyps is remarkable. The zooxanthaellae utelises the sun's energy and prepare their own organic food by the process of photosynthesis. All corals do not contain these zooxanthaellae. Those do have are referred to as *hermatypic* or reef-building corals, and those do not have are called *ahermatypic*. The hermatypic corals are benefited by the presence of zooxanthaellae. More than 90% of organic carbon produced by zooxanthaellae leaks out of the algal cells becomes the food source for coral polyps. Due to photosynthetic activity of the algae, corals are able to deposit their lime stone skeletons that provide the reef's structural framework. The coral polyps as a result of stress caused by high temperature, low or high light intensity, low salinity, diseases etc., may expel these zooxanthaellae, in which case the coral turns white. This phenomenon is known as *bleaching*. The bleached corals may recover if environmental conditions are favourable immediately after the occurrence.

The beautiful living corals are actually occupy small upper part of the reef overlies a solid limestone foundation. This limestone platform is composed of the remains of past coral generations and numerous other reef-dwelling animals that have hard skeletons or shells composed of calcium carbonate. Foraminifers, molluscs, crustaceans, echinoderms, sponges, soft corals, worms and fishes also contribute to the skeletal matrix. Some plants like coralline red algae, *Halimida* etc. contributes greatly to sediment formation. Therefore, a variety of animals and plants provide basic building material for the reef formation.

LIFE ON CORAL REEFS

A thought-provoking question is that Why do coral reefs support abundant and diverse life forms than by any other habitat and topical oceans? The answer is a bit critical. The high primary productivity rate of coral ecosystems is due to their extremely efficient biological recycling capacity and high retention of nutrients. The plants are the primary food source for many of the invertebrates and fishes, thus forming a first vital link in the reef food web. Occurrence of large number of species on reefs is due to the physical complexity of a reef offering numerous microhabitats. The number of holes, crevices, rocks and dead coral blocks on reef provide shelter for a huge number of species of different animal groups. The solid substrate of reef allows many bottom living organisms like clams, sponges, tunicates, sea fans, anemones etc. to settle and grow. In addition, different animal species associate with live and dead corals. Symbiotic associations are common among the reef animals. Many animals such as molluscs, crustaceans, worms and even small fishes frequently live on outer surface or within the body cavities of sponges, echinoderms, ascidians, hard and soft corals. Many micro and macroscopic animals live in subsurface of sand or coral rubble. The other key component is plankton, an

important food source for many reef inhabitants. In fact, the diversity of faunal components on the reefs is so high that animals of more than 30 phyla are found on and around the reefs.

The life on the reef is an endless process changing as constantly as night follows day. Within a moment of dawn the nocturnal inhabitants withdraw into their hideouts. As soon as they leave the habitat, the entire area becomes desert for a while and soon become chaotic as other creatures come out and take over the charge of the habitat. Every animal, from smallest shrimp to giant grouper fish, fully takes the advantage and exploits the particular niche to which it is adapted. While grazers like many fish keep seaweed growth in check on the reef, other species feed on plankton. Sea cucumbers, gastropod molluscs, etc. move slowly across the bottom grazing on seaweeds in the shallow waters of the reef lagoons. The animals that live on sand and coral rubble of the lagoon adopt different strategy to escape from the predators. Simply they bury themselves under sand or rubble and expose only eyes while some animals hide in burrows and cover entrances with coral rubble. Some creatures display warning colourations or having camouflaged appearance that allow them to escape detection. The more complex pattern of existence such as symbiotic or mutually beneficial partnerships is most common on all reefs. Species of clown fishes live among the tentacles of sea anemones to avoid predators. The other interesting symbiotic partnership is found between labrid cleanerfish and their "clients" Many other fish also live by cleaning external parasites of larger fish, sometimes even enter into their mouths and gills for feeding parasites. The most important symbiotic relationship on the reef is between corals, clams, some sponges, and the single-celled plants called zooxanthaellae.

As the dusk falls, all the day dwellers began to retreat into the hiding places to escape. One may think that during night the entire reef is deserted and calm. In fact, the scene is as busy as it is during the day with different inhabitants. Many nocturnal fish hide during daytime emerge during night for feeding. Most of the animals change their colour as night falls and appear black or dark and nearly invisible. Many of the gastropods and nudibranchs are nocturnal. They slowly move around and graze on seaweeds, corals, sea anemones, sponges etc. The coral polyps stretch out their tentacles for feeding. The brittle stars, seaurchins move out from their crevices to feed on algae. Even some of the larger animals like turtles are also active during night. When day breaks, the nocturnal feeders retreat into their hiding places and daytime shift takes over the charge of the reef. This rhythm continues without any break on the reef.

VALUE OF CORAL REEFS

Coral reef resources are being exploited by man since time immemorial. They are important sources of food for coastal people in the tropics. There are evidences that even before 16th centaury the Southeast Asian people were used coral blocks for construction of houses. Most of the coastal people supplement fish intake by consumption of reef resources like seaturtles and their eggs, dugongs, a variety of invertebrates such as bivalves, gastropods, limpets, octopuses, squids, seacucumbers, seaurchins, lobsters, shrimps, etc. The miscellaneous food items

from the reef include edible algae, and jellyfish. The corals provide a readily available source of building materials and have long been used in house construction in many parts of the tropics. Lime is extracted for use in cement and the sand extracted from reefs used in cement mixes, road construction, etc.

Many of the reef animal products are known to have curative properties and traditional coastal communities used to depend on them for curing many ailments. People use the meat of *Tridacna* sp. (Giant clam) to treat malaria, *Trochus* meat to ease childbirth, spines of pencil seaurchin for ear problems. The concoction of seafans believed to cure tuberculosis, black coral for treating lung ailments, red organpipe coral for coughs and bronchitis. Due to rapid development of science in these days, the most important utility of coral reefs is extraction of antibiotics. The biochemical compounds and other biotoxins present in tissues of many reef organisms like sponges, slugs, seafans, softcorals, anemones, poisonous fishes etc. are used in pharmaceutical and industrial products. Many of these biochemical compounds have antifungal, antimicrobial, antispasmodic, anticancer and anticoagulant properties. The coral skeletons are being used in bone grafting. Many species of algae and other seaweeds contain rich vitamins and minerals. They also provide a source of agar and carrageenan. Apart from this, a wide range of non-food products for everyday use derives from reefs. Ornamental corals, shells, colourful reef fish support large number of small-scale industries. Manufacturing decorative pieces and jewelry become a lucrative trade all over the world. Shells have long been used for decoration and jewellery. In olden days many countries of Indian and Pacific Oceans were used cowries (*Cyprea* sp.) in their natural state as currency.

Coral reefs are valuable resources for the tourism industry. The aesthetic appeal, biological richness, clear waters and relatively easy accessibility of reefs make them popular recreation centers for tourists. Underwater photography, shell collection, SCUBA, skin diving and snorkeling, reef watching are some of the activities associated with reefs. The economy of many island nations such as Indonesia, Sri Lanka, Thailand, Maldives etc. are solely depending on the reef tourism. The entire scientific community of the world considers the coral reefs as living laboratories for biological and ecological studies. Research activities on coral reef ecosystem has increased over the past couple of decades and become inevitable for sustainable utilization of reef resources and to address new management questions.

Traditional use of reefs for food, decoration and building by small coastal communities has probably had relatively little impact on the reef ecosystem. Usually the level of exploitation by these communities is very minor in terms of quantity of any one species harvested. In fact, the people of these societies have a system of using the reefs at sustainable levels to ensure that these resources are not over-exploited and lived without damaging their environment. But now, reefs all over the world are at threat and their destruction crossed beyond recoverable stage. Due to increase of human population, the reefs are being exploited constantly for food and other purpose resulted in the severe destruction of reef habitats and its associated fauna throughout their range. The advent of sophisticated SCUBA equipment and the new laboratory techniques on reef research has put enormous pressure on the reefs. It is true that the coral reefs are disappearing at a rapid rate but reefs are extremely resistant to all types of destructive forces, both natural and

man-made, but not beyond their limits. The coral communities and reef organisms have the capacity to recolonise almost immediately within a couple of decades. The reef systems itself are self destructive through the action of coral boring and coral feeding organisms. In fact these destructive agents are vital for the continued existence of coral reefs because the remains of reef organisms are eventually formed as a solid platform for future coral growth.

The reefs, particularly fringing and barrier reefs, acts as natural backwaters, which protect coastal areas from severe wave beating and erosion. Coral reefs also contribute to the formation of vast sandy beaches and islands. These natural acts of coral reefs protect coastal villages and navigational or other structures erected along the outer edges of reefs. If these reefs were destroyed, for erection of artificial reef structures for protection of coastal areas would costs millions of dollars without any guarantee.

CORAL REEFS OF THE ISLANDS

Until recently, the sea around Andaman and Nicobar Islands with a coastline of 1962 km was considered the least explored regions in the Indian Ocean. The recent explorations carried out in this region have revealed the presence of varied and incredible fauna in its diverse habitats, reputing the islands a '**living laboratory**" of marine life. It is true that the littoral habitats with marvelous corals and diverse groups of animals are quite startling and fascinating. The rich variety of isolated habitats and fringing coral reefs favouring an evolution of a variety of species lead to the high percentage of endemism. Thus, the Andaman Sea is gifted with rich legacy of corals and their associate fauna. The integrity of these ecosystems is to be protected and conserved in the interest of mankind. But with the unchecked population growth in recent years in the islands, all the ecosystems are being disturbed and the faunal elements are recklessly killed, seriously affecting their composition, density, distribution and posing problem for their conservation (Rao and Khan, 1989)

Physiography and Hydrography

The Andaman Sea is a semi-enclosed basin connected by three main channels to the Bay of Bengal on one side and to the Pacific on the other side. The Preparis Channel, on the north, which is 285 km wide, the Ten Degree Channel, which is about 150 km wide, separating the Andaman group from the Nicobar group, while the Great Channel, south of Great Nicobar is about 189 km wide. The nature of sea bottom changes with depth. Large part of the bottom contained hard rock, a series of ridges and depressions, which include Alcock Sea Mount and Narcondum-Barren Basin (Sewell, 1925). The shallow sea bottom is dominated by coral reef, coralline sand and debris. The islands are largely volcanic in origin being set on the seismic zone and subjected to heavy gales and tropical cyclones. The climate is typically tropical with hot and humid conditions, with the atmospheric temperature varying between 25°C and 35°C during the year (Tikedar *et al.*, 1986). The currents are strong and the tides are semidiurnal with amplitude of 2.5 m. The salinity of inshore waters ranges between 29 and 33 ppt depending upon the season. The salinity range is higher on the western side of the islands than on the eastern side. The subsurface

temperature of the seawater varies from 26°C to 29°C. Temperature decreases from shallow to a depth of 500 m or more and there is a sharp decease in the bottom temperature (Sewell, 1928). The continental shelf around the islands is narrow, which is abruptly plunges down into a steep slope limiting the continental shelf to about 15,000 sq km only. The shelf area of the western coast of the islands is wider than the east coast.

The islands are under the influence of both southwest and northeast monsoons. The rainfall is heavy and prolonged for a long period exceeding 300 cm in a year mainly during southwest monsoon prevailing from May to October. The northeast monsoon is active in November-December. The February and Mach are the exceptionally dry months. During monsoon the available sunshine is limited to 3-8 hours a day and during other days it may be 8-10 hours a day. The scientific studies by many scientists revealed that Andaman Sea is oligotrophic in nature with low primary and secondary productivity. The average primary productivity was estimated to be 273 mg C/m^2/day and secondary productivity 288 mg C/m^2/day (Subba Rao, 1998). The flagellates and dinoflagellates rich in Andaman Sea are the important .primary producers. As the dinoflagellates are able to tolerate low inorganic nutrient levels, they are abundant in the oligotrophic waters of Andaman Sea. The diatoms are abundant in coastal waters where nutrient contents are naturally high. The bulk of the zooplankton constituted by the crustaceans, chaetognaths and tunicates contributes to the secondary production in the sea. The zooplankton biomass was estimated at 5.6 ml/100 m^3. The percentage of larvae of decapods, fish, echinodermata, cephalopoda, polychaeta etc. in the zooplankton is very low (Marichamy, 1983).

The winds have high velocity and blow from southwest to northeast and the strong winds blow during southwest monsoon. During other months the wind velocity is much lighter. The relative humidity varies between 76 and 82 percent. The unprotected inshore waters of the islands are often turbid due to the presence of mud and silt. The soils are usually loams or clayey loams but some islands are with coralline sand or calcareous mud soils. The coastal zones have saline soils. It is estimated that these islands are losing as high as 56-98 tonnes of soil per year and washed into the sea during the rainy season. The silting effect is comparatively less in protected bays.

The coastline of the islands is quite wavy with serpentine creeks, bays and lagoons supporting rocky, sandy and muddy beaches. Patches of sand beaches occur between rocky shores, while extensive sand and mud flats are common in sheltered areas and mangrove swamps. The sandy beaches are nesting sites for turtles and birds like terns, etc. The rocky coasts offer ideal habitats for mollucs, crustaceans and other cryptofauna. The mangroves are rich along the sheltered bays, lagoons and creeks, while coral reefs of the fringing type are common in shallow coastal waters often extending to long distances and getting partly exposed during low tide. The mangroves spread over an area of 970 km are the third largest in India. Luxuriant mangrove belts occur on the seaward fringe and on either side of creeks of many islands. Over 48 species of mangrove plants including trees, palms, shrubs and climbers are recorded from the Bay Islands (Das, 2002).

The reefs of the islands are estimated to extend over an area of 1000 sq km. More than 175 species of scleractinian corals have been so far recorded from the islands. Southeast Asia has highest number of about 400 coral species. Western Indian Ocean has over 200 species while Thailand on the east coast of Andaman Sea has 250 species. Keeping in view of the coral diversity of the adjacent areas, it is presumed that the Andaman Islands may have at least 250 species of corals, which are to be explored (Venkataraman *et al.*, 2003). The coral fauna is very diverse in the Andaman Islands compared to the other parts of Indian reefs. Many coral genera are endemic to the islands. The genera like *Seriatopora, Pleurogyra, Physogyra, Lithophyllon, Halomitra, Sandalolitha, Scaphophyllia, Pectinia* and *Echinophyllia* are recorded from these waters among the Indian Coral fauna. *Acropora* spp. and massive *Porites* spp. are the most dominant components on the reefs of the islands. The most common acroporan corals are *Acropora humilis, A. robusta, A. florida, A. prolifera, A. formosa* and *A. nobilis*. Patches of *Seriatopora* and *Picillopora* are always found along with the acroporan corals.

Most of the reefs are fringing type occur along the coastline. There are reports of existence of a chain of interrupted coral banks considered as barrier reefs stretching over a length of about 320 km along the west coast of Andaman Islands with about 80 m deep lagoon between the shore and banks (Tikader, 1986). Channel reefs known as leeward reefs are found along the sheltered shores where the wind and wave action is very minimal. Such reefs are common in Ritchie's Archipelago and South Andaman. The knolls occur in channels adjacent to fringing reefs of the islands. The reef edges are dominant by species of *Acropora, Pocillopora, Favia, Favites, Porites* etc. Growth of monospecific coral colonies is a common sight along many islands. For example the reefs of North and Middle Button Islands are dominated by extensive growth of *Acropora* corals, while Long Island, west coast of Interview Island with massive type of corals. In Andaman Islands, the reef flat extends to about 300 to 500 m from the shore with many channels formed due to erosion. On the west coast of the islands, the coral formations are extensive and thick in the protected bays. The reefs of Nicobar Islands are also fringing type. Coral patches are found about 100 m from shoreline at a depth of 1.5 m. The major coral assemblages around the islands are of massive and ramose types. The massive corals include *Porites, Favia, Favites, Platygyra, Symphyllia, Goniastrea, Diploastrea, Oulastrea* etc. The ramose types are abundant in shallow sandy areas include *Acropora, Seriatopora* and *Pocillopora*. Extensive patches of *Tubipora musica* known as organpipe coral are found around Car Nicobar and Great Nicobar islands. The foliaceous corals like *Pavona* spp., *Montipora* spp., *Echinopora* spp. etc. are not so profuse but grow extensively among foliaceous and massive forms. Many species of solitary and colonial fungids are common and found on all types of reef habitats. Extensive patches of Alcyonarians, Gorgonians and non-scleractenian corals like *Heliopora* and *Millipora* occur among the massive coral colonies.

Faunal composition of reefs

The marine ecosystem of the islands is supporting large number of species. Over 5000 species of various organisms comprising meiofauna, sponges, corals, other cnidarians, worms, crustaceans, molluscs, echinoderms, pisces, reptiles and mammals so far documented from the island waters (Table 1). The reefs formed by

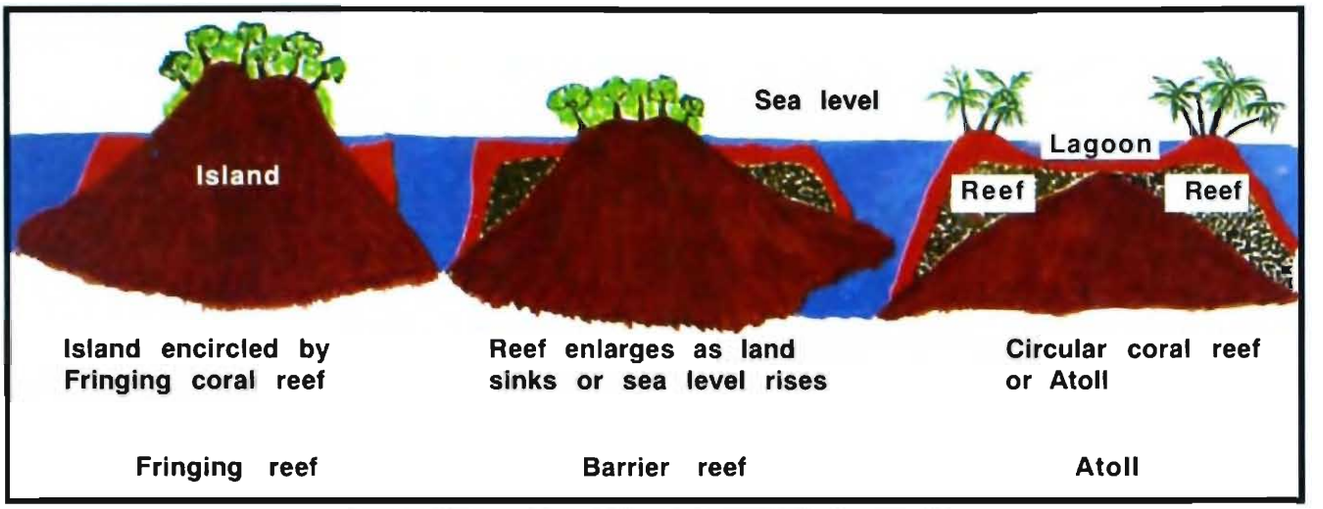

Fig. 1. Types of coral reefs and their evolution

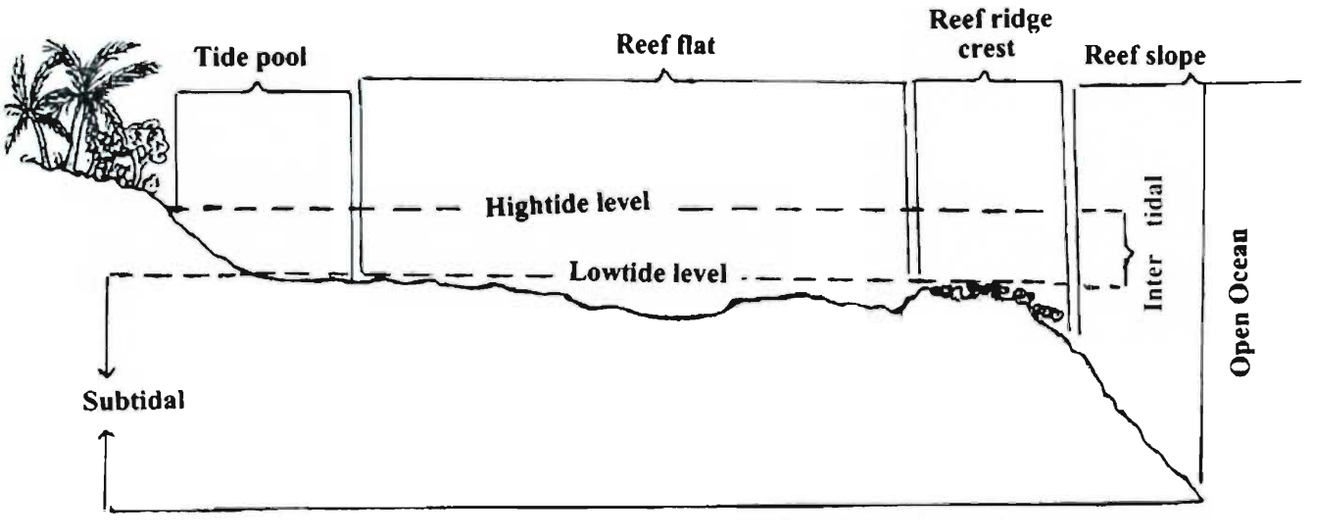

Fig. 2. Zonation of a typical Fringing reef (after A.T. White, 1987)

Fig. 3. The New Millennium sun rays on the emerald blue Island waters

Fig. 4. Aerial view of reef around islands

Fig. 5. A view of Island projected from mid-sea

Fig. 6. A view of Landfall Island from East Island

Fig. 7. A view of shallow reef around Island

Fig. 8. Aerial view of Cinque Islands, South Andaman

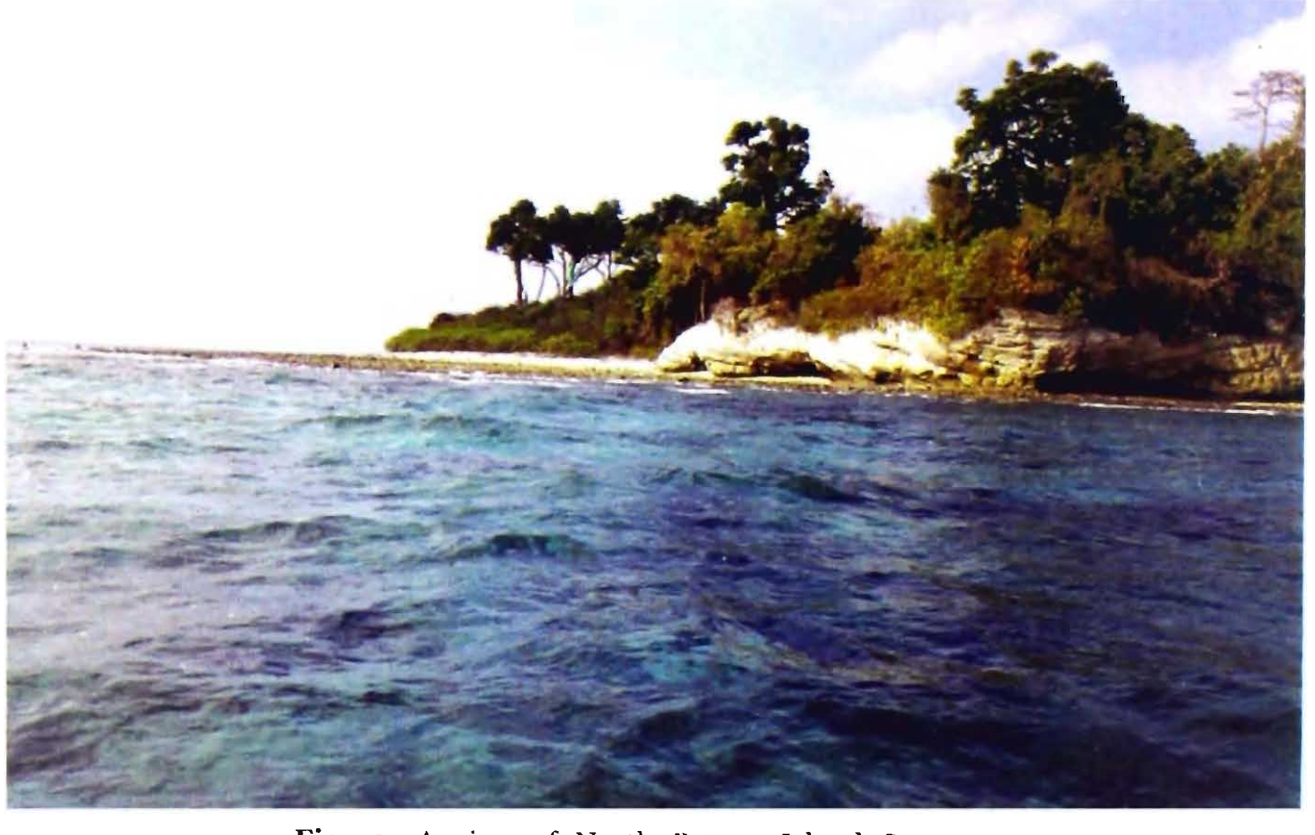

Fig. 9. A view of North Button Island Sanctuary

Fig. 10. Rocky coast of Inglish Island

Fig. 11. View of West coast of Interview Island

Fig.12. Panoramic aerial view of Little Andaman

Fig. 13. Southern most point of Island chain, Indira Point (Great Nicobar)

Fig. 14. A view of Chowra Island (Nicobar Group)

Fig. 15. Teressa Island (Nicobar Group)

Fig. 16. A shallow reef exposed during low tide

Fig. 17. Intertidal reef flat with luxuriant corals at North Reef Island

Fig. 18. Intertidal reef flat at South Reef Island

Fig. 19. Reef flat at Havelock Island

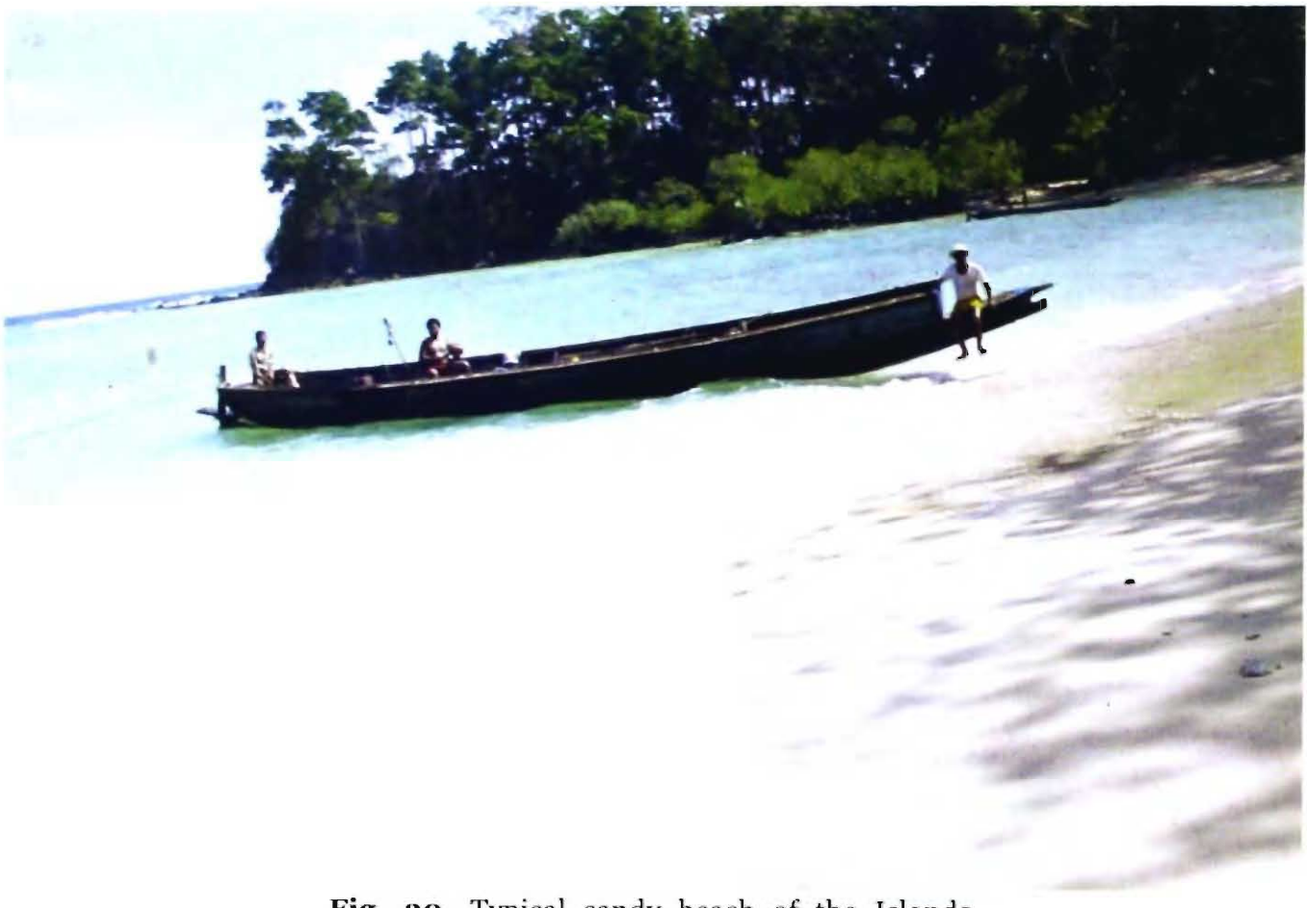

Fig. 20. Typical sandy beach of the Islands

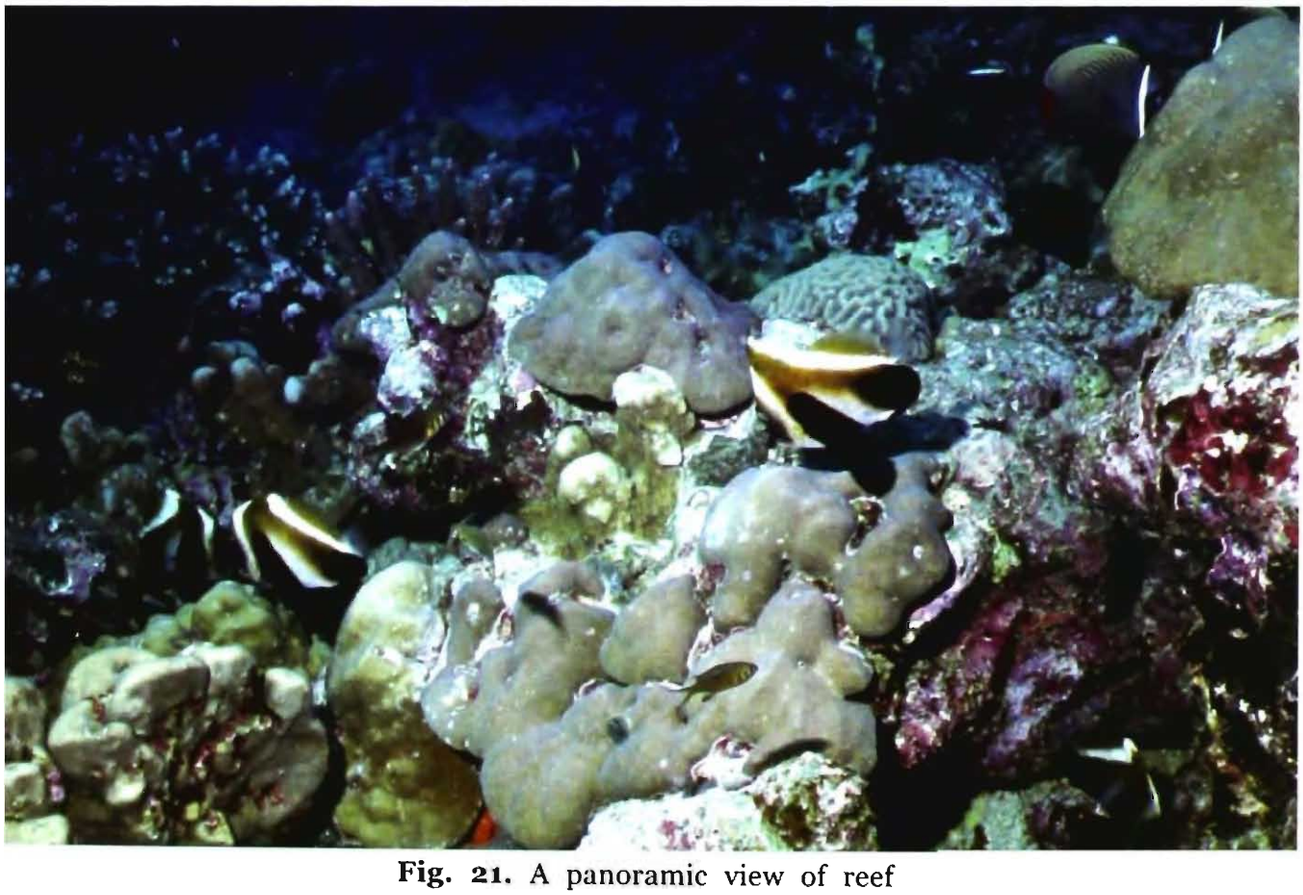

Fig. 21. A panoramic view of reef

Fig. 22. A reef slope with corals

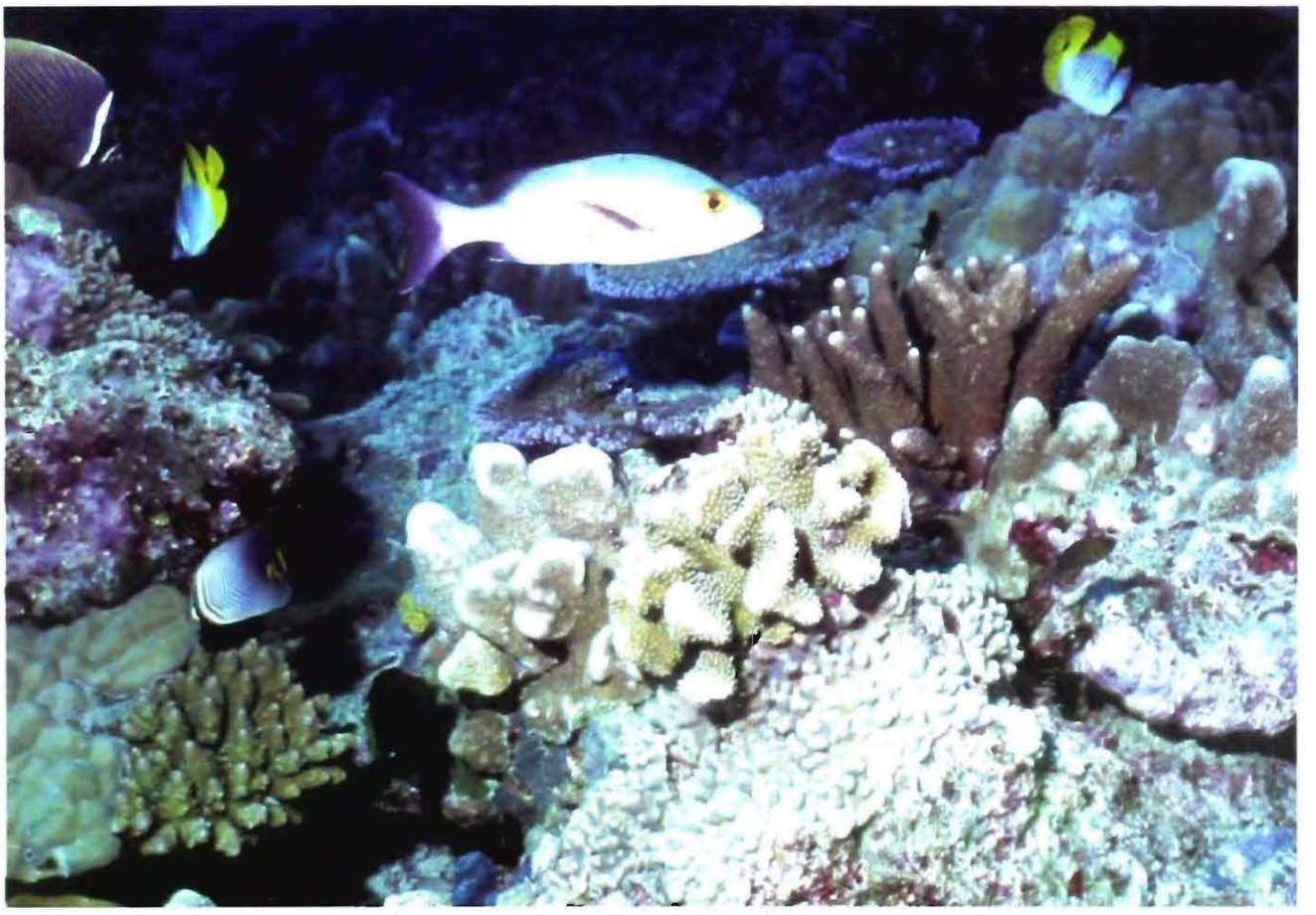

Fig. 23. A view of reef with associates

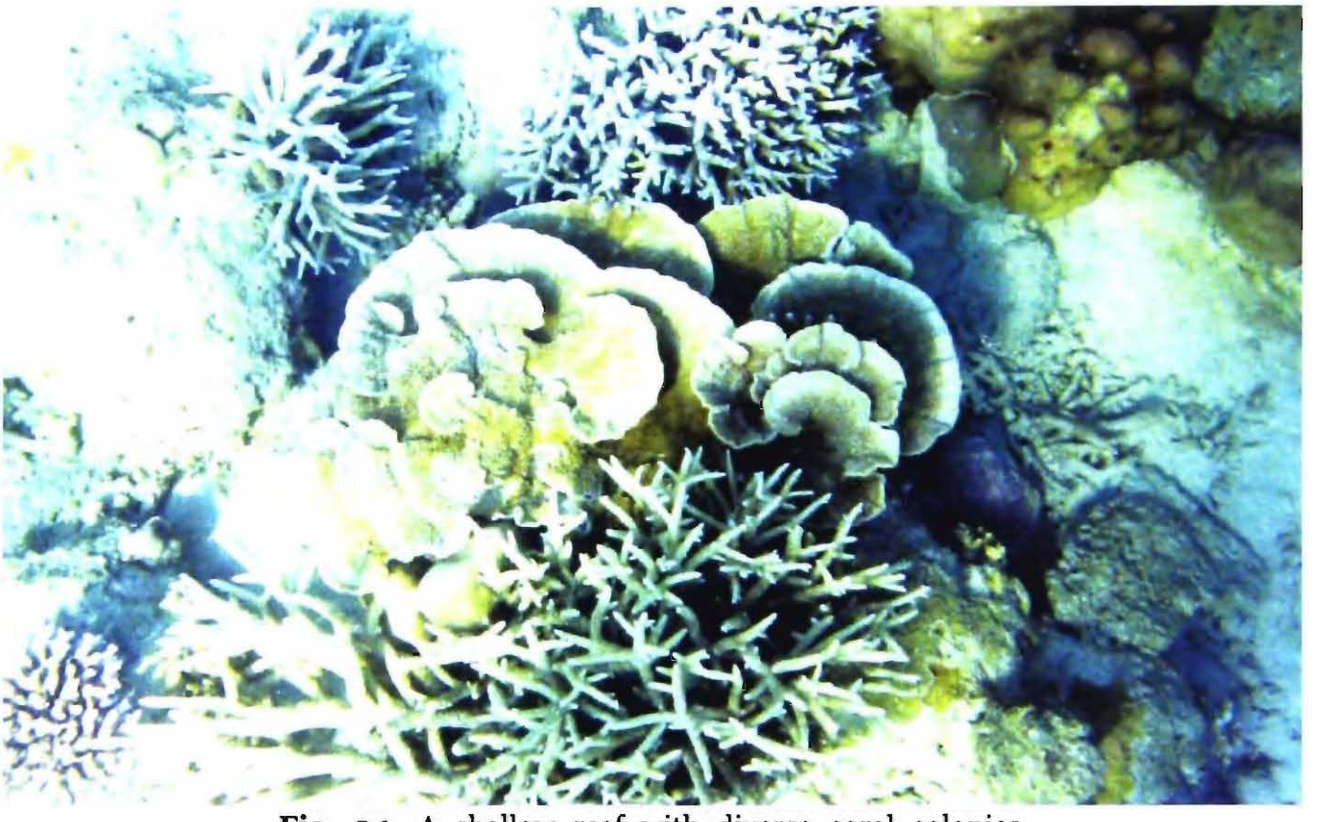

Fig. 24. A shallow reef with diverse coral colonies

Fig. 25. Underwater studies

Fig. 26. Underwater videography studies by the author

the scleractinian corals harbour a rich variety and colourful plant and animals comprising of almost all the animal phyla.The important plant communities include corallian red algae, *Lithothamnion* which help in binding of the detritus and green algae *Halimeda* which contributes to sedimentation. Species of *Ulva*, *Laurencia*, *Sargassum*, *Turbinaria*, *Padina*, *Gracilaria*, *Caulerpa*, *Amphiora*, *Hormophysa*, *Galaxuara* and seagrasses of *Cymodocea*, *Enhalus*, *Halodule*, *Halophila*, *Syringodium* and *Thalassia* are the primary producers of the reef ecosystem. In addition to the reef building corals, the hydrozoans corals such as *Millipora*, *Tubipora* and *Heliopora* also form calcareous skeletons and help in the process of reef building. The soft corals, gorgonians and pennatulids, which possess spicules in their fleshy bodies, contribute to the accumulation of detritus on the reefs. The macrobenthic faunal elements consist of the sponges, hydrozoans, anthozoans, polychaetes, sipunculans, nemertians, mysids, euphasiids, isopods, amphipods, stomatopods shrimps, lobsters, crabs, gastropods, bivalves, nudibranchs, asteroids, ophiuroids, echinoids, holothuroids, crinoids and colourful fishes, and whereas the meiobenthos is represented by Foraminifera, Turbellaria, Gastrotricha, Kinorhyncha, Nematoda, Oligochaeta, Polychaeta, Ostracoda, Copepoda and larval forms of invertebrates. The Nematoda and Copepoda constitute bulk of the meiobenthos.

The sea anemones have interesting symbiotic relationships with clownfishes. Many animals like shrimps lobsters, crabs, fishes live in crevices or between branches of corals and sponges. The cleaner shrimps and predatory crabs maintain the hygiene of the reef ecosystem. Molluscs are the most dominant group on the reefs. Species of *Tridacna*, *Turbo*, *Trochus*, *Lambis*, *Cyprea*, *Drupa*, *Conus*, *Xancus*, *Cassis*, *Murex*, *Nautilus* and oysters, slugs, cephalopods are abundant and found commonly in the reef areas. The Triton's Trumpet, *Charonia tritonis*, which feed on Crown of Thorns Starfish, is an endangered mollusc and becomes rare in the islands. Echinoderms are the other major invertebrate group inhabits the coral reefs. The species of *Linckia*, *Acanthaster* and *Culcita* are the predators of live coral polyps. More than 40 species of sea cucumbers are live in association with reefs (Sastry, 2002). Few species like *Holothuria*, *Actinopyga*, etc. are commercially important. Brittle stars *Ophiolepis*, *Ophiocoma*, etc. inhabit crevices, under coral boulders, sand-rubble while some are epizoaic on seafans. The sea urchins like *Diadema*, *Echinothryx*, *Stomopneustes*, *Tripneustes*, etc. are the chief herbivores of coral reefs. They keep check on the excess growth and maintain the balance in the ecosystem. After invertebrates the fish is one of the major and important constituents of the reef fauna. More than 1300 species of marine fish have been recorded. Of which over 700 species live in and around reef environment, some of which are ornamental in nature (Rao, 2004). The most colourful and spectacular reef fishes include butterflyfishes, angelfishes, pomacentrids, parrotfishes, labrids, filefishes, puffers, balisteds, scorpionfishes, pipefishes seahorses and damsels etc.

In addition to macrofaunal assemblages, below the sand surface lies a hidden world of rich variety of animal life known as meiofauna which can pass through a sieve with a pore size of 0.5 mm, and retained by a sieve with a pore size of 65 microns. Almost all the free-living invertebrate groups from the single-celled Protozoa to multi-celled Protochordates are represented in this habitat. These live in the capillary system of minute spaces between sand grains. For this reason, these

animals are also known as interstitial fauna.The meiofauna plays an important role in the food chain of the coastal ecosystem by forming food for larger beach animals. In some productive areas, the meiofauna are known to occur in great densities even exceeding the secondary production (zooplankton) of the seas. Many meiofaunal elements are quite sensitive to ecological stress. The harmful effects of pollution in the habitat are indicated by the disappearance of sensitive species and increase in the population density of few tolerant species. Therefore the comparative study of meiofauna of the different habitats helps to assess the degree of pollution of the ecosystem. Very little is known about the reef meiofauna of the islands. The literature studies revealed the presence of all groups of fauna characteristic of the littoral habitats. The worms and crustaceans constituted the major groups. The free living meiofaunal groups recorded in and around coral reefs of these islands are ciliates, foraminiferans, platyhelminths, gastrotrichs, kinorhynchs, archiannelids, polychaetes, oligochaetes, ostracods, copepods, isopods, amphipods, arachnids, tartigrads, gastropods and echinoderms. Many of the species occur in mud, sand and algae of the littoral region are also common to the reef ecosystem. A variety of meiofauna also reported on the surface and subsurface of stony corals as creeping, burrowing and clinging forms belonging to the groups Ciliata, Turbellaria, Gastrotricha, Rotifera, Polychaeta, Copepoda etc. The diversity of meiofauna in this region proved quite rich due to the lager landmasses, long geological history and variety of habitats followed by a lower degree of pollution in the habitats (Rao, 1975).

Table 1. Marine Faunal Diversity of Andaman & Nicobar Islands.

Faunal Group	**No. of Species**
Meiofauna	486
Porifera	72
Hexacorals (Hard corals)	177
Octocorals	221
Other Cnidarians	44
Polychaeta	184
Sipuncula	29
Mollusca	1282
Crustacea	1029
Pycnogonida	8
Echinodermata	425
Pisces (Fishes)	1368
Retpilia	12
Mammals	7
Total	**5344**

REEF ASSOCIATES

REEF FLORA
(Source of Reef's Energy)

Even on the reefs, the plants are primary producers convert sunlight and nutrients into energy rich organic compounds. This energy passed on to many microorganisms and other small animals such as crustaceans, molluscs, echinoderms, fish etc. In the second stage, larger predators inturn consume these animals. Thus the energy cycle is linked on the reefs. Therefore, plants are the basic components of a food web that involves all types of organisms living on the reef. Seaweeds and seagrasses are the two major types of plants found on the reefs in addition to algal components.

The seagrasses are marine angiosperms believed to have originated from terrestrial grasses are adapted to marine environment. Except polar region, seagrasses occurring in the shallow waters of every coast and sea and amongst coral reefs as patches or as vast meadows adjacent to sand-silt areas. They play a significant role in the ecosystem as they have biological, physical and chemical effects on habitats include prevention of erosion, trapping and binding of sediments and organic matter. The sea grasses also acts as feeding, breeding and nursery grounds for a wide range of invertebrates such as crustaceans, molluscs, echinoderms and vertebrates like fishes, turtles and marine mammals. The shallow waters of sand-silt reef areas are usually dominated by the seagrass meadows of *Enhalus acoroides*, *Thalassia hemprichii* and *Cymodocera rotundata*. Of the 14 species of sea grasses known from the Indian coasts, about nine species such as *Enhalus acoroides, Halophila ovalis, H. ovata, Thalassia hemprichii, Cymodocea rotundata, C. serrulata, Syringodium isoetifolium, Halodule pinifolia,* and *H. uninervis* are recorded from the Andaman and Nicobar Islands (Das, 1996).

Based on the colouration, the macroscopic algae can be broadly classified into three categories *viz.* greenalgae (Chlorophyceae), brownalgae (Phaeophyceae), and redalgae (Rhodophyceae) are commonly known as seaweeds. They occur in shallow to deep waters and are most abundant floral elements on all reefs and rocky shores. The blue-green algae found on rocks in slimy form where water splashes along rocky shores. The red, brown and green forms are variable in shape and sizes. Some are branching, bushy, leaf-like or beads-like. Some grow as sponge-like encrustations on coral rocks. The red or pink calcareous algae known as coralline algae (*Amphiroa*, *Galaxaura*) impregnated with calcium carbonate spread on rocks and coral blocks of the intertidal or shallow reef areas. *Padina, Dictyota*, *Sargassum* and *Turbinaria* are the common and wide spread brown algae on the reef habitats, found often large quantities washed to the shores by waves. The green algal forms such as species of *Halimida, Ulva, Chaetomorpha, etc.* are frequently encountered on reefs (Gopinathan and Panigrahi, 1983).

The seagrass meadows and seaweeds support diverse faunal assemblages. Many faunal components live in and around coral reefs like shrimps, seaurchins, seacucumbers, brittlestars, seastars, molluscs like oysters, gastropods,

nudibranchs, polychaetes, fish, seaturtles, seamammals *etc.* visit weedy areas for the purpose of shelter and food. The dense vegetation, which reduces the speed of water movement and increases the oxygen concentration in the habitat, supports high densities of different animal assemblages. Many juvenile and young crustaceans and fishes primarily take shelter in the weedy areas. Only a few animal species feed on seagrass and weeds. Some crustaceans are herbivorous and feed on algae attached to the rocks and aquatic flora. The important grazers are seaurchins like *Echinometra mathaei*, *Echinothrix calamaris*, *Diadema setosum*, *Tripneustes gratilla* feed on algae and rotten vegetation. Seacucumbers like species of *Holothuria*, *Actinopyga*, *Synapta*, *Bohadischia* also feed on decomposed vegetation. The brittlestars like species of *Ophioplocus*, *Ophiarthrum,* seastars like *Asterina, Patiriella, Luidia, Astropecten* frequently found in seagrass and weedbeds. The parrotfishes, surgeon fishes, shrimps found in seagrass and weed habitats feed only algal epiphytes of the vegetation. The seaturtles and marine mammals (Dugongs) are the main vertebrate grazers of seagrasses.

Fig. 27. Extensive patches of *Sargassum* sp weeds in intertidal reef area.

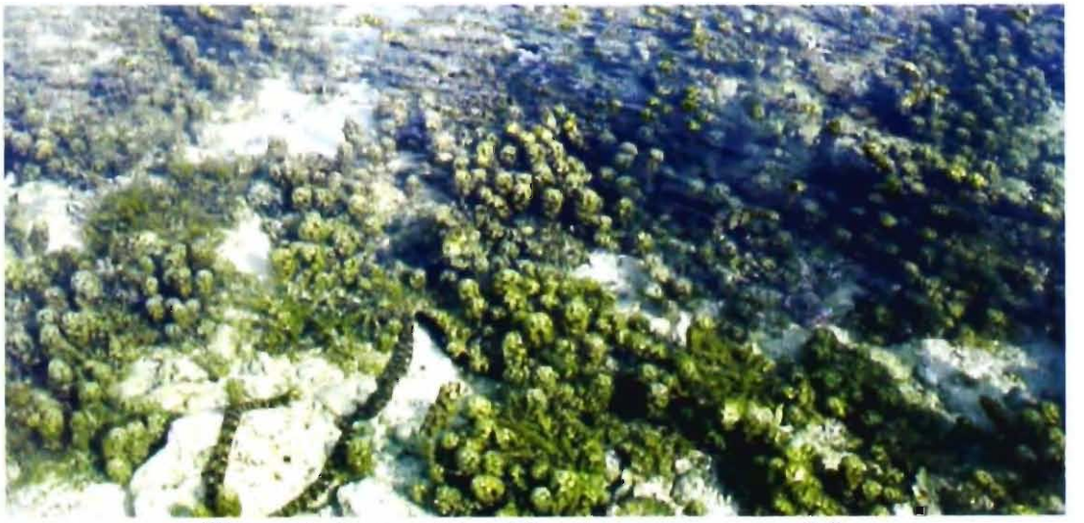

Fig. 28. Mats of *Turbinaria ornata* on reef flat

Fig. 29. Common shallow redalgae, *Gracilaria millardtii*

Fig. 30. Prolific growth of algae on dead corals

Fig. 31. *Gracilaria crassa* on a rocky reef

Fig. 32. Common sea weed, *Turbinaria ornata*

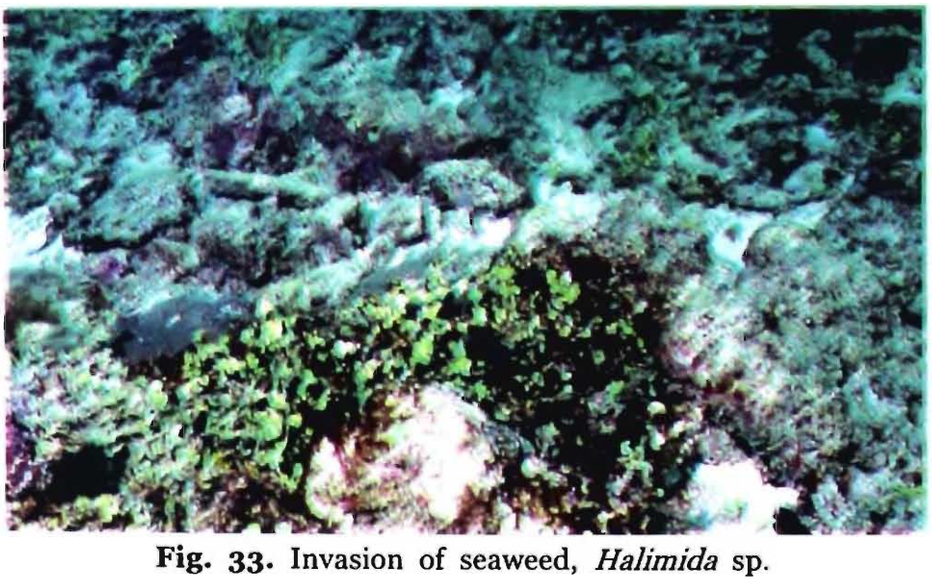

Fig. 33. Invasion of seaweed, *Halimida* sp.

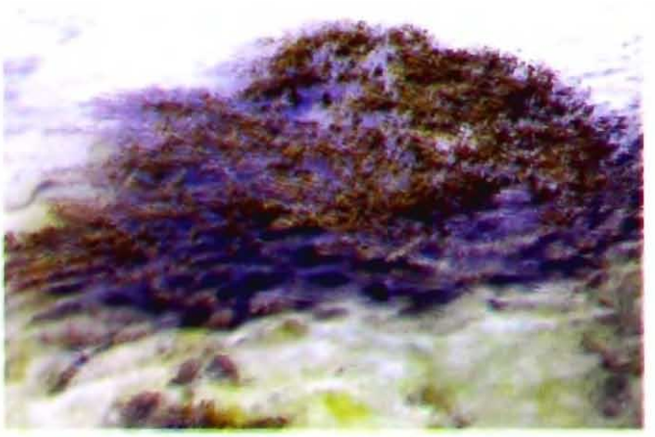

Fig. 34. Shallow water seaweed, *Sargassum whitii*

Fig. 35. Extensive patches of *Gracilaria* sp.

Fig. 37. Seagrass, *Thalassia hemprichii*

Fig. 36. Seagrass, *Cymodocea* sp.

Fig. 38. Seagrass, *Enhalus acoroides*

Fig. 39. Seaweed, *Halimida* sp.

REEF FAUNA

SPONGES
(Silent Spectators)

Sponges are very simple, sessile multi-cellular aquatic organisms, mostly marine and largely inhabitants of hard substrata like rocks, shells, submerged timbers, corals etc. in shallow waters. They vary greatly in size from a small grain to a large earthen pot. Some are radially symmetrical, but the majority is irregular and show massive, encrusting, erect or branching growth patterns. The growth form of a sponge is an adaptive response to the availability of space, type of substrate and the velocity of water current. A particular species may assume different appearances under different environmental conditions. Most of the species are brightly coloured with yellow, brown, red, blue and purple. Sponge structure is unique in having a system of water canals. The surface of the body is perforated with many small pores, from which the name Porifera (pore-bearers) is derived. The outer layer of body is composed of cortex, and an inner layer with numerous glass-like needles made of silica or calcium carbonate known as spicules. The pores of outer layer of the body are known as ostia. These join a network of internal canal system, through which water circulates. The water enters through these ostia and exit through osculum, a large opening on the external surface of the sponge. Sponges are very efficient filter feeders. A big ball sized sponge can filters several thousand liters of water each day. They will be able to filter smallest organisms like bacteria and microalgae, a major source of nutrition. Cells of blue greenalgae found in tissues of some sponges inhabit coral reefs. This symbiotic relation is similar to that found in tissues of other organisms like corals, molluscs, etc. and derives nutrients from the activities of bluegreen algae.

Sponges belong to phylum Porifera and almost all living sponges belonging to suborder Demospngiae, characteristically have spicules composed of silica. It is difficult to identify sponges based on photographs and one should be specialized in taxonomic studies. The identification will be based on the shape and size of spicules present in the tissues. The spicules are of needle-like rods with pointed, knobbed, or hooked ends, some with star like clusters, some are triradiate, tetraradiate or hexaradiate. Sponges of the suborder Calcarea possess calcium carbonate spiclues. These sponges are usually small tubular forms found on the under side of coral blocks and rocks of shallow reef areas. More than 10,000 species of sponges have been recorded from the world waters. Of which, only 150 species or so are of freshwater, the rest are marine forms.

Sponges also host many varieties of commensal animals like crabs, worms, shrimps, sea cucumbers, brittle stars, feather stars and small fish. Large barrel or pot-like and fan-like sponges live in association with hundreds of small synaptid sea cucumbers, *Chondrocloea striata,* is a common site on reefs. These sea cucumbers feed on the organic matter accumulates on the surface of sponge. The other commensal organisms like fish and feather stars feed on plankton from the currents passing through the pores. Large number of reef fishes like *Zanclus cornutus*, *Heniochus acuminatus*, *Abalistes stellaris*, *Odonus niger*, *Pomacanthus annularis*, *Pterois russelli*, *Lutjanus sebae*, species of *Chaetodon etc.* are found hovering over or moving in between the columns of the large sized sponges.

Sponges and reef corals interact in many ways. Boring sponges of the family Clionidae bore live and dead coral blocks and inhabit cavities. The activities of boring sponges do not harm the living coral polyps nor do the sponges get any nourishment from the polyps. But, sometimes the point of attachment of coral to the substrate is eroded, causing the coral to break off. Over 75 species of sponges have been recorded from Andaman and Nicobar Islands (Pattanayak and Manna, 2001). Large numbers of sponge species are found on or under rocks, live and dead coral patches of the reefs from shallow intertidal to deep waters. Species of *Callospongia* and *Poterion* belonging to class Demospongia grows like large pots on the reefs of many Islands. *Phyllospongia calciformes* is a common cup like sponge grows commonly in littoral waters.

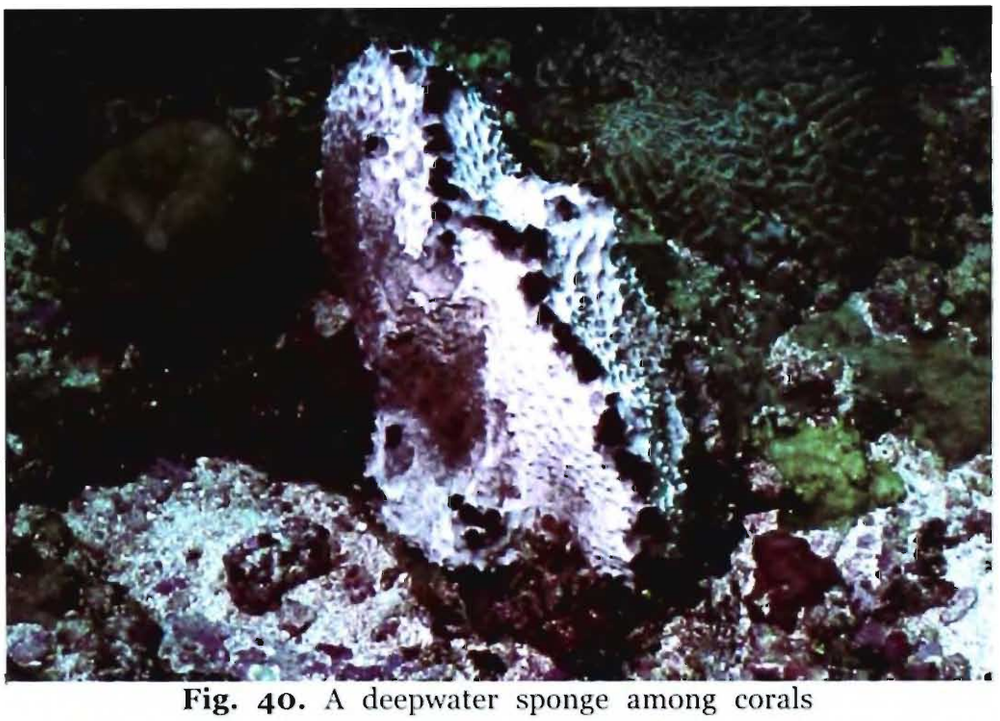

Fig. 40. A deepwater sponge among corals

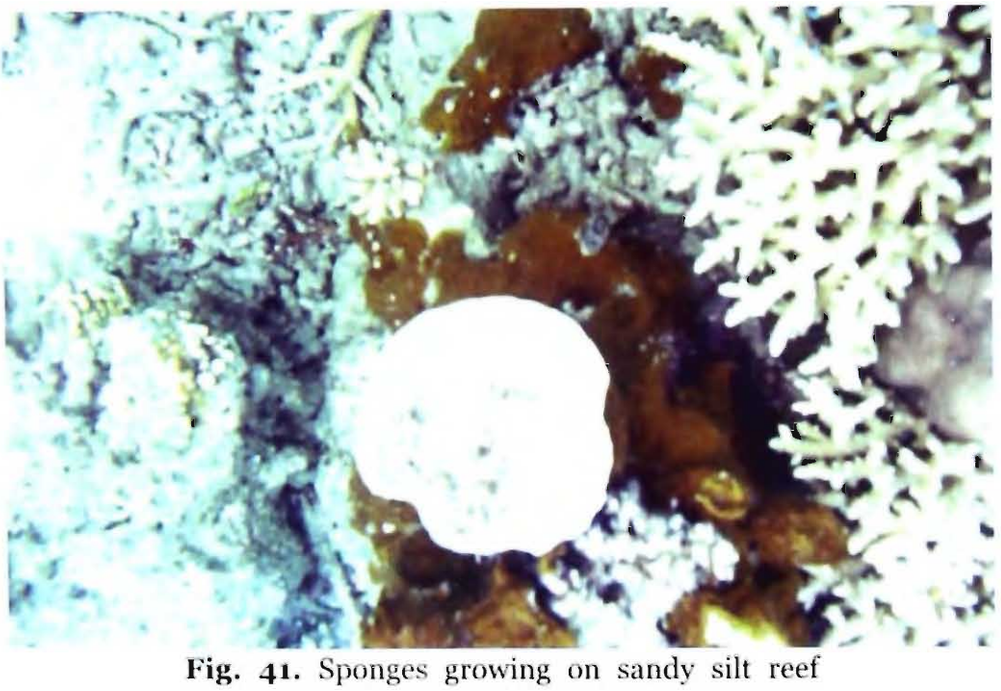

Fig. 41. Sponges growing on sandy silt reef

Fig. 42. An encrusted sponge on dead coral colony

Fig. 43. Shallow water sponge, *Xestospongia* sp.

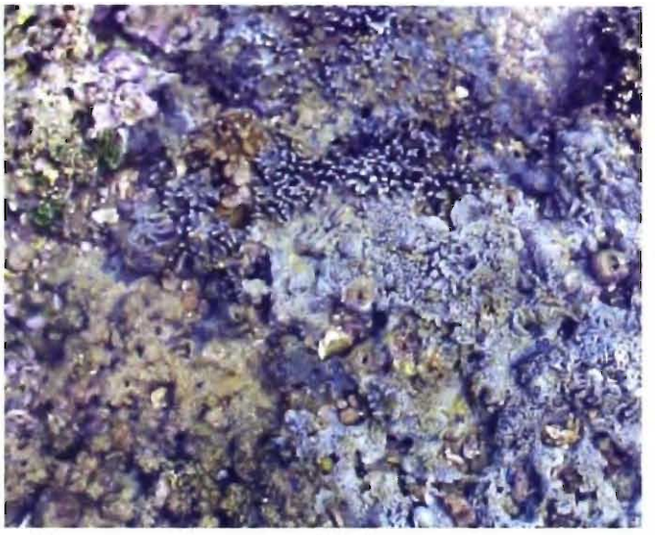

Fig. 44. Encusted shallow water sponge *Haliclona* sp.

Fig. 45. Extensive growth of sponge

Fig. 46. Cup-like sponge, *Phyllospongia foliascens*

Fig. 47. A sponge, *Halicona* sp. on coral rubble

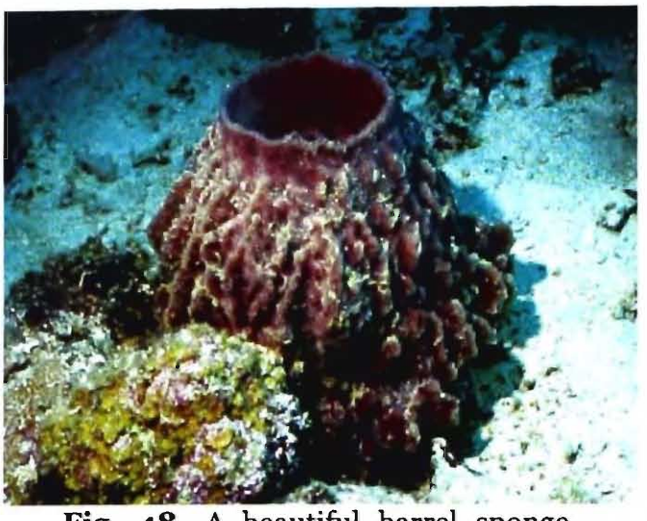

Fig. 48. A beautiful barrel sponge, *Xestospongia testudinaria*

Fig. 49. Bright yellow sponge, *Stylotella* sp.

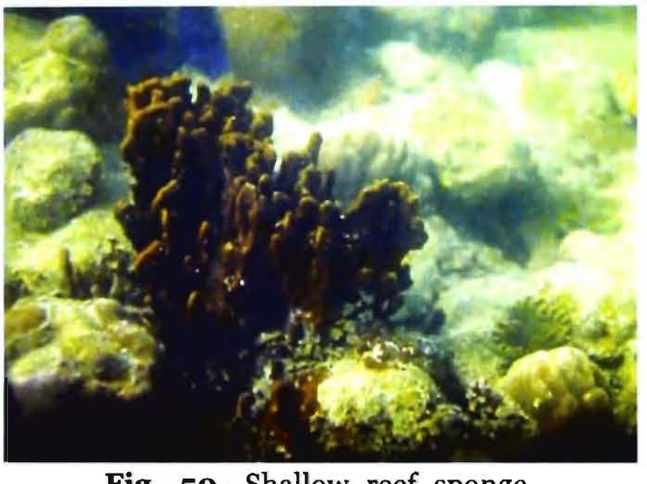

Fig. 50. Shallow reef sponge, *Spirastrella inconstans*

Fig. 51. Cluster of Cupsponge, *Phyllospongia lamellose*

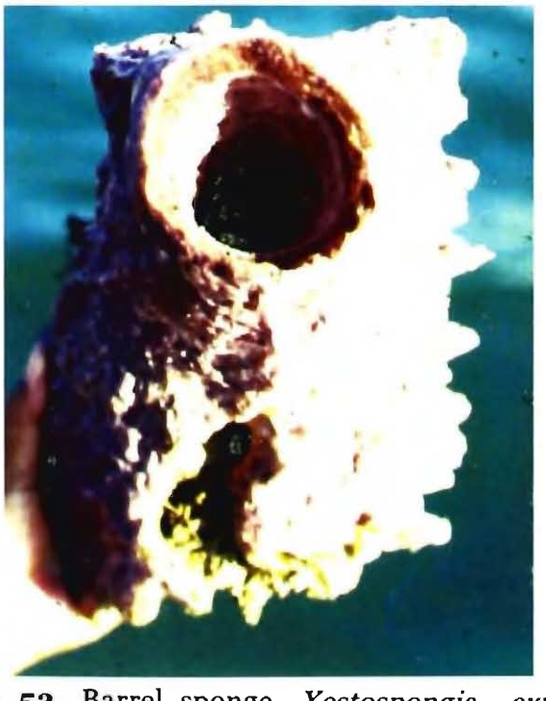

Fig. 52. Barrel sponge, *Xestospongia exigua*

CNIDARIANS
(Stingers)

The phylum Cnidaria (=Coelenterata) exceptionally a diverse group includes hydroids, jellyfish, sea anemones, diverse forms of hard and soft corals, sea fans, and sea whips. The brilliant colouration of many species, combined with a radial symmetry, often creates a beauty that is surpassed by other animals. Body is soft, radially symmetrical with tentacles encircling the mouth at one end. The mouth is only opening into the gut cavity. They exhibit two different body forms, the medusa, with mouth and tentacles directed downwards, which is adaptive for a pelagic life and the polyp form is tube-like or cylindrical, with mouth and tentacles directed upwards or laterally, which is adaptive for sedentary benthic life. The body of a medusoid form resembles an umbrella, with a convex side upward, and the mouth located in the center of the concave undersurface and the tentacles hang down from margin of the bell. These cnidarians live either solitary (jellyfish, sea anemones) or colonial (corals). They are primitive and lack of organ systems. The body wall consists of an outer epidermis, an inner gastrodermis, and in between mesoglea which is a cellular or acellular. Most feed on zooplankton, but some on larger animals and few are suspension feeders. Prey is caught with tentacles. Digestion is initially extracellular, then intracellular. The tentacles possess specialized stinging cells, the nematocysts, which are unique to the phylum. These sting cells are microscopic, spring-like darts that are extremely sensitive to pressure. With a slight touch, thousands of these cells may be discharged stings and bores its way into the tissues of either prey or an unwary bather and injects a toxic protein having a paralyzing property. Nematocysts of some forms like Portuguese Man-of-War and some other jellyfish species produce highly toxic substances and cause very painful burning sensation and irritation or even death of humans. A ciliated free-swimming larval stage known as a planula occurs in the life cycle of most cnidarians. Almost all the cnidarians are marine except few are freshwater. They are inhabitants of shallow water; found in large numbers on rocky coasts or on reefs in tropical waters. Over 9000 species belongs to three classes *viz.* Hydrozoa, Scyphozoa and Anthozoa are recognised.

HYDROZOANS
(Reef pests)

Hydroids are the most common form of hydrozoans found on every coral reef spread like pests. They are the most primitive of the three classes of Cnidaria. People are largely unaware of their existence because of their small size and inconspicuous nature. They live attached to pillars, rocks, shells, corals and wharf pilings. Some are solitary but majority are colonial. Each colony looks like a feather with many side branches studded with minute polyps. The growth form may be either arborescent or pinnate. Some polyps of the colony perform feeding function and armed with nematocysts. Other polyps function as reproductive organs. *Physalia* (Portugues-Man-of-war), *Velella*, *Porpita* are some of the common colonial floating forms occasionally encounter at the surface of the coral reefs. They do not secrete any skeletal systems except the forms belong to order Hydrocorallina. They assume a wide variety of growth forms similar to scleractinian corals like branching colonies, encrusting or vertical plates. These hydrozoans secrete a hard calcium carbonate skeleton are known as hydrocorals. Skeleton covered by a thin epidermal

layer as seen in stinging or fire corals (*Millepora* sp.). In some, a thick layer of tissues overlying delicately branched skeleton as in lacecorals, *Stylaster* sp. that are frequently found under ledges and roofs of reef caves. Hydroids usually reproduce by sexual means. In some small medusae develop on the branches, later break off from the parent and become free-swimming individual. They produce either eggs or sperm into the waters and after fertilization the eggs hatch into free-swimming planula larvae which attach to the hard surface and grow into a new colony.

Fig. 53. Feather-like Hydrozoan coral colony

Fig. 54. Massive colony of stinging coral *Millepora* sp.

Fig. 55. Colony of *Millepora* sp. among hard coral colonies

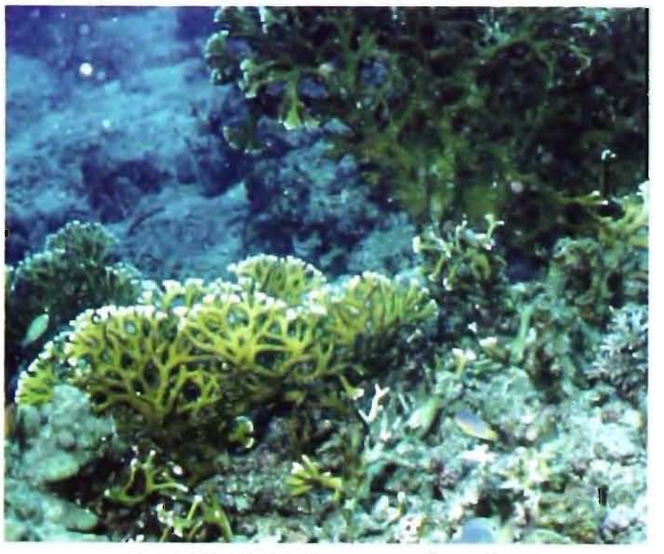

Fig. 56. Stinging coral colony, *Millepora* sp.

SCYPHOZOANS (Jellyfishes)
(Floating Umbrellas)

Jellyfishes belongs to the Class Scyphozoa of the Phylum Cnidaria. They have few similarities with corals and anemones such as basic body plan and presence of same larval stage known as a planula. Basically the medusa and the polyp are very similar in their structure, consisting of a soft body with tentacles around the central mouth. In the medusa the mouth and the tentacles are usually directed downward, but in polyps they are typically directed upwards or laterally. The medusoid form is the dominant and eye-catching individual. All are pelagic and live in all seas from arctic to tropical. Over 200 species of jellyfishes have been described so far. Although many are deep sea, but the majority of them are inhabitants of coastal waters. Most of the medusae are umbrella or bell shaped. The bell varies in shape from a shallow saucer to a deep helmet with lobed margins. Four or eight frilly oral arms are drawn out from underside of the umbrella. These arms help in capture and ingestion of prey. Many forms bear a fringe of small tentacles around the rim of umbrella but in some they grows to a length of over a meter. The body of jellyfish is colourless or slightly tinted and jelly-like, but the gonads and other internal parts may be deep orange, pink or some other colours visible through the bell. Most jellyfish move horizontally by currents or waves, but some swim fast horizontally with aboral end forward by creating pulsations. Jellyfish feed on a variety of small animals like crustaceans, fish, etc. but some are suspension feeders, filter plankton from water passing through the tentacular fringe. Many larval and juvenile fish swim among the tentacles for protection and to avoid predators. The tentacle of medusae does not sting the fish. Many jellyfishes are harmless, but few species are extremely dangerous capable of inflicting painful stings and few may cause death. Sometimes the lesions caused by the tentacles may be severe. The jellyfishes of tropical waters are more dangerous than their counter parts of temperate waters. Sea wasps or Box jellyfish (*Chironex flecken*) of Indian Ocean is notorious and said to have caused many deaths. These are, however, not common along the shores of these islands. Better, one should avoid contact with the jellyfishes while swimming or snorkeling.

Fig. 57. Oral view of a jellyfish

Fig. 58. Common jellyfish of the reefs

ANTHOZOANS
(Anemones and Corals)

The anthozoans are either solitary or colonial forms; the medusoid stage is completely absent. Sea anemones, corals, sea fans, soft corals, and sea pens are the members of this class are the largest of the cnidarian classes representing over 6500 species. Majority of anthozoans are colonial except sea anemones. Although colonies may reach a massive size, the individual polyps are generally small. Rarely polymorphic colonies are found in few groups. Inhabits mostly tropical seas in shallow to deep waters of silty, sandy, rocky, rubble and reef habitats. The polyp is more specialized than that of hydrozoans. They contain cellular mesoglea, separate gastrovascular cavity, cnidosysts in gastric filaments and gastrodermal gonads. Due to heterogeneous state of this class, the sea anemones, stony corals (Hexacorallians) and soft corals (Octocorallians) are dealt with in separate chapters.

SEA ANEMONES
(Flowers of the Sea)

Essentially an anemone is nothing but more than an overgrown coral polyp that lacks a hard skeleton. An anemone is a soft, large and heavy solitary polyp. They inhabit coastal waters throughout the world but are abundant and common in tropical seas particularly on coral reef areas. They live attached to rocks, shells and submerged objects, and some anemones burrow in mud or sand. Some small anemones live attached to jellyfish and ctenophores and some are commensal on the shells of hermit crabs. Most of the anemones hide in cracks of rocks, coral crevices or underneath rocks and coral heads. But few anemones grows to a large size are readily visible such as those found with colourful clown fishes. Many of the sea anemones are brightly coloured, they may be white, green, orange, blue, red or with combination of exciting colour pattern. A sea anemone is an extremely simple animal. The body is long and cylindrical, closed at lower or pedal end. With this end it may dig into soft sediments or attaches firmly to solid objects like rocks or coral branches. The free end of the column is known as oral disc where a circular or elongate mouth is located at center. It bears eight to several hundred hollow tentacles arranged in radial rows or in circlets. The tentacles are very diverse, short or long, thin or thick, pointed or blunt, globular or branching. The mouth opens into a pharynx, which in turn leads to gastrovascular cavity is divided by vertical partitions or mesenteries, extend from the column wall across the central space. Although anemones are sedentary, an individual glides on its pedal disc, covering a few centimeters in a day. Sea anemones feed on small fish, seaurchins, crabs, shrimps and plankton. Many sea anemones harbour unicellular algae known as zooxanthellae within the cells of their tentacles and oral disc. The algal cells utilize sunlight and produce high-energy sugars and part of these sugars utelised by the host anemone. Some anemone species are capable of absorbing nutrients directly from seawater through their tissues. The anemones range in size from 1.5 cm to more than a meter in diameter at the oral end. The largest anemones known in the world belongs to the genus *Stoichactis*. Both asexual and sexual reproduction is common in anemones. Some appears to have separate sexes. Development takes place through larval stage. Over a thousand species of anemones are known from the world seas. Of which only 10 species provide habitat for the well-known colourful clown or anemone fishes, certain crabs and shrimps. In this symbiosis, the

associates are unaffected by the stings of the anemone and sheltered among the tentacles. Several species of sea anemones occur on the coasts of Andaman and Nicobar Islands. The species of *Metridium, Stoichactis, Stychodactyla, Entacmaea* and *Heteractis* are some of the common colourful anemones found on the reefs. Species of *Adamsia* and *Hydractina* anemones grows on the gastropod shells, occupied by the hermit crabs.

CERIANTHARIANS AND ZOANTHIDEANS
(Tube anemones and Sea mats)

Two orders of small anemone-like anthozoans commonly encountered on reefs. The order Ceriantharia includes burrowing or tube sea anemones. They are large and solitary anthozoans. Their body encased in a thick mucous tube, which is buried within the substratum. When in danger, the animal withdraws immediately into the tube. They have a double row of long slender tentacles arranged in a circle on oral disc. *Cerianthus andamanensis* is commonly seen on sandy bottoms near reefs.The members of the order Zoanthidae are largely tropical and some are common on reefs. They are relatively small and either colonial or solitary. The body rather short and button-like and look like small anemones. The polyps embedded in a semi-soft medium known as mesoglea. Some reef species grows to large encrusting masses. Zoanthideans also harbour zooxanthellae in their tissues. They reproduce asexually or sexually similar to that of hard corals. Information on the Zoanthideans of these islands is scanty. The species *Epizoanthus stellae* is widespread on the reefs of these islands.

Fig. 59. Sea anemone, *Heteractis magnifica* with clownfishes

Fig. 60. Sea anemone, *Radianthus* sp.

Fig. 61. Sea anemone, *Heteractis magnifica* in shallow water

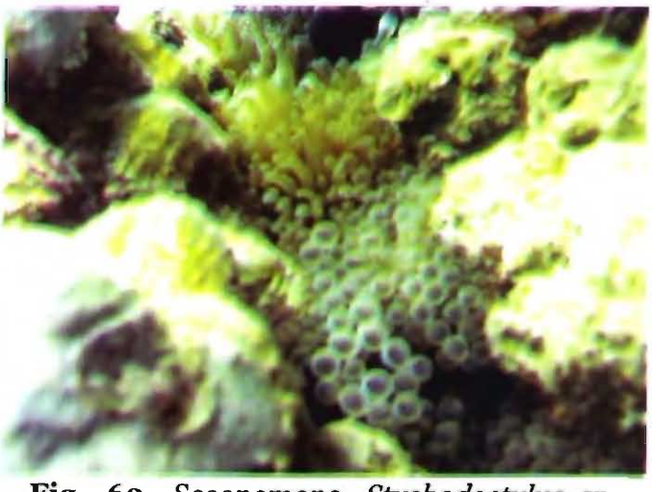

Fig. 62. Seaanemone *Stychodactylus* sp. among coral colonies

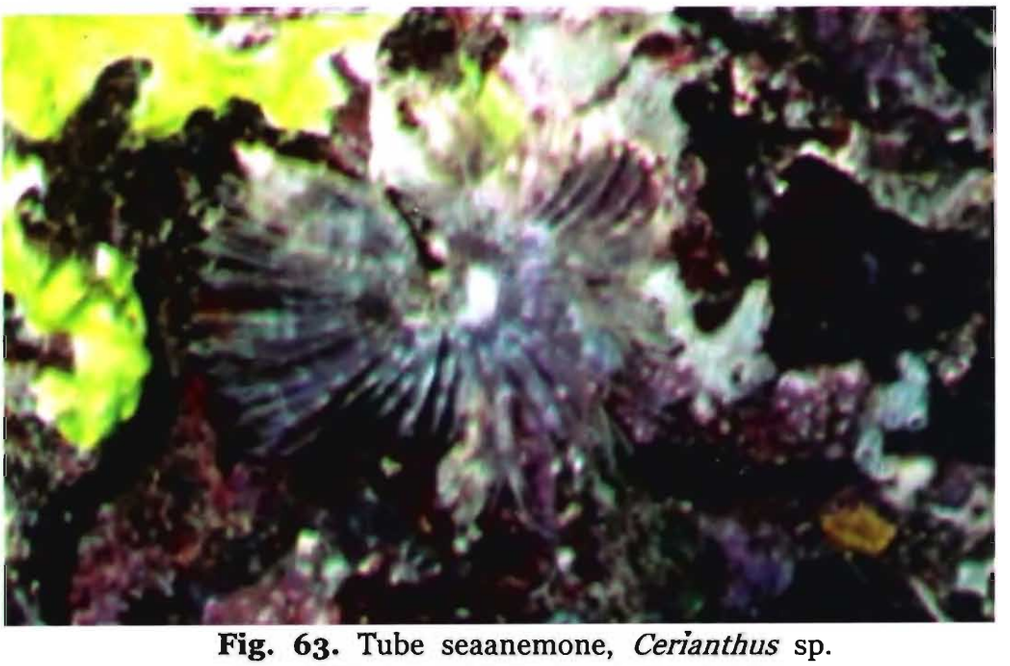

Fig. 63. Tube seaanemone, *Cerianthus* sp.

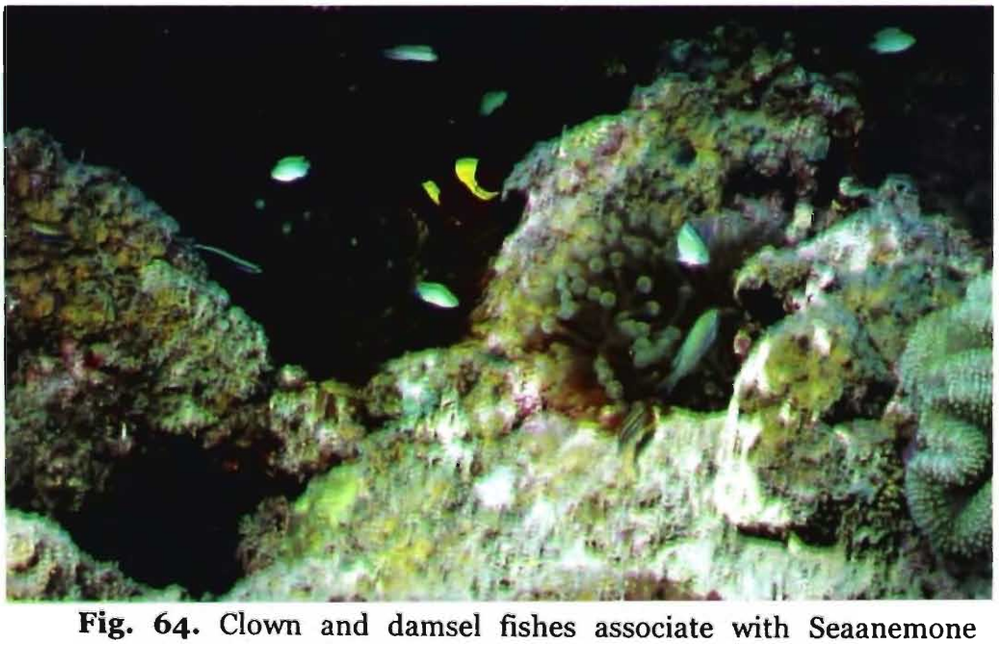

Fig. 64. Clown and damsel fishes associate with Seaanemone

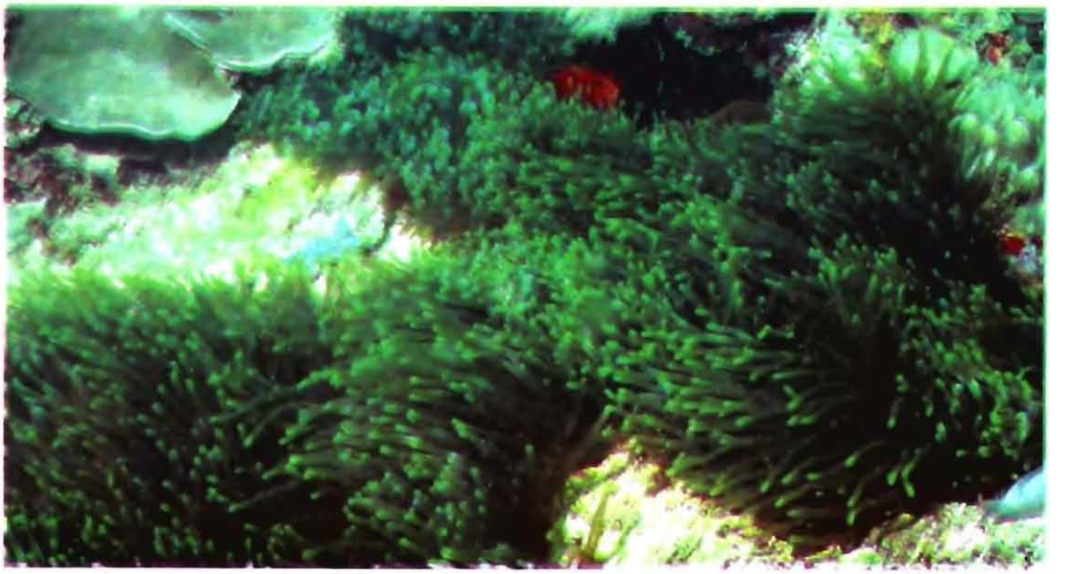

Fig. 65. Extensive growth of seaanemone, *Stichodactyla* sp.

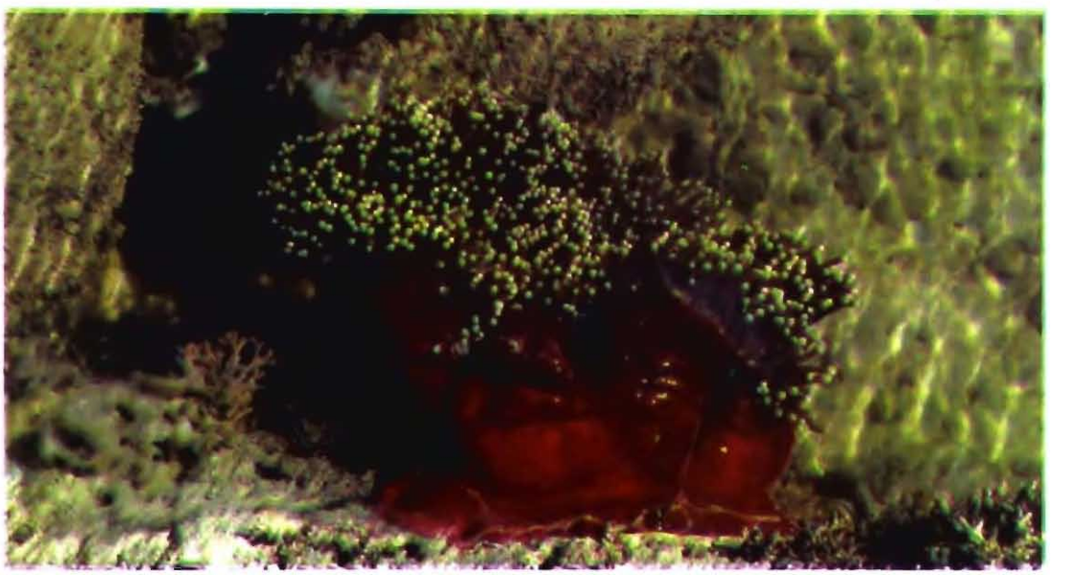

Fig. 66. Shallow water Sea anemone, *Heteractis* sp.

Fig. 67. Zoanthid mats, *Epizoanthus stellae*

CORALS
(The jewels of Reefs)

The stony or scleractinian corals (also known as Madreporarian) are closely related to sea anemones. In contrast to sea anemones, the stony corals produce calcium carbonate skeletons are marvelous architectural monuments of the seas. Skeletons of thousands of millions of tiny coral polyps deposited by countless generations form the hard solid limestone platforms on which the corals grow. In other words, the living coral reefs are the versatile work of simple tiny polyps responsible for the formation of massive structures spread around the world's shallow, sunlit tropical seas. Many of the corals have wide distribution that extends from the Red Sea and East Africa to islands of the Central Pacific and Atlantic Oceans. The richest coral reef area spread around central Indo-Pacific, south to the southern Great Barrier Reef and north to the northern Philippines. Eastwards across the Pacific, there is a progressive decrease in diversity and west wards across the Indian Ocean, diversity remains relatively constant. The Atlantic Ocean is much less rich in corals than the Indo-Pacific and most of the corals are concentrated in the Caribbean. There are no hermatypic (reef building) corals in the Mediterranean. Approximately 790 species of corals are known from the world waters; where as over 500 species are known from the Indo-Pacific region. There are four major coral reef aeas in India *viz.* Lakshadweep (91 species f corals), Gulf of Kachchh (36 species of corals), Palk Bay and Gulf of Mannar (82 species of corals) and Andaman and Nicobar Islands (177 species of corals).

Coral growth : All reef-building corals require adequate light for photosynthesis of the zooxanthellae present in their tissues. The visibility of reef waters may exceed 50 meters in open sea reefs to few meters around fringing reefs. Usually most of the corals grow in shallow waters. The sediment comes from the land through river run-off have relatively high effect on water clarity. The sediment is stirred up by waves making the water turbid and reduces the light penetration for a long period. Also, the sediment settles on coral polyps and kills them by choking. The salinity plays an important role, both on reef distribution and coral zonation. Constant salinity greater than 30 but less than 36 ppt is ideal range for growth of corals. Reefs cannot develop in areas where river water or rainwater flows regularly. The freshwater influx is a primary factor controlling the formation and distribution of corals along the coastline. The seawater temperature also limits the coral growth and reef development as a whole. The ideal temperature for growth of corals ranging from 18° C or higher but never less than by few degrees. At the same time, severe temperature rise in waters may cause death of corals. In addition to these factors, sufficient circulation of pollution free water is also essential for maximum growth of corals (Fig. 68).

The tiny coral polyps are the architects of colourful reefs. The majority of coral species are colonial with very small polyps ranging 1 to 3 mm in diameter, but the entire colony may grow to a very large extent. Some deep-sea species and *Fungia* are solitary with polyps reaching 25cm diameter. The coral polyps are similar in structure to the sea anemones but do not possess siphanoglyphs. The mesenterial filaments contain only one glandular lobe with nematocysts. The skeleton is composed of calcium carbonate secreted by the epidermis of the lower part of the

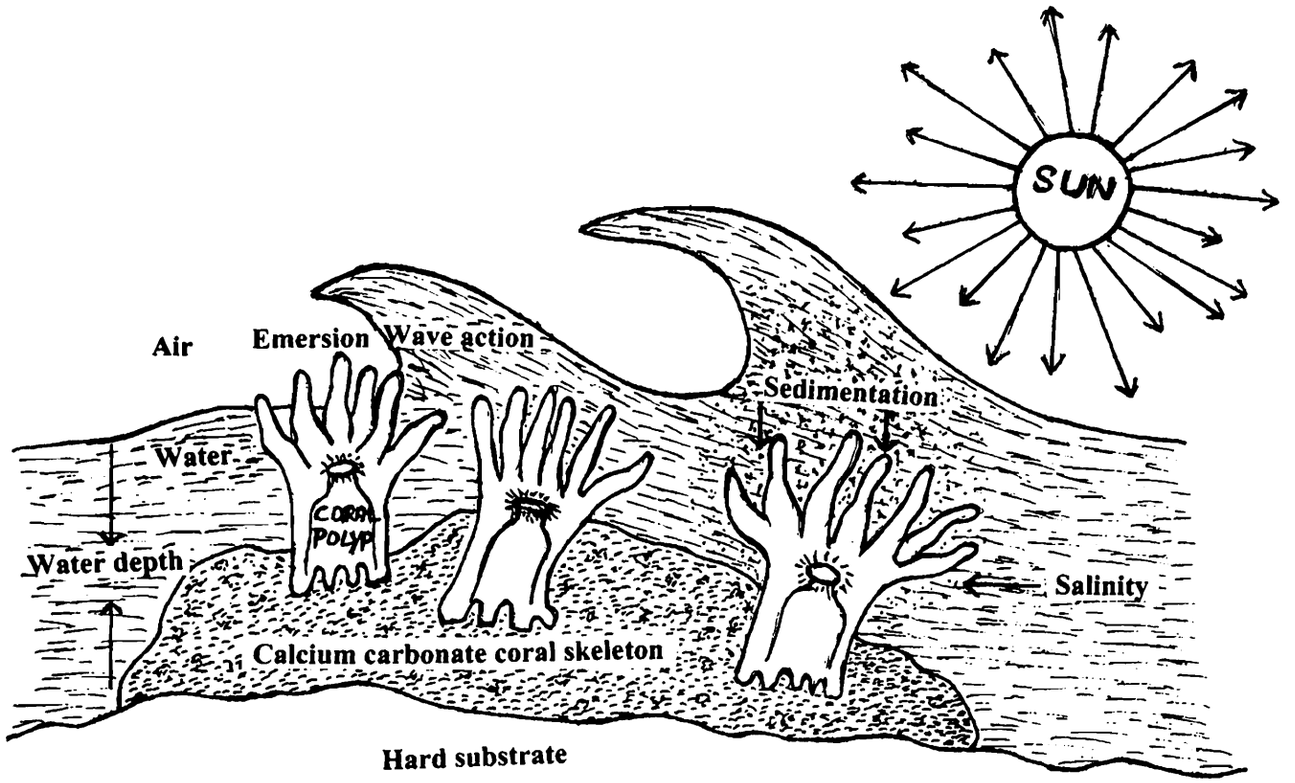

Fig. 68. The limiting environmental factors of reef growth (after A.T. White, 1987)

column and basal disc. During the process, a skeletal cup known as calyx is produced within which the polyp is fixed. The surrounding wall of the cup is known as theca, the floor of the cup is basal plate. The floor of the cup contains thin radiating calcareous septa. Each of these scleroseptum is project into the base of polyp, folding the basal layers and inserting them between a pair of mesenteries. The skeleton not only provides base to the polyp but also protection. The polyps of colonial forms are all interconnected, but the attachment is lateral one. The column wall folds outward above the skeletal cup and connects with similar folds of adjacent polyps. Thus, a tissue layer interconnects all the polyps of the colony and the living coral colony lies entirely above the skeleton and completely covers it (Fig. 69). Depending up on the spices, the growth pattern of corals varies like flat or round skeletal masses, upright and branching growth forms, large and heavy structures; foliaceous or plate-like or small and delicate. The coral colonies expand by the process of budding which may be intratentacular or extratentacular. The growth rate of corals also varies greatly depending upon the species and water temperature. Massive and plate corals grow only about nine millimeters per year where as branched corals grow rapidly in a linear direction of about 10 to 15 cm per year. The density of the calcium carbonate secreted by the corals is not uniform throughout the year; it depends on the physico-chemical conditions of the habitat.

Food : Corals feed on zooplankton. During daytime polyps remain contracted and at night when plankton is abundant in surface waters, the polyps become active. Virtually all reef-building corals possess unicellular brown algae (zooxanthellae) within their polyp tissues are known as hermatypic corals. The algae get a place to live in the tissues of coral polyps and the waste products released by polyps are

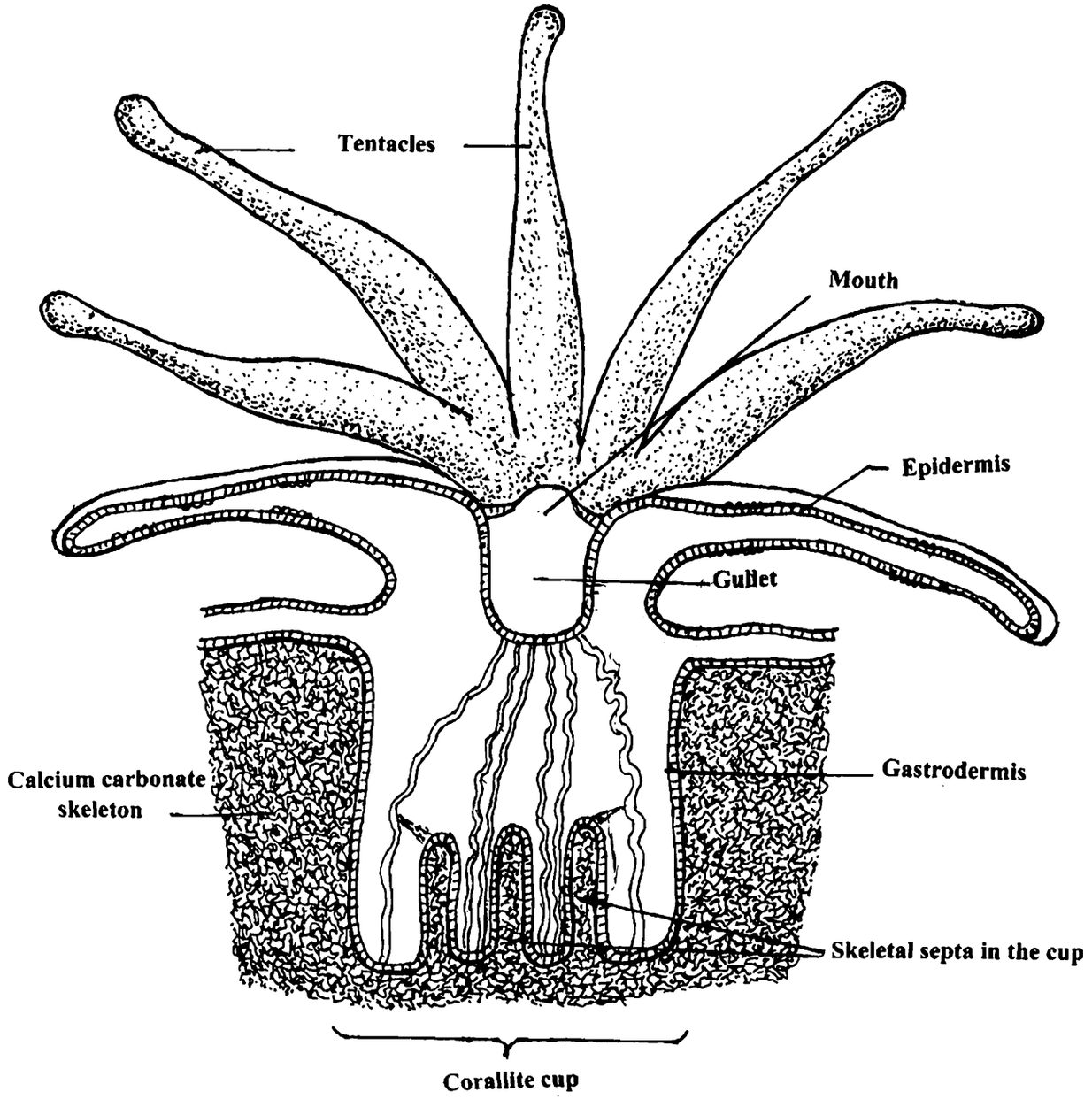

Fig. 69. Anatomy of a coral polyp

utelised as nutrients for photosuynthsis and in return the algae supply the coral with as much as 90 per cent of its food requirements. Many of the hermatypic corals live in dark conditions and deep waters grow slowly. These forms depend on organic material and bacteria that trapped in the mucus of polyps and also directly absorb dissolved organic material from seawater. The coral species which do not have symbiotic algae in their tissues known as ahermatypic are carnivorous and feed on a variety of small animals like fish, worms and even sea-urchins.

Reproduction : Usually the corals multiply by asexual method for expanding the colonies. In this process, the polyps simply divide to form new ones lead to extensive growth. In some cases the polyps detach from their skeletons and develop into new colonies. All corals, however, reproduce sexually. Polyps are either hermaphroditic or produce either eggs or sperm. Every year mass spawning occurs

at night during full moon period for a few days. Millions of eggs are released into the water and float to the surface. The eggs and sperm are released separately by the hermaphroditic species. The scene during spawning is fantastic like being in the midst of upside down snowstorm. The sperm and eggs have a wide variety of colours, but are mostly yellow or pink. The fertilization takes place in the water and fertilized eggs hatch into planula larvae and settles onto the reef to grow into a new colony. The sexual reproduction is a means of long distance dispersal and also means for genetically crossing of corals.

Enemies : Right from the egg stage to full-grown colonies of corals are eaten away by many marine animals. Only a very small percentage of larvae are able to survive and find suitable substrate to settle on. Large number of plankton feeders on reef heavily feed on eggs and larvae of corals. A variety of predators destroy the coral colonies also. The most prominent and common enemy of coral colonies and their associates is Crown-of-Thorns Starfish (*Acanthaster planci*) feed heavily on coral polyps, molluscs, fishes and coral-burrowing worms. Many fishes, including butterfly fishes directly feed on live polyps. Parrotfishes grind coral skeletons of living polyps into sediment. Triggerfishes scrap outer layer of coral rocks. Boring organisms like mussels and *Lethophaga* sp., various worms including Christmas tree worm *Spirobranchus giganteus*, sipunculids and many species of boring sponges may also have a long-term effect on coral communities. Apart from this, the corals also susceptible to fungal, bacterial and viral diseases which cause sever damage. Another most important phenomenon that causes extensive damage to corals with in a short period is **coral bleaching**. Some times the coral polyps expel its symbiotic algae from the tissues due to increase in water temperature that lead to mass destruction of corals or in the event of death of algae, the coral turns white and slowly dies.

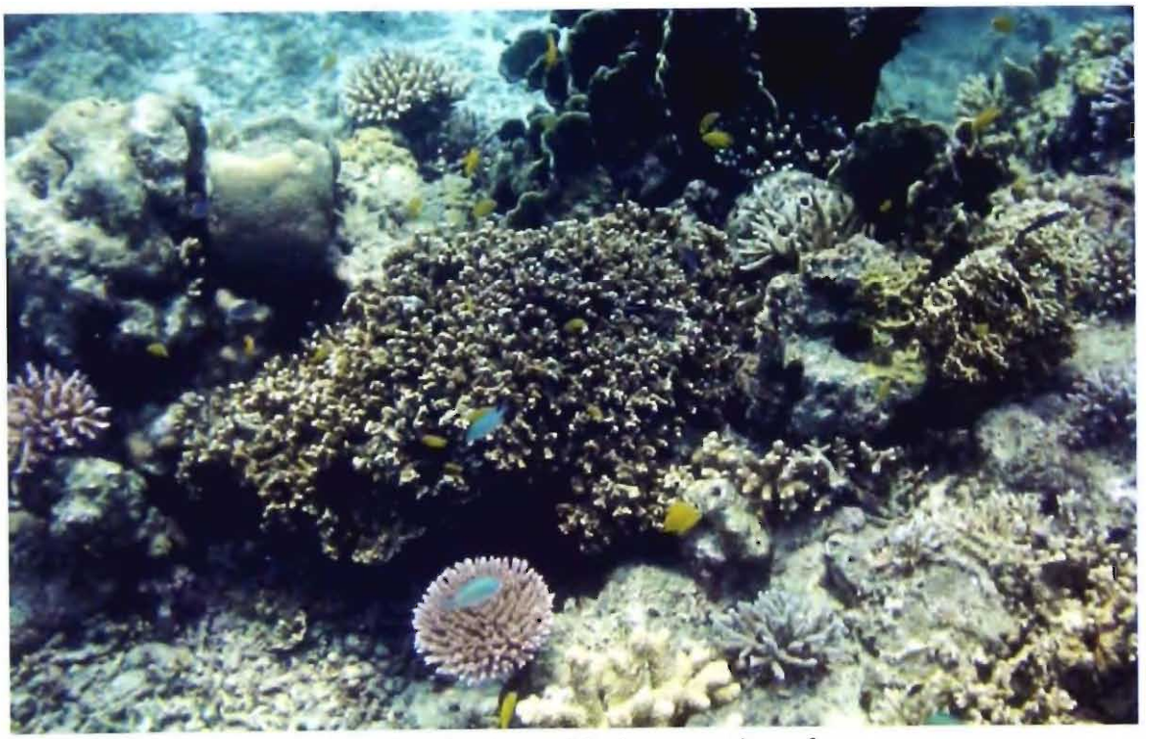

Fig. 70. Coral colonies with its associate fauna

Fig. 71. Thicket of *Acropora aspera*

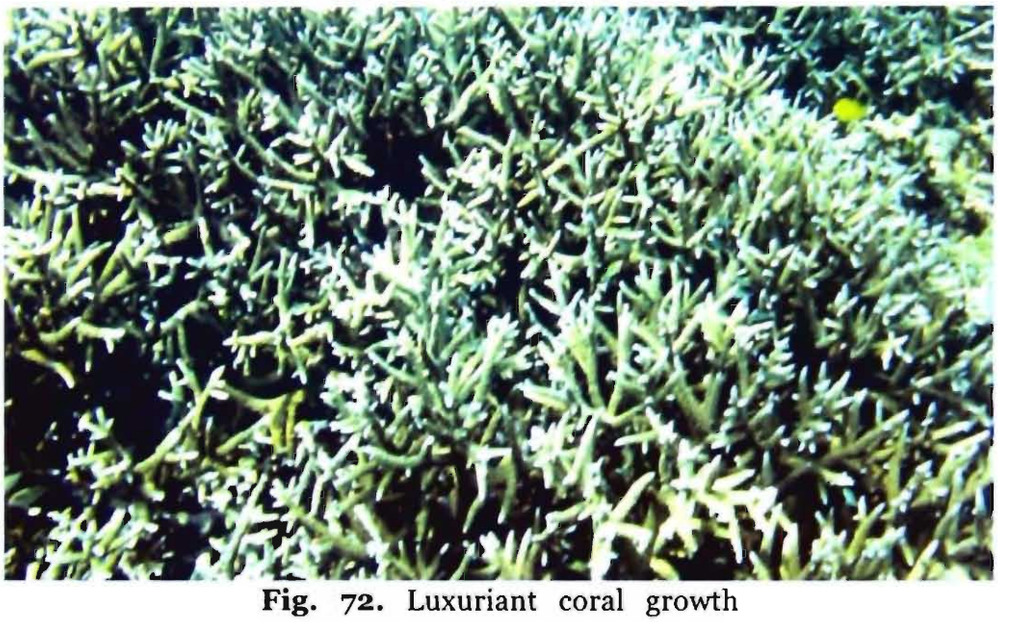

Fig. 72. Luxuriant coral growth

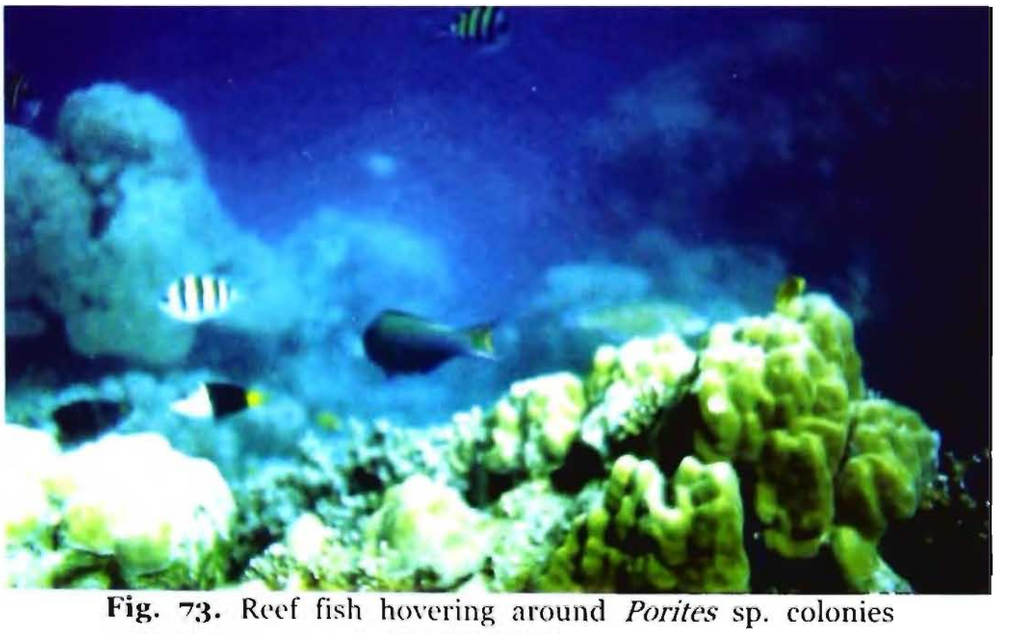

Fig. 73. Reef fish hovering around *Porites* sp. colonies

Fig. 74. *Pocilopora eydouxi* growing along with *Porites* sp.

Fig. 75. Close view of *Pocilopora eydouyxi*

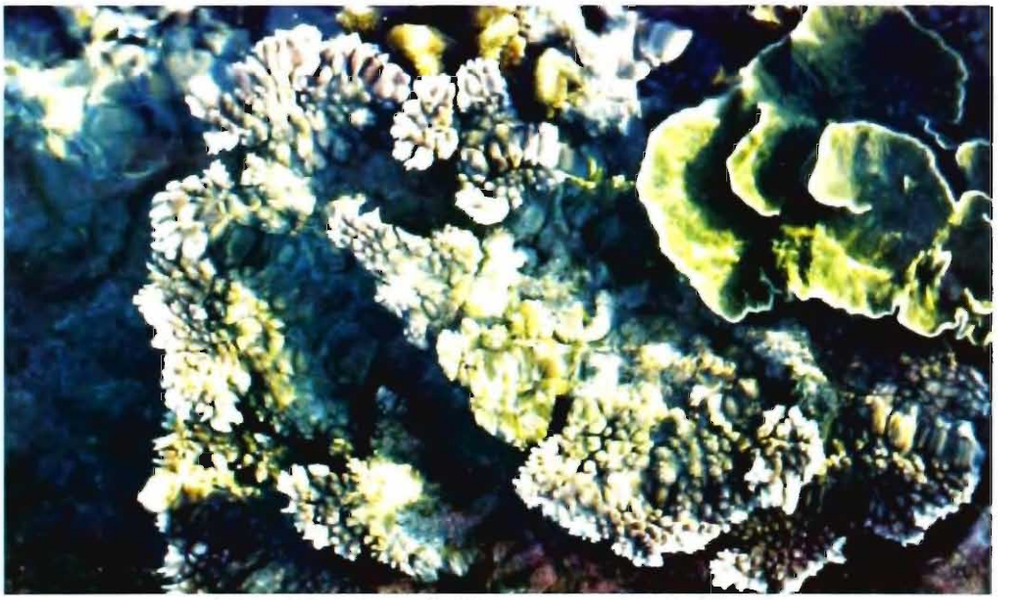

Fig. 76. Irregularly grown *Acropora* sp.

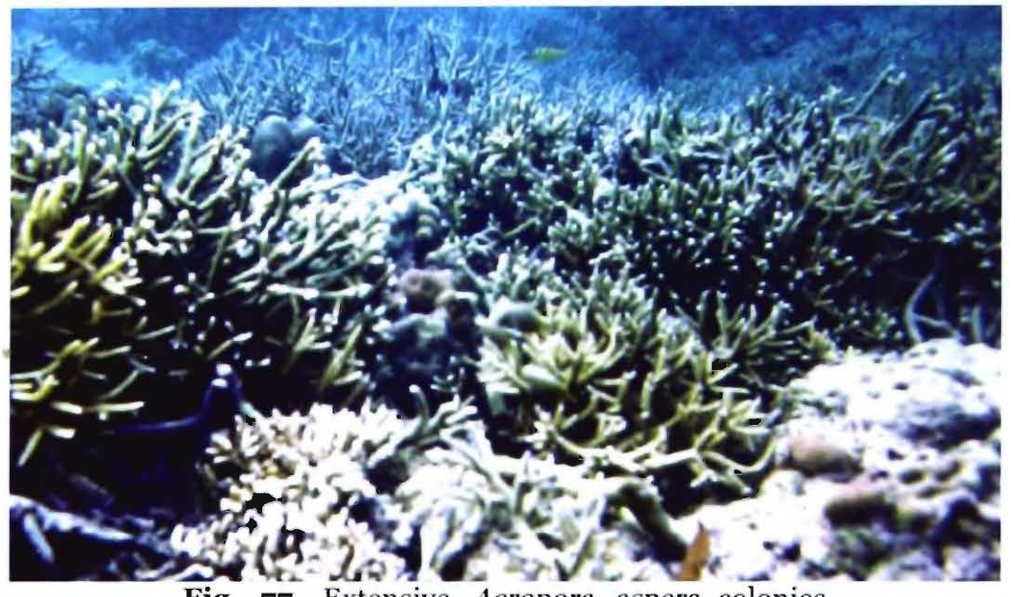

Fig. 77. Extensive *Acropora aspera* colonies

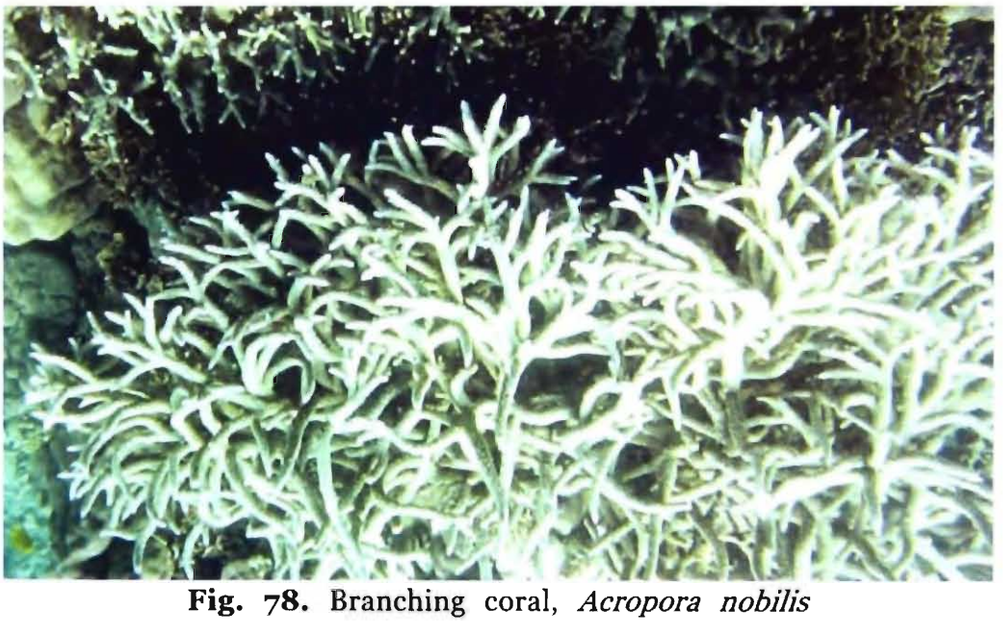

Fig. 78. Branching coral, *Acropora nobilis*

Fig. 79. Staghorn coral, *Acropora aspera*

Fig. 80. Common shallow coral, *Seriatopora hysrix*

Fig. 81. *Acropora digitifera* in shallow waters

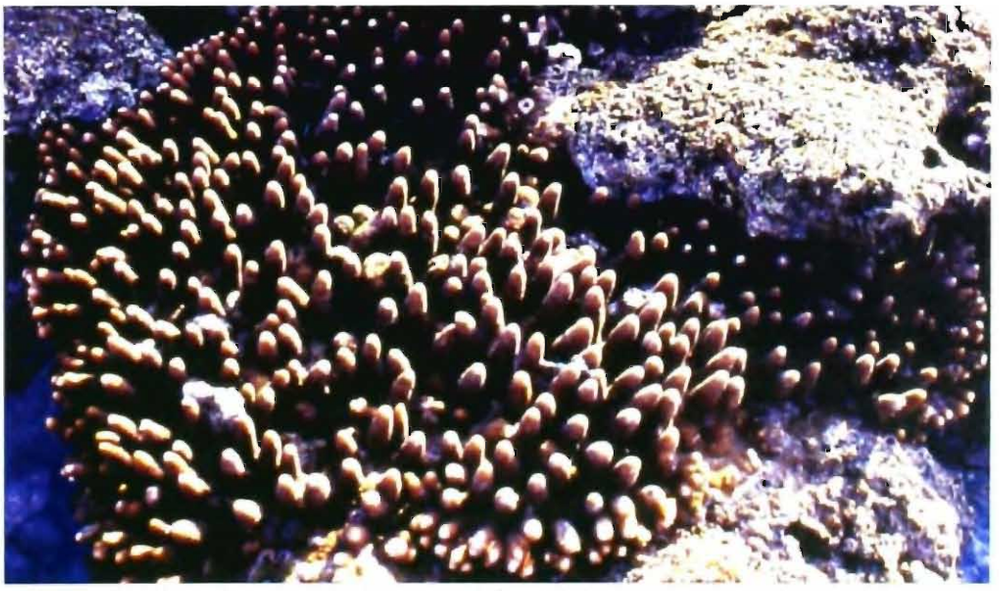

Fig. 82. A digitate coral, *Acropora gemmeiea*

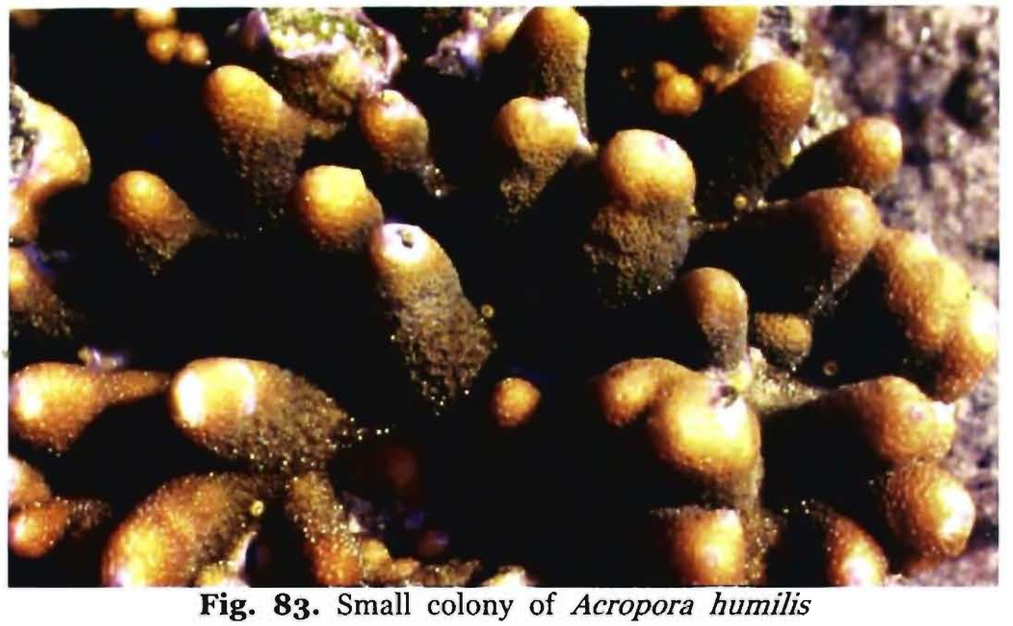

Fig. 83. Small colony of *Acropora humilis*

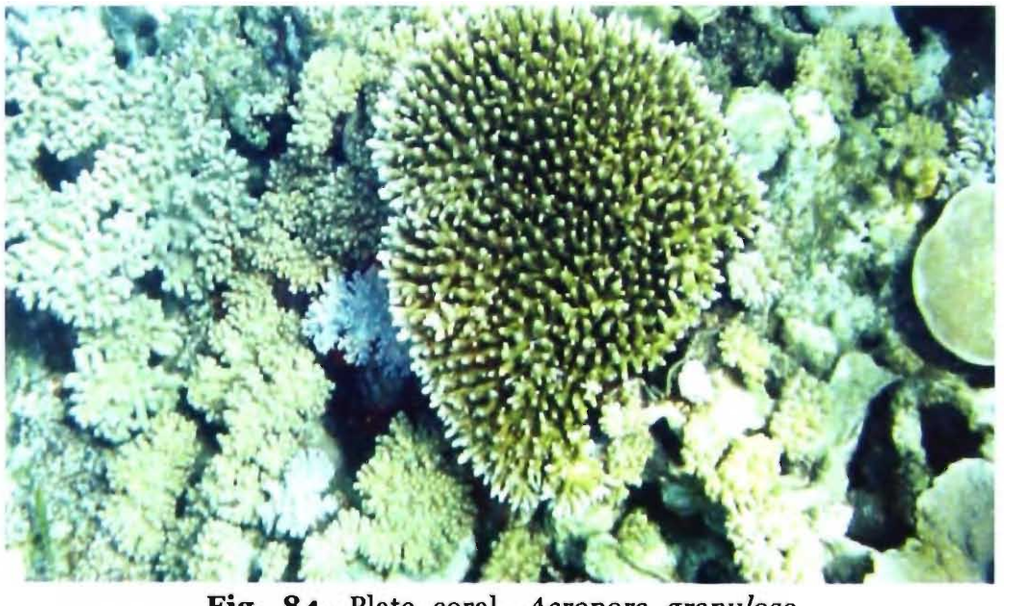

Fig. 84. Plate coral, *Acropora granulose*

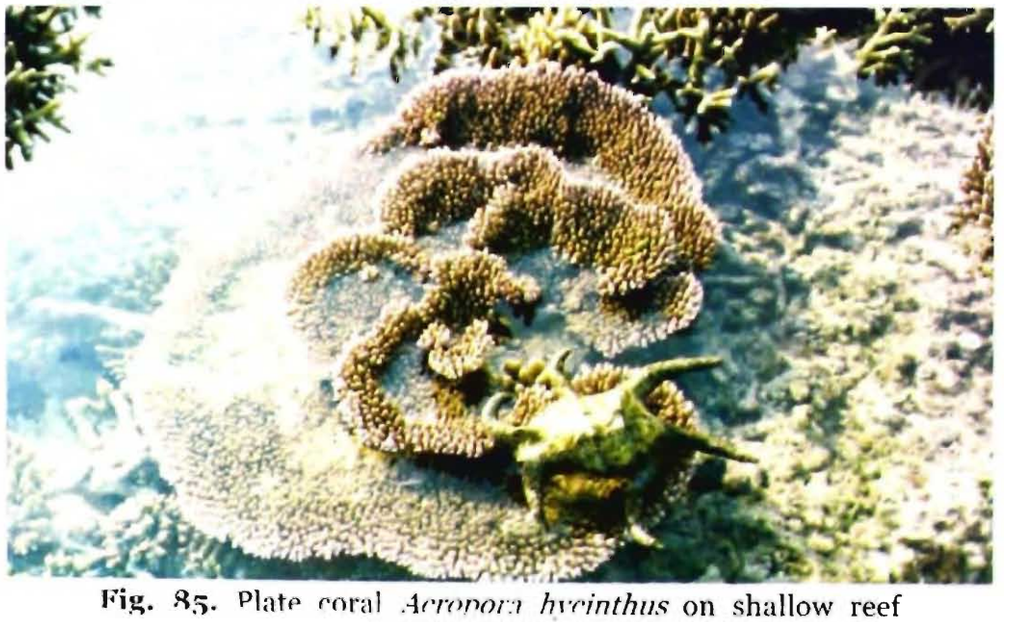

Fig. 85. Plate coral *Acropora hyacinthus* on shallow reef

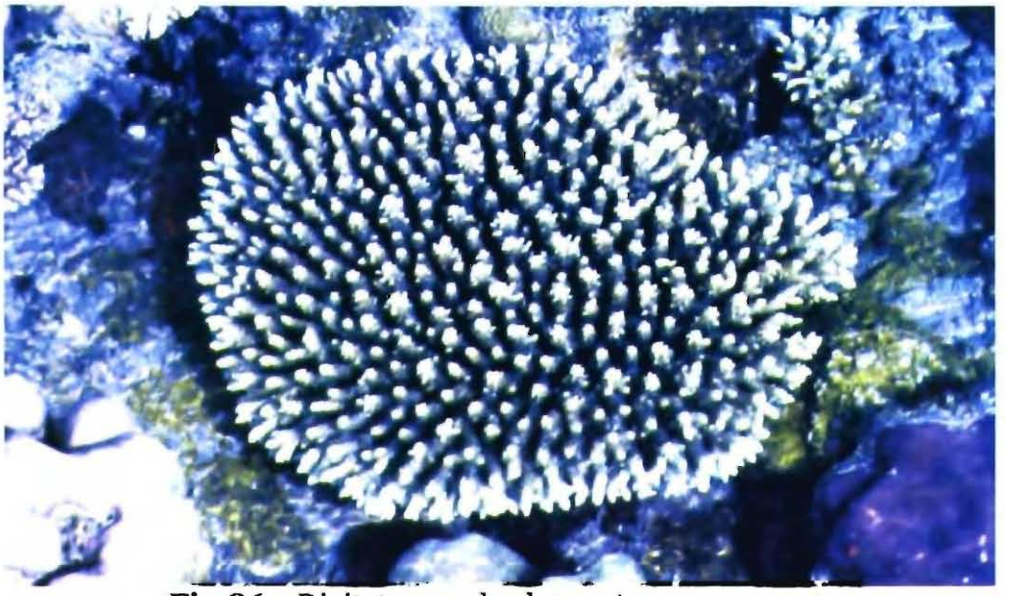

Fig.86. Digitate coral plate, *Acropora nasuta*

Fig. 87. Branching coral, *Acropora sp.*

Fig. 88. Robust branched coral, *Acropora palifera*

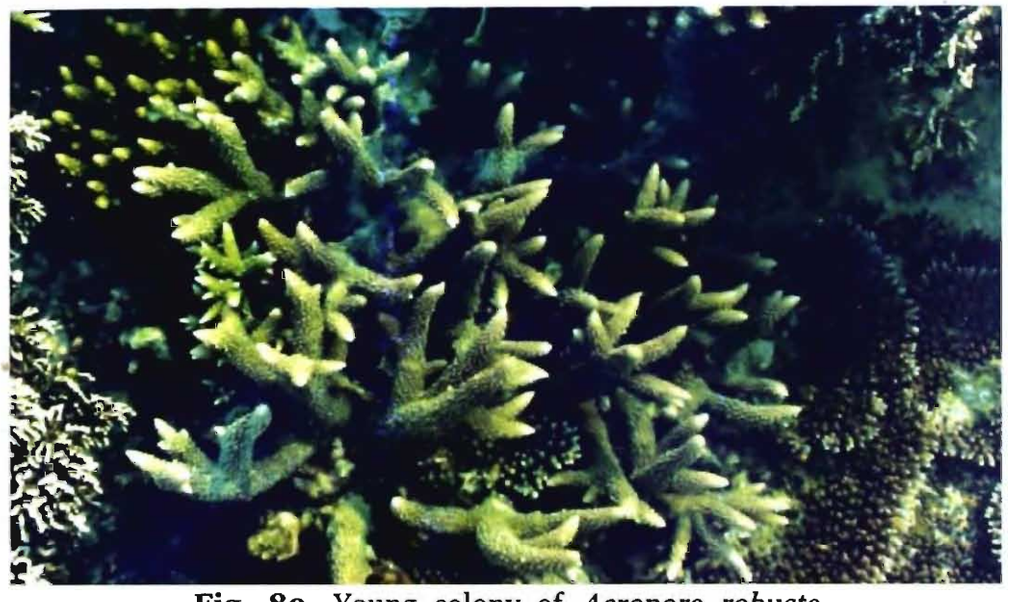

Fig. 89. Young colony of *Acropora robusta*

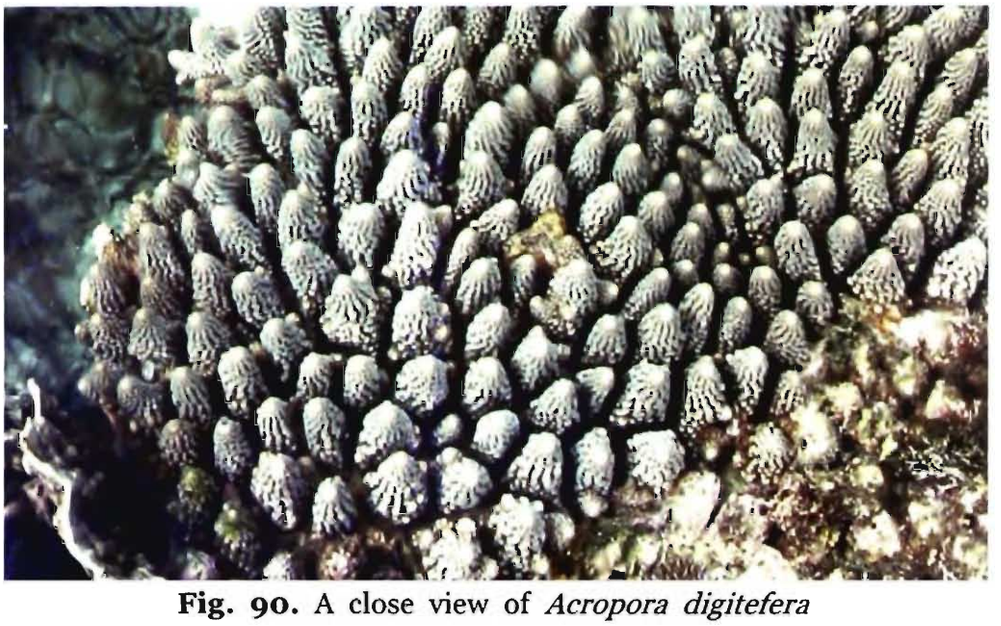

Fig. 90. A close view of *Acropora digitefera*

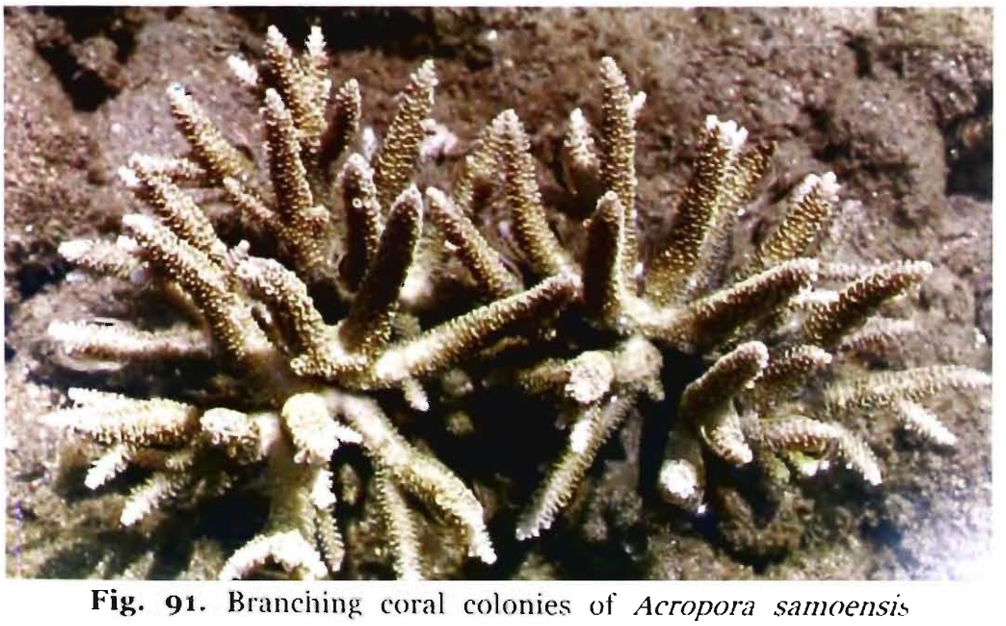

Fig. 91. Branching coral colonies of *Acropora samoensis*

Fig. 92. Robust branches of *Acropora* sp.

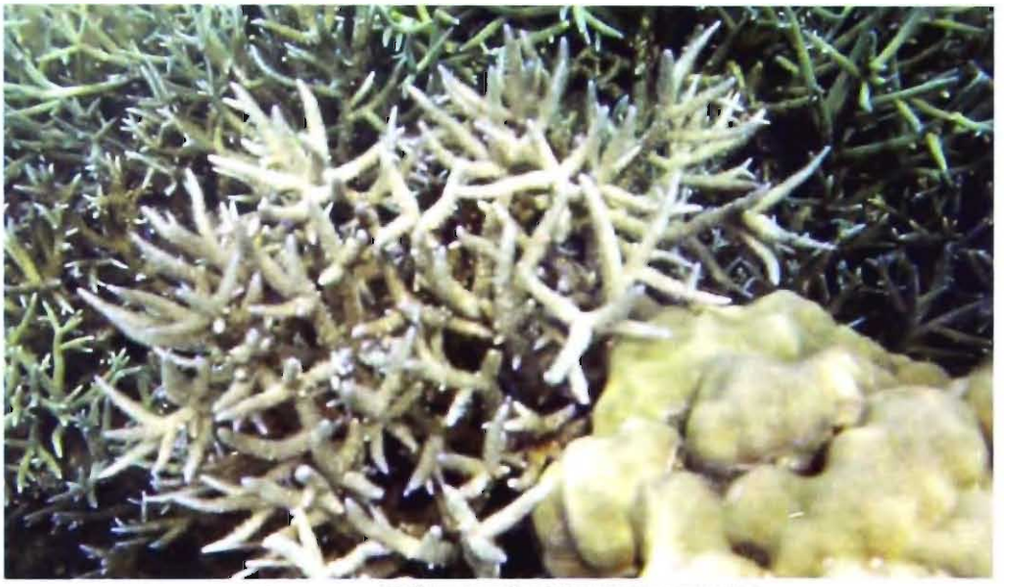

Fig. 93. Colony of *Acropora aspera*

Fig. 94. *Acropora* sp. overgrowing on *Acropora hyacinthus*

Fig. 95. Plate coral, *Acropora clathrata*

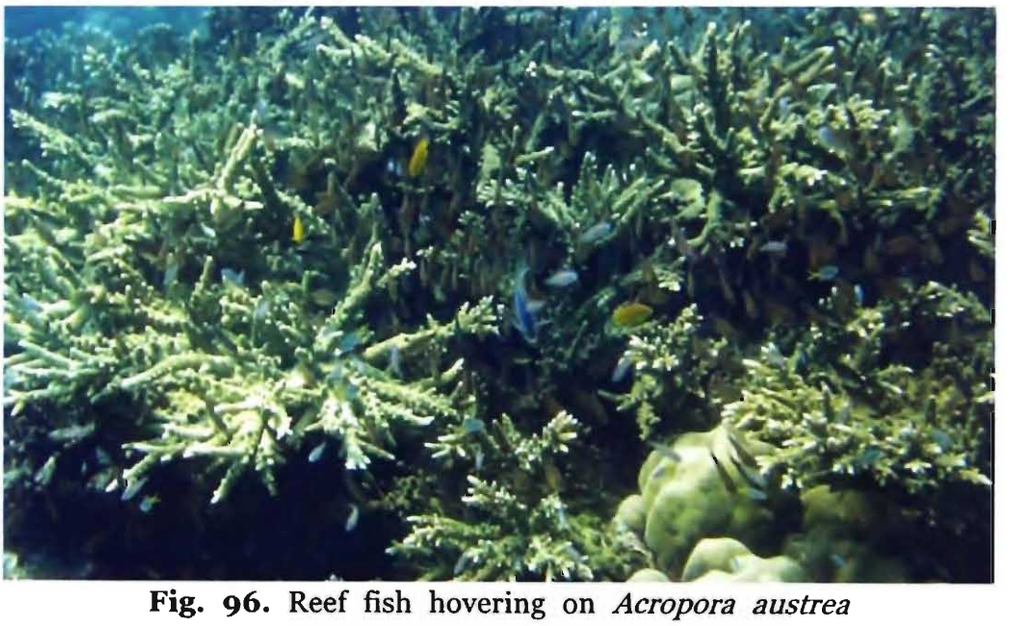

Fig. 96. Reef fish hovering on *Acropora austrea*

Fig. 97. Colonies of diverse *Acropora* species

Fig. 98. Massive *Oulophyllia crispa* (Brown) and *Leptoria phrygia*

Fig. 99. Encrusted form of *Echinopora lamellose*

Fig. 100. *Acropora* sp. and *Porites* sp. colonies

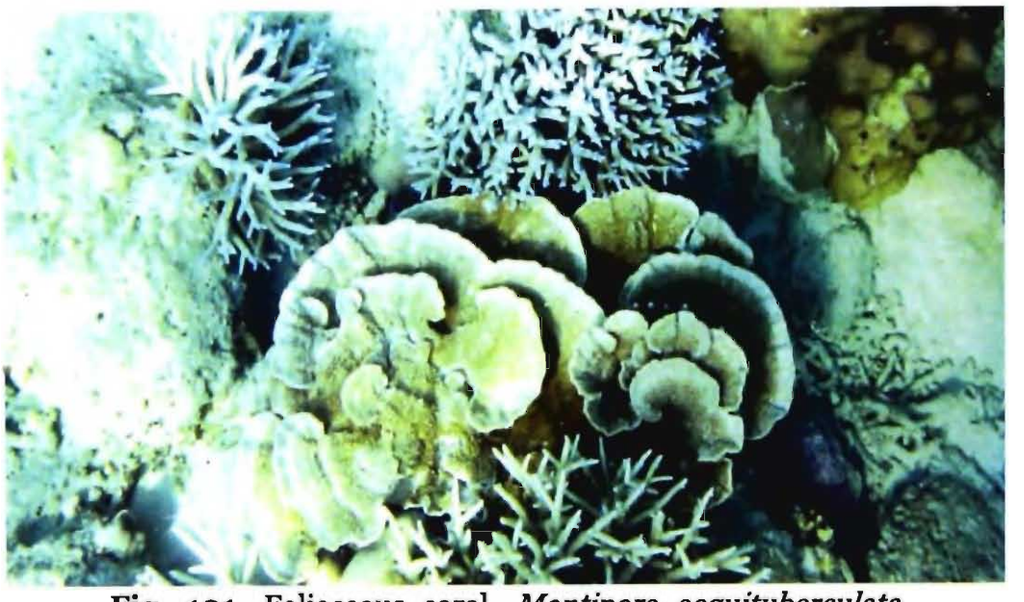

Fig. 101. Foliaceous coral, *Montipora aequituberculata*

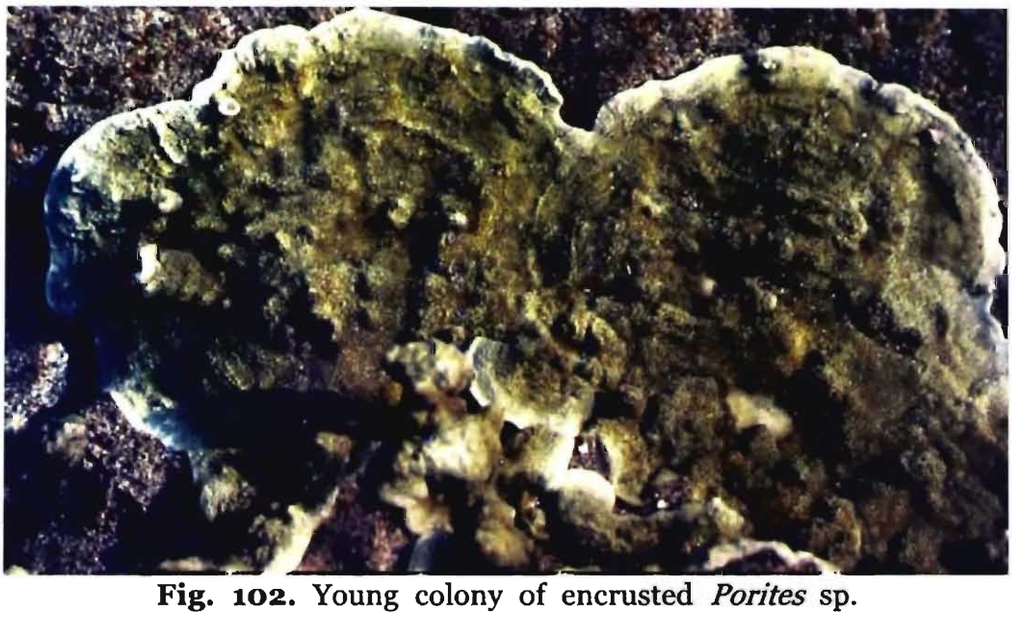

Fig. 102. Young colony of encrusted *Porites* sp.

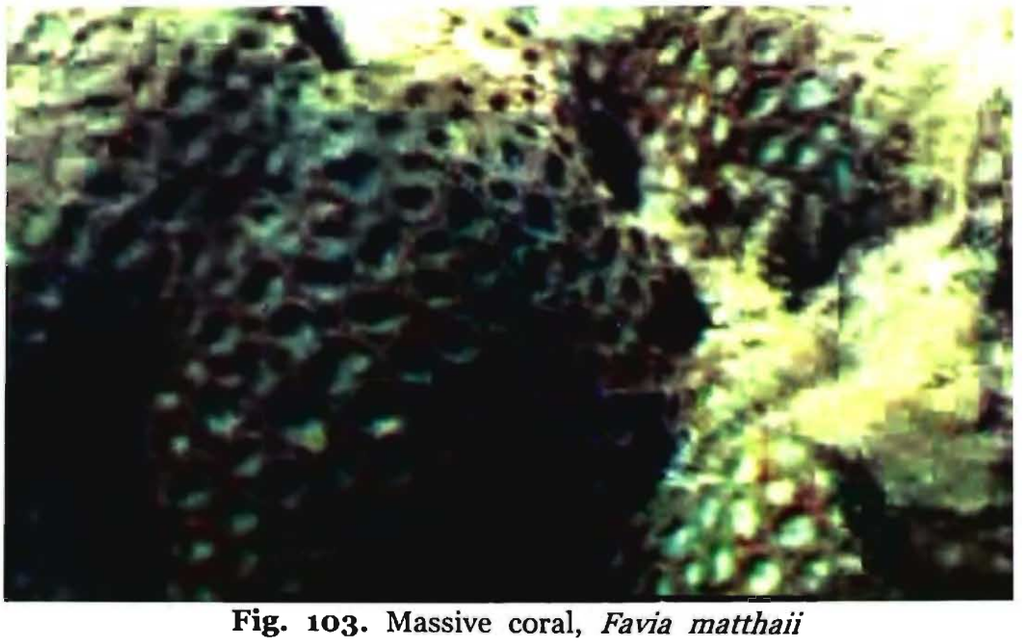

Fig. 103. Massive coral, *Favia matthaii*

Fig. 104. Massive coral, *Favia favus*

Fig. 105. Massive coral, *Favia halicora*

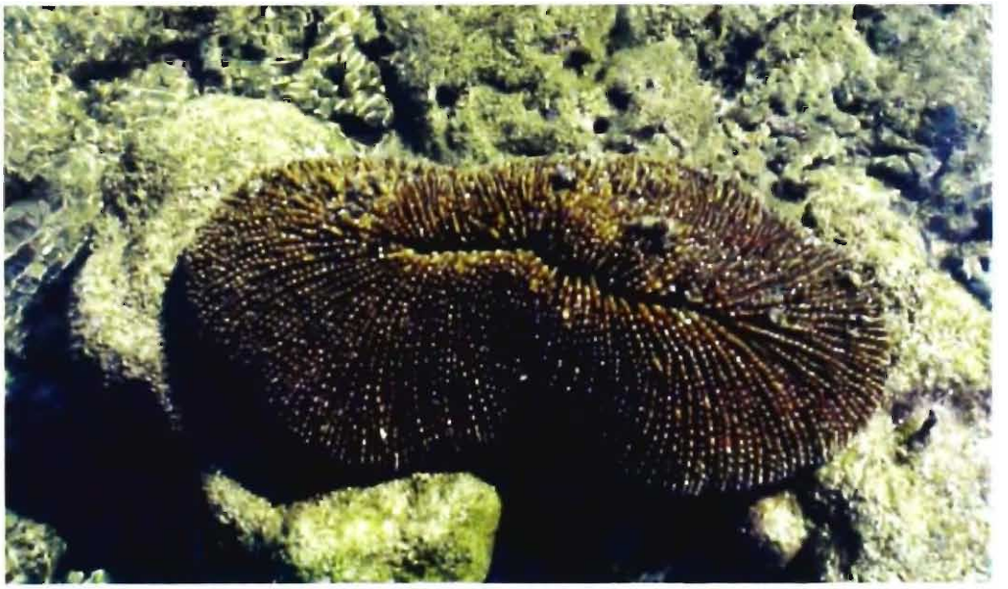

Fig. 106. Mushroom coral, *Fungia echinata*

Fig. 107. Mushroom corals, *Fungia danai*

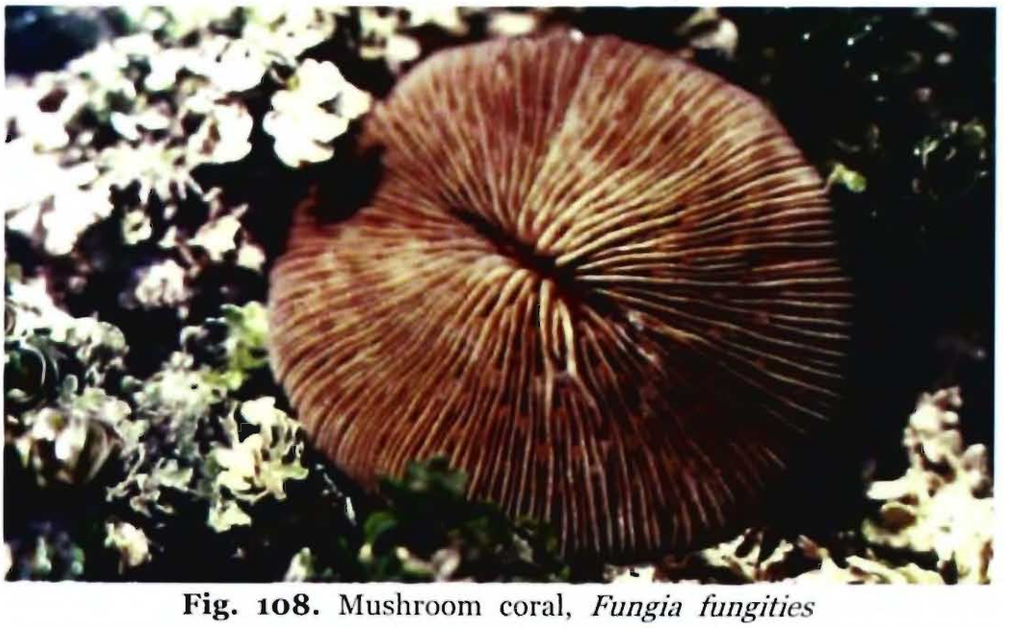

Fig. 108. Mushroom coral, *Fungia fungities*

Fig. 109. Massive colony of *Goniastrea* sp.

Fig. 110. Colony of *Goniastrea edwardsi*

Fig. 111. Massive coral with expanded polyps

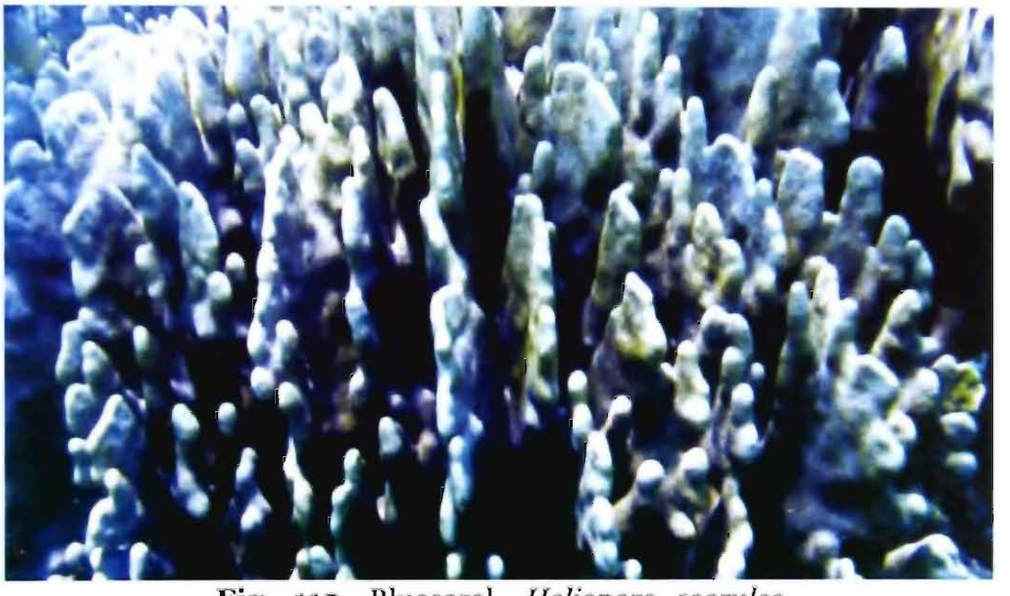

Fig. 112. Bluecoral, *Heliopora caerulea*

Fig. 113. Massive colony of *Leptoria phrygia*

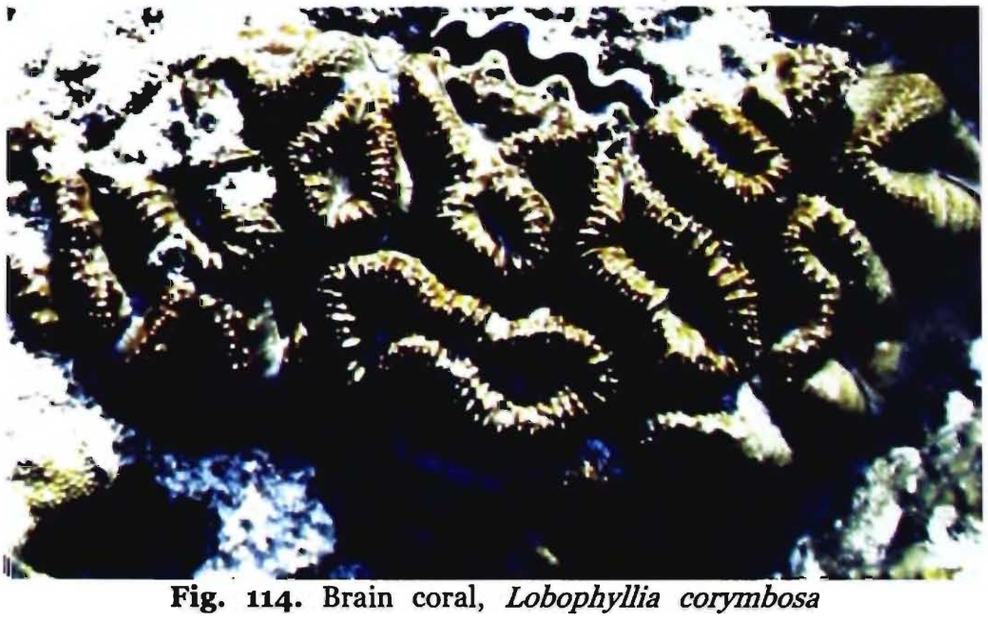

Fig. 114. Brain coral, *Lobophyllia corymbosa*

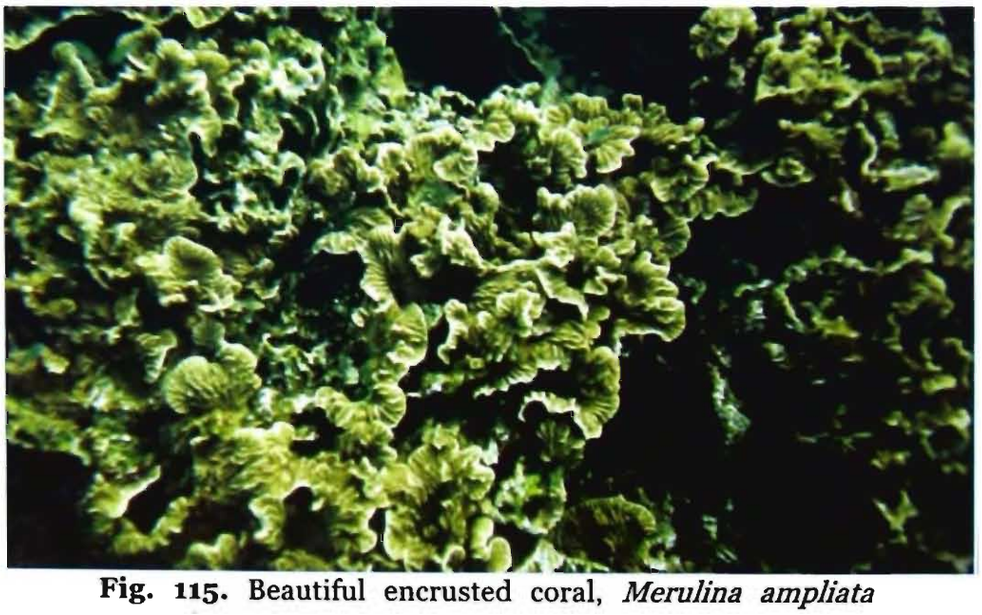

Fig. 115. Beautiful encrusted coral, *Merulina ampliata*

Fig. 116. Colony of *Montastrea* sp.

Fig. 117. Encrusted clony of *Cyphastrea* sp.

Fig. 118. Curly plates of *Montipora aequituberculata*

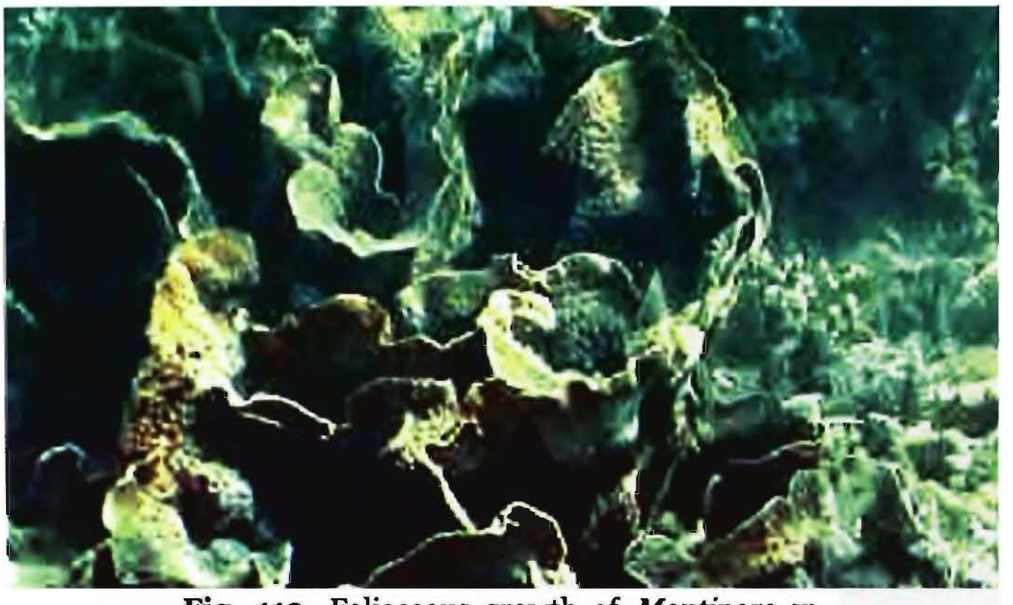

Fig. 119. Foliaceous growth of *Montipora* sp.

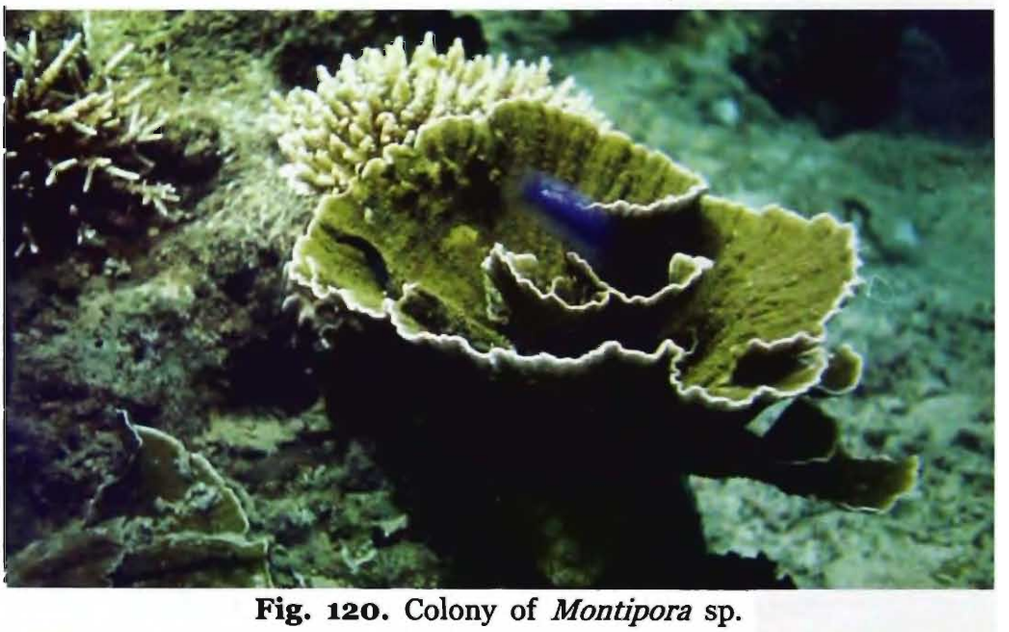

Fig. 120. Colony of *Montipora* sp.

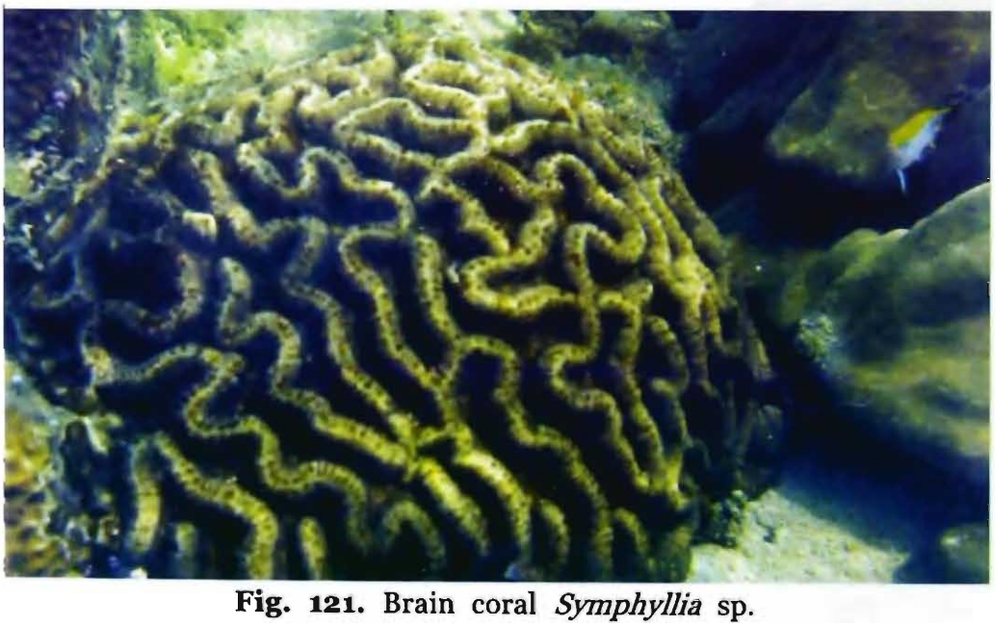

Fig. 121. Brain coral *Symphyllia* sp.

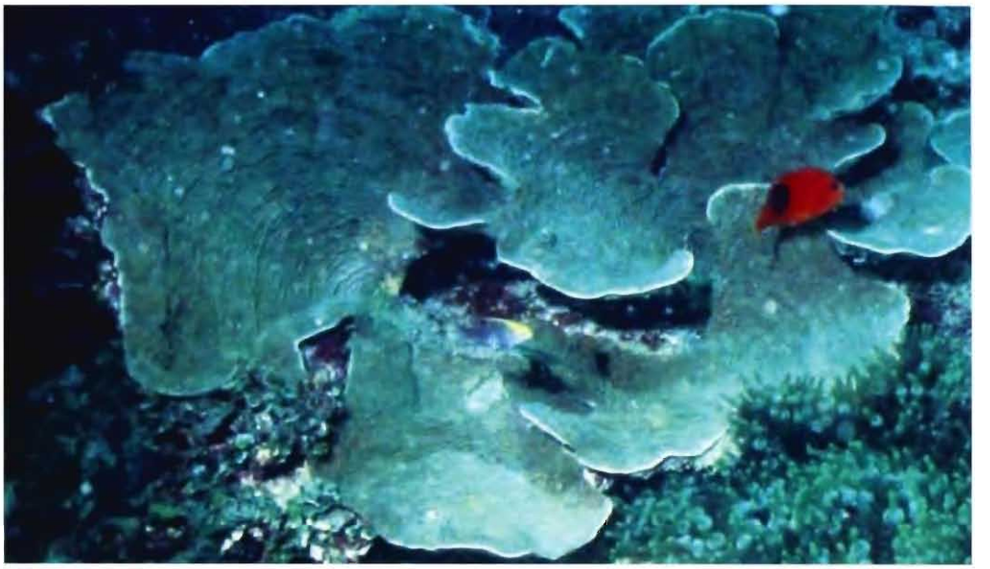

Fig. 122. Encrusted *Pachyseries* sp.

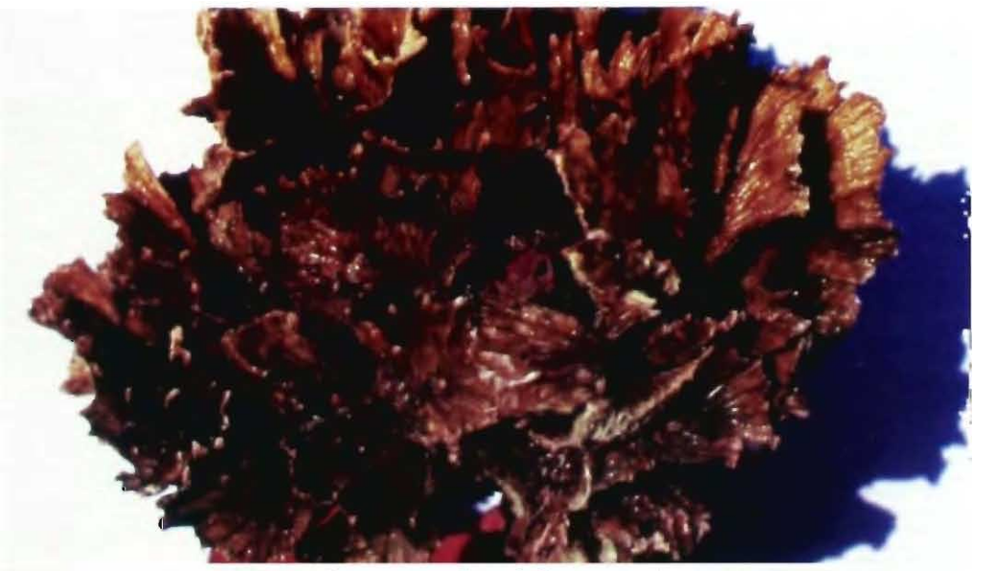

Fig. 123. *Pectinia paeonia*

Fig. 124. Oysters growing on massive *Porites* coral

Fig. 125. Masive colony of *Platygyra sinensis*

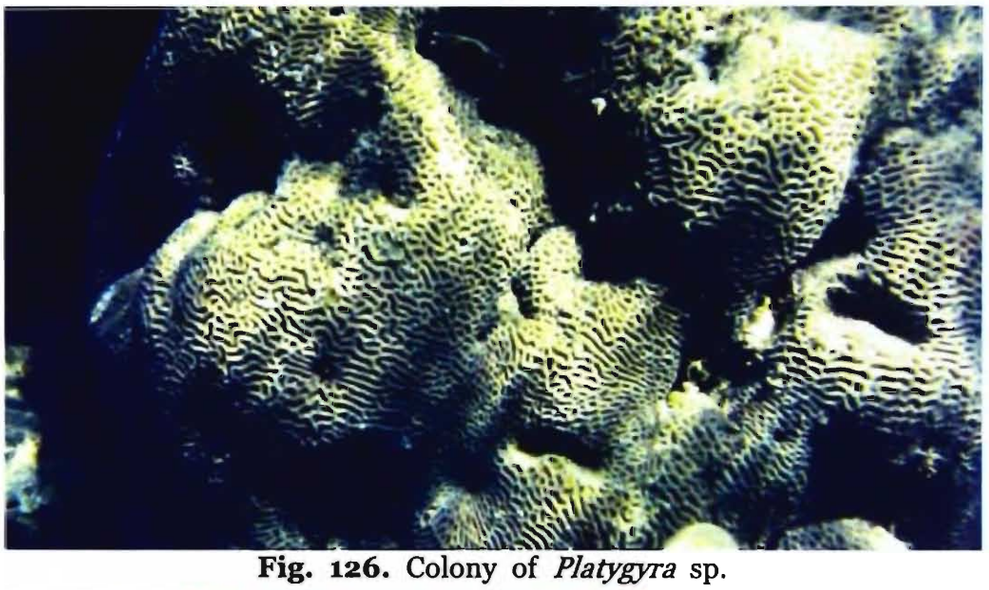

Fig. 126. Colony of *Platygyra* sp.

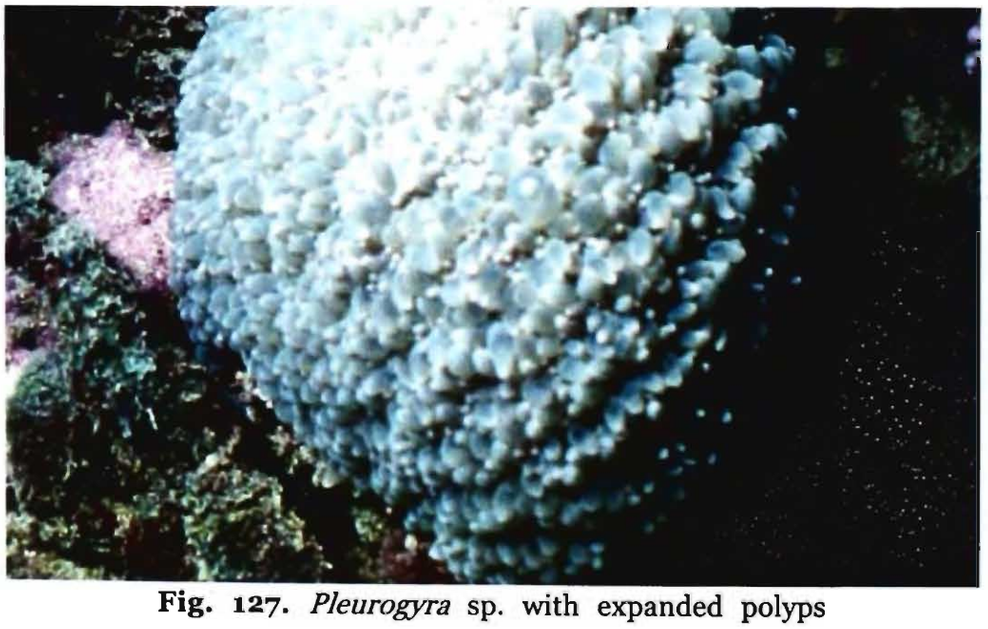

Fig. 127. *Pleurogyra* sp. with expanded polyps

Fig. 128. *Goniopora* sp. colony with expanded polyps

Fig. 129. Common coral *Pocillopora verrucosa*

Fig. 130. *Pocillopora danicornis*

Fig. 131. *Pavona decussata*

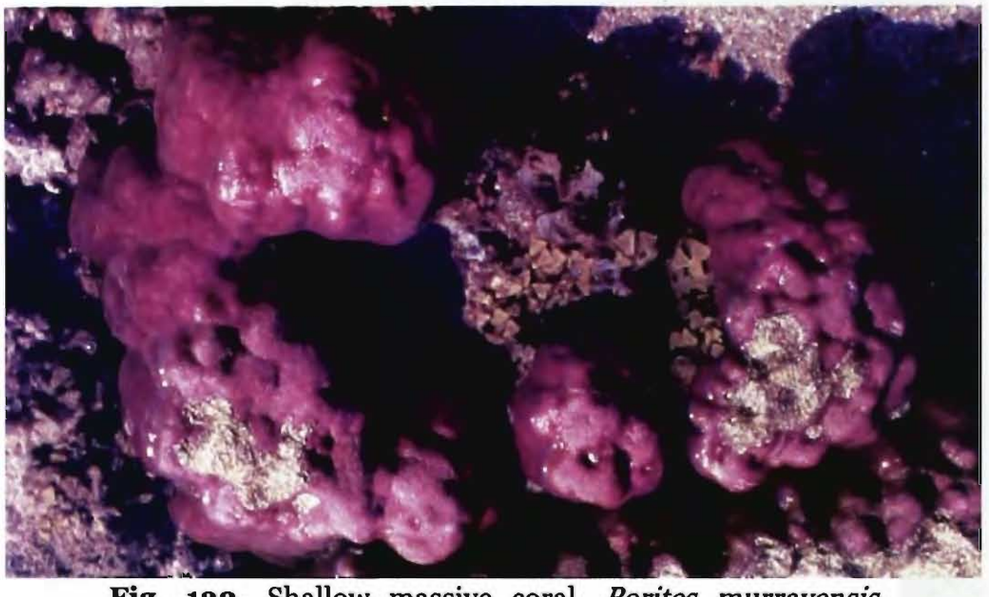

Fig. 132. Shallow massive coral, *Porites murrayensis*

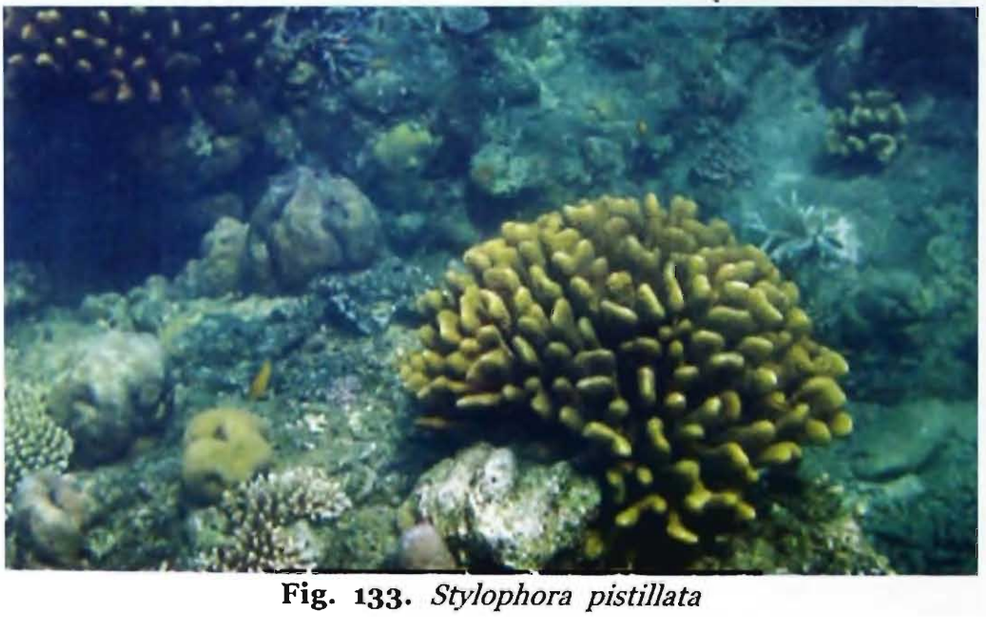

Fig. 133. *Stylophora pistillata*

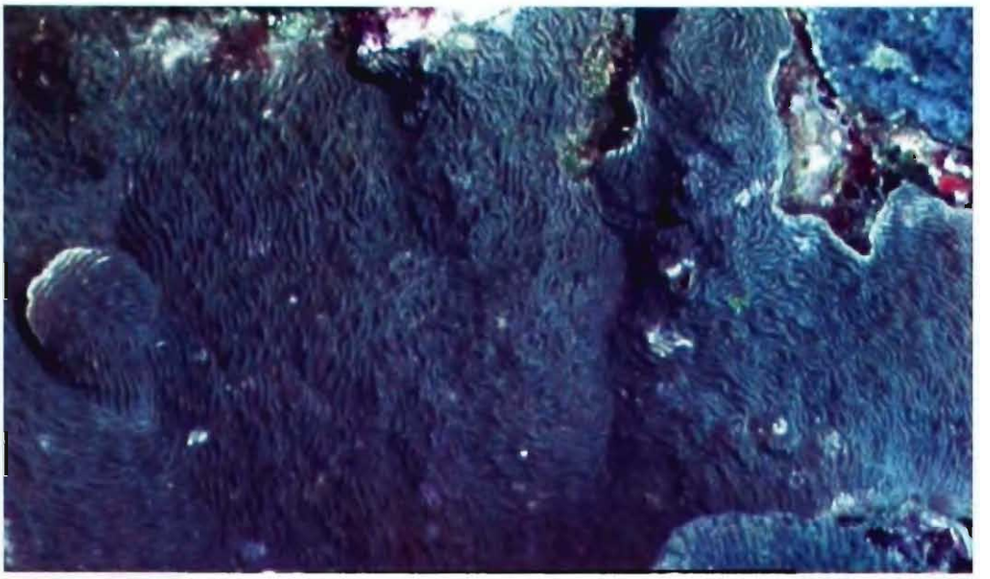

Fig. 134. Encrusted coral, *Leptoseries* sp.

Fig. 135. Huge massive coral, *Porites lobata*

Fig. 136. Brain coral, *Symphyllia radians*

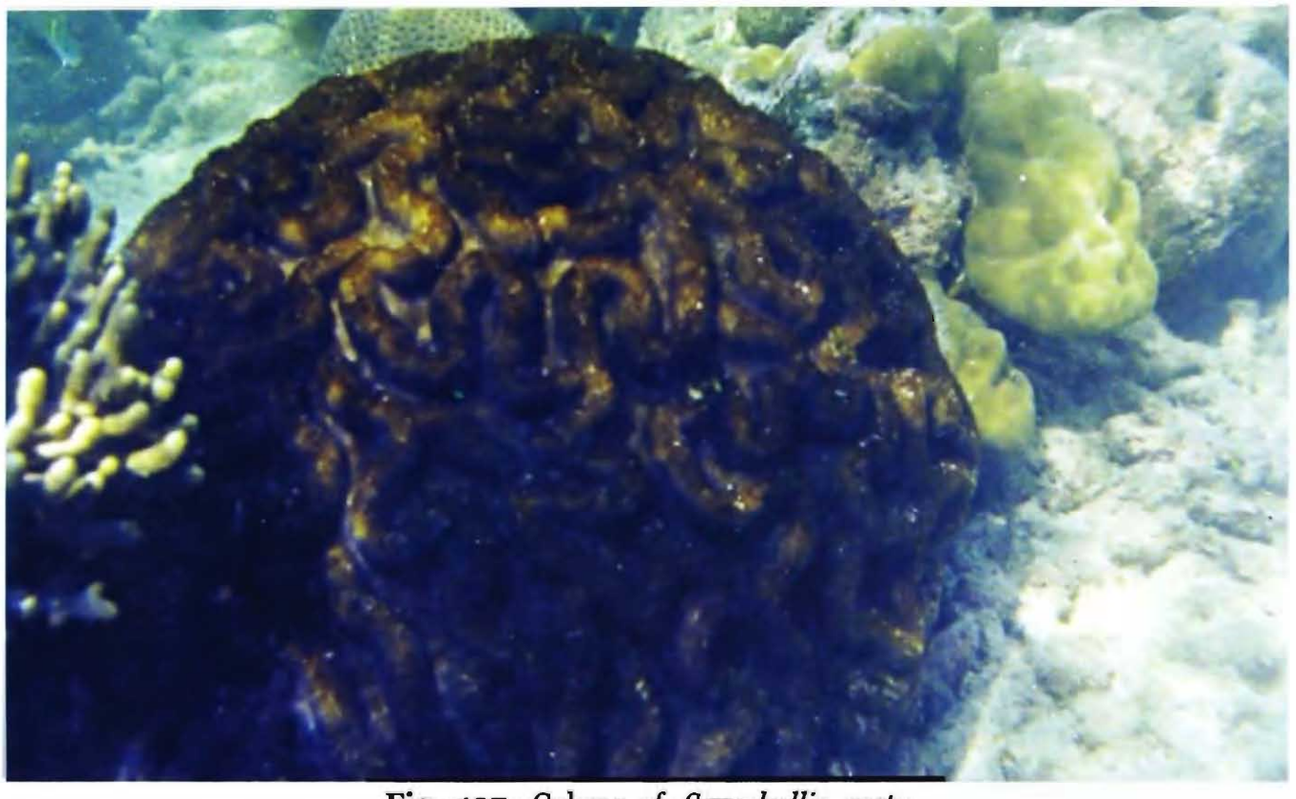

Fig. 137. Colony of *Symphyllia recta*

Fig. 138. Colony of *Tubastrea aurea*

SOFTCORALS, SEAFANS AND SEAWHIPS
(Cushions and fans of the Sea)

Soft corals or octocorals (Subclass Octocorallia) are colonial forms and are the most common and widely distributed group of sessile, benthic macro-invertebrates after stony corals found in all tropical marine waters. Occur in encrusted or attached form on hard and semi-hard substrate of reefs. Most of the species found on the continental shelf and slope but few are found at great depths. The soft and fleshy texture of the soft corals is due to presence of tiny skeletal fragments or horny material (sclerites) present within the tissues. But the forms like *Tubipora musica* (Red coral), *Heliopora caerulia* (Blue coral) have hard skeletal body like true hard corals. The diversity of colony morphology is greater than that of any other encrusting marine forms. Externally many species look alike and specimens of the same species may also often appear different. The colonies have diverse forms such as the long branches, tentacle-like, lobular, funnel or mushroom-like discs (Alcyonaceans), whip-like (Whip corals), arborescent (Nephithids), fan-like (Gorgonians). Many species reproduce asexually and create monospecific dense carpet beds composed of large number of colonies spread over several square meters on coral rocks. Most of the species belong to Alcyoniidae found up to 10 to 12 m depth in abundance, but species belong to Nephtheidae and Xiniidae found on reef slopes below 8 m depth and gorgonians grow in shallow to moderate depths. These are bushy and arborescent with prickly or bristly appearance in bright colours attached to reef caves, terraces, vertical walls and overhangs.

The distribution and abundance of the soft corals depends on wave exposure, depth, slope of substratum, turbidity etc. Most of the species are able to tolerate the conditions like desiccation, heavy sedimentation and low salinity. All the softcorals, except the members of Pennatulacea, are typically fixed by a basal attachment to hard substrata but few species have developed other adaptations for holding the colony. Some enclose a lump of mud in a basal expansion and some species develop root like rhizoid attachments. The polyp bearing portion is usually restricted to the terminal or sides of the colony i.e. branches or lobes and lobules. Usually the base of the colony is a sterile stalk without polyps.

All the members of the sub-class Octocorallia are exclusively polypoid coelenterates with a mouth invaginated to form a tubular pharynx and gastro-vascular cavity partitioned by thin non-calcareous septa called mesenteries. They are usually monomorphic with all polyps identical and performing the same tasks called autozooids. In massive forms, the polyps are dimorphic. There are eight tentacles around the upper end of the pharynx. When the polyp withdraws, the tentacles are either folded over the oral disc or retracted into the gastrovascular cavity. The internal skeleton consists of sclerites or spicules of calcium carbonate. The arrangement of spicules, their size, shape and distribution in polyps and in various layers of the coenenchyme has systematic importance. The soft corals are prolific calcium carbonate producers but the extent to which these soft corals contribute to the formation of reef limestone is not known since this material is in the form of minute spicules, easily dissolves in the water and is carried away by the currents. The massive alcyonaceans possess densely spiculed coenenchyme and the lower dead part gets consolidated with the reef while the upper parts of the colonies remain alive. Most soft corals are various shades of green, yellow and brown. The

colour of the colonies is largely due to the presence of single celled algae, zooxanthillae, that live within their tissue. About 221 species of octocorals are recorded from the Andaman and Nicobar Islands (Rao and Kamla Devi, 2003).

The most common soft coral associates are small reef fishes, crabs, shrimps, sea cucumbers, brittlestars, anemones, sponges, molluscs, copepods and seaweeds. But their exact symbiotic relationship with the softcorals is not much known. The most common and complicated relationship has been found in the case of ovulid gastropods, which seem completely dependent upon their alcyonacean hosts. The mollusc may feed on the polyps without causing much damage and death of the colony or may only feed foreign materials that deposited on the colony. The other interesting soft coral-mollusc relationship is between the softcoral *Sinularia* sp. and the snail *Rapa* sp. The gastropods living imbedded deep in the fleshy tissue of the soft coral practically cause no damage to the host. Small doriid nudibranchs are also found common on many alcyonaceans. Brittlestars, small reef crabs and bivalves live in association with gorgonians apparently causing no damage to hosts.

The corals and their associated fauna particularly the sponges, molluscs, gorgonids, soft corals, etc. are the store houses of many bio-active compounds which possess antimicrobial, antiviral, antihelminthic, anticoagulant, antispasmodic, antidepressant, antihypertensive, bronchodilator, antileukemic and other properties. Currently, world over, intensive studies are on way to establish the therapeutic properties of the bioactive compounds of these animals. Presence of various chemicals such as Lobolide, Sarcophine, Lobophytollide, Crassolide, Sinulariolide, Sinularin, Cassinacetate, etc. is well established (Rao *et al.,* 1996). These compounds exhibit very interesting biodynamic and anti-neoplastic properties. These discoveries may lead to the synthesis of 'miracle drugs' in future.

Fig. 139. Soft coral *Lobophytum* sp. on reef slope

Fig. 140. Colony of *Sarcophyton* sp. with expanded polyps

Fig. 141. *Sarcophyton ehrenbergi* colonies on reef slope

Fig. 142. Extensive patches of *Sinularia gibberosa*

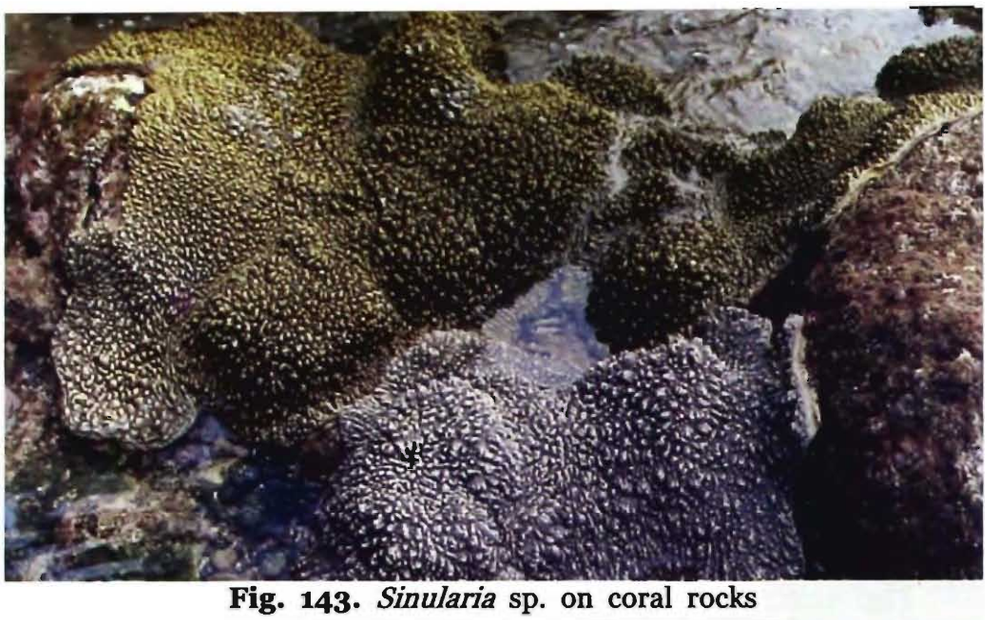

Fig. 143. *Sinularia* sp. on coral rocks

Fig. 144. *Lobophytum* sp. grown like propeller blades

Fig. 145. Invasion of *Lobophytum crassum* in shallow waters

Fig. 146. Prolific growth of *Sarcophyton infundibuliforme*

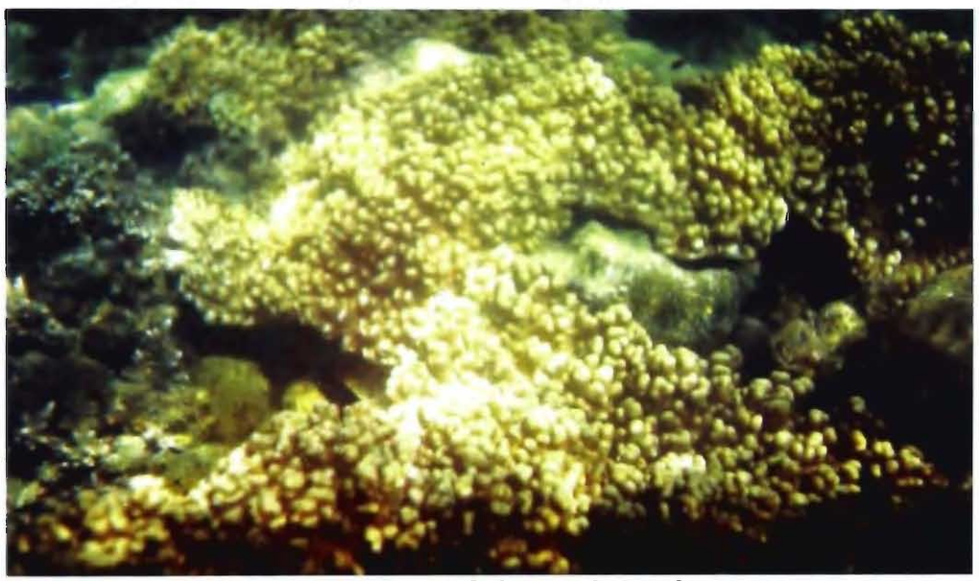

Fig. 147. Encrusted form of *Sinularia* sp.

Fig. 148. Soft coral, *Cladiella australis* colony

Fig. 149. Colony of *Lobophytum hirsutum*

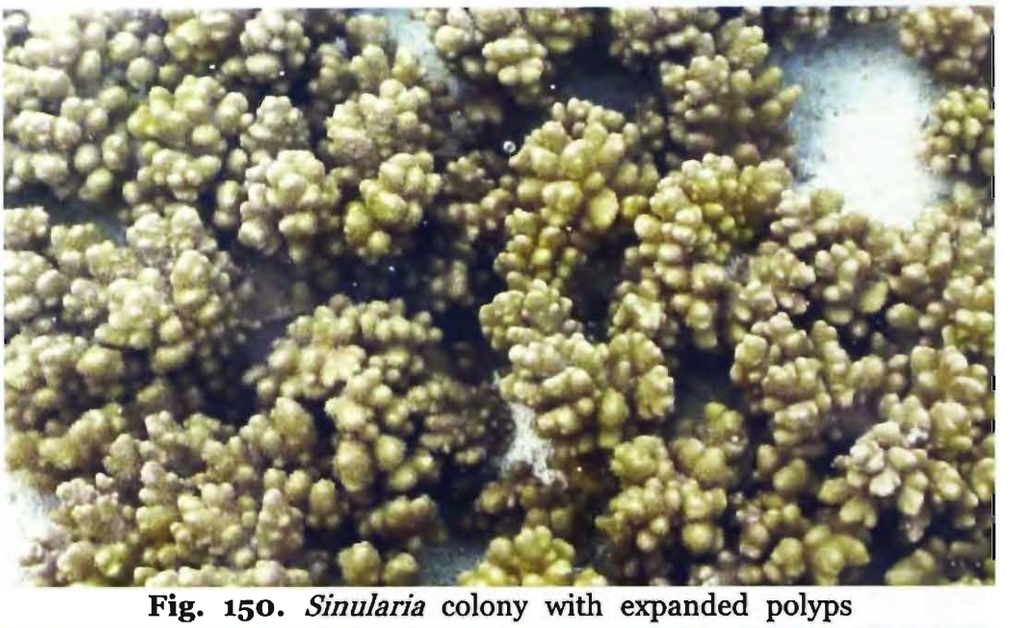

Fig. 150. *Sinularia* colony with expanded polyps

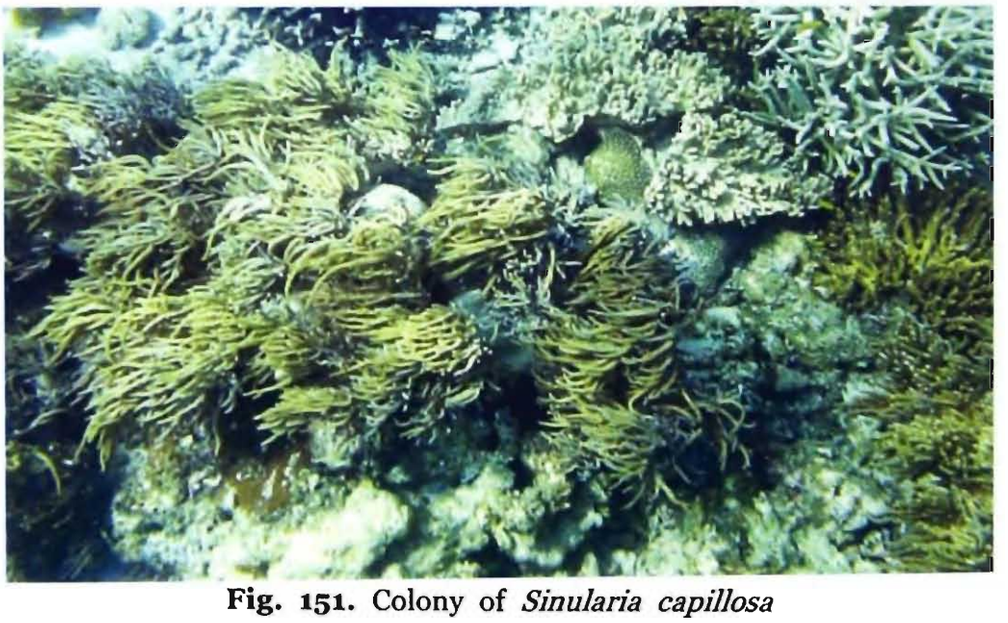

Fig. 151. Colony of *Sinularia capillosa*

Fig. 152. Soft coral, *Capnella parva.* in intertidal waters

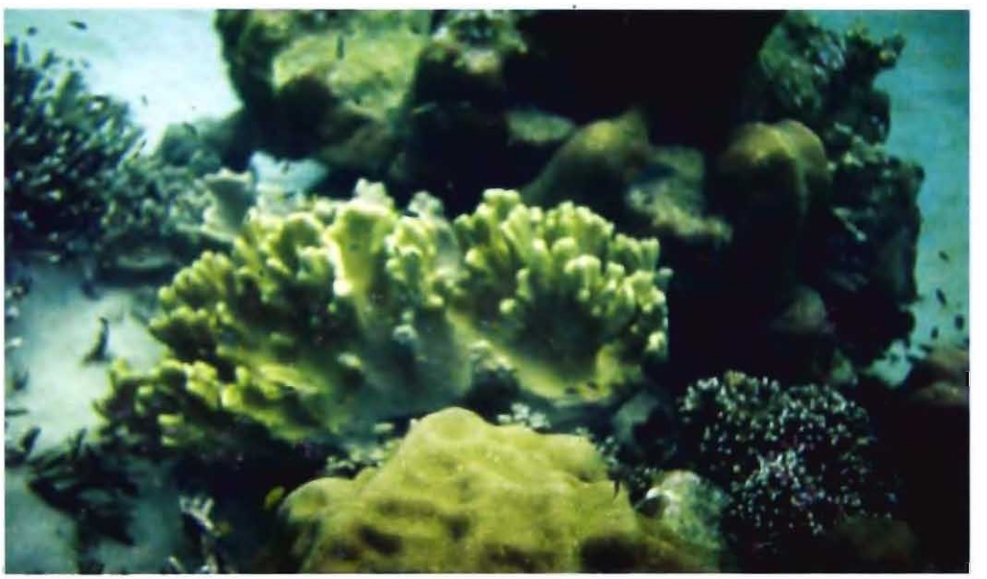

Fig. 153. *Lobophytum* sp. growing among hard corals

Fig. 154. Soft coral, *Dendronephthea* sp.

Fig. 155. *Nephthea* sp. on reef slope

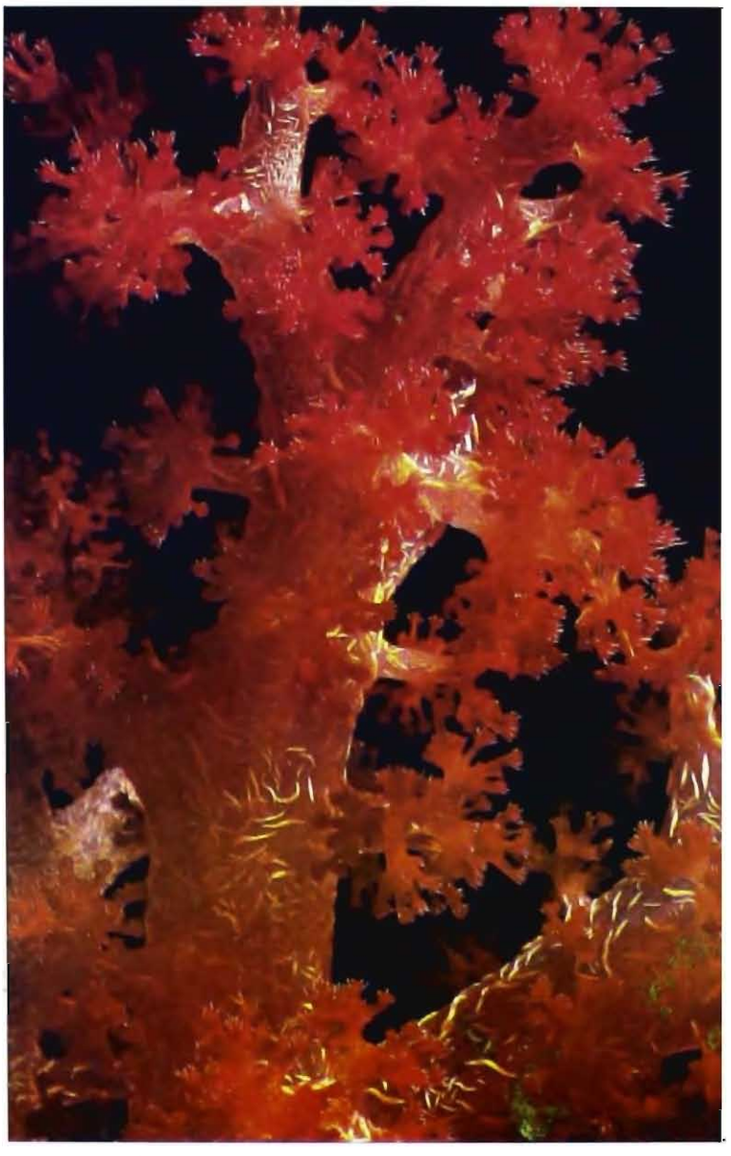

Fig. 156. Brilliant red *Nephthea* sp.

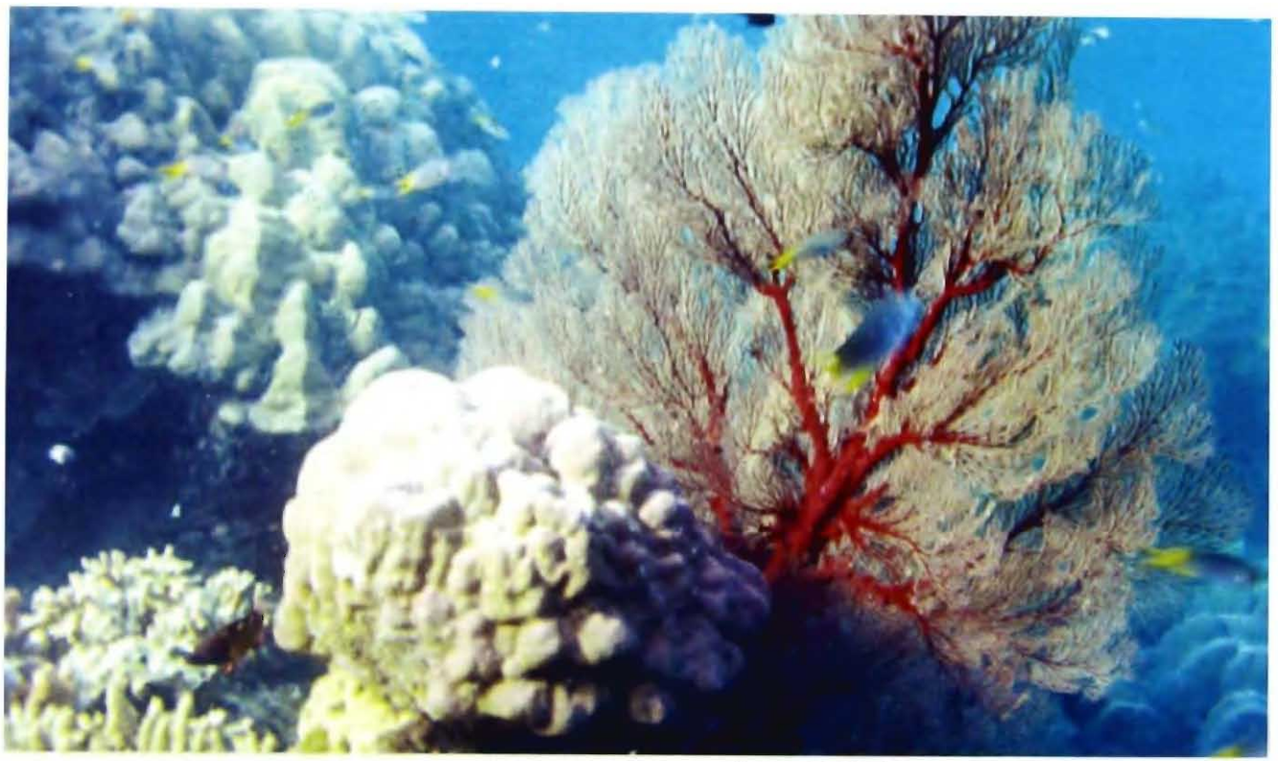

Fig. 157. A gorgonian colony on reef slope

Fig. 158. Seafan, *Gorgonia* sp.

Fig. 159. Seafan, species of *Plexauridae*

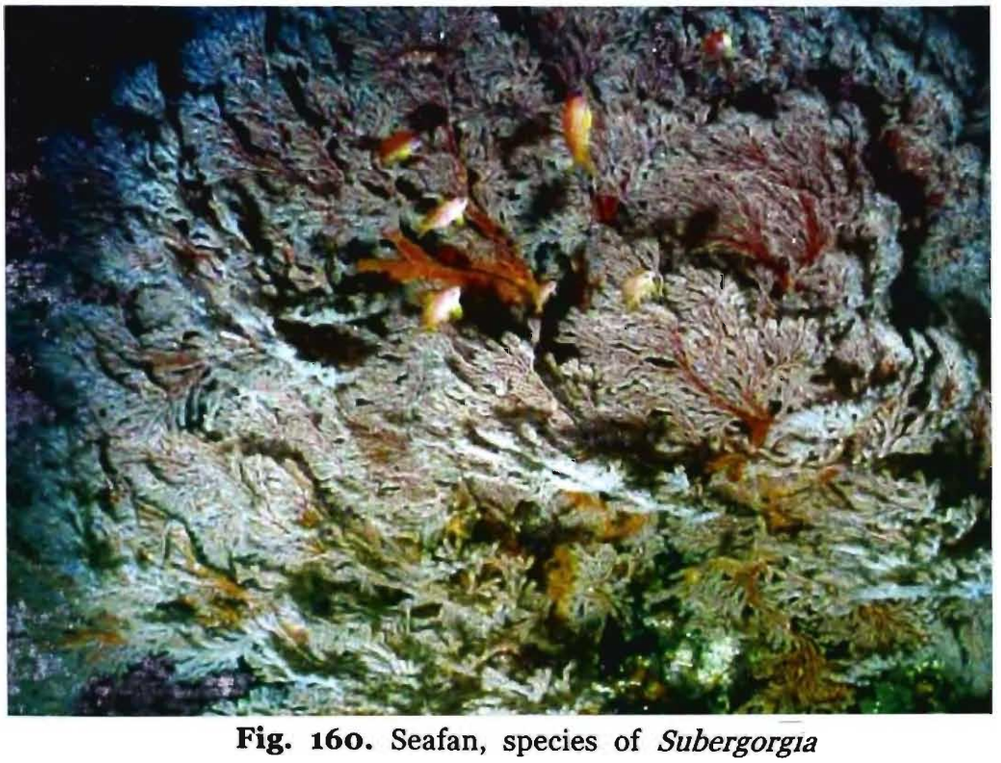

Fig. 160. Seafan, species of *Subergorgia*

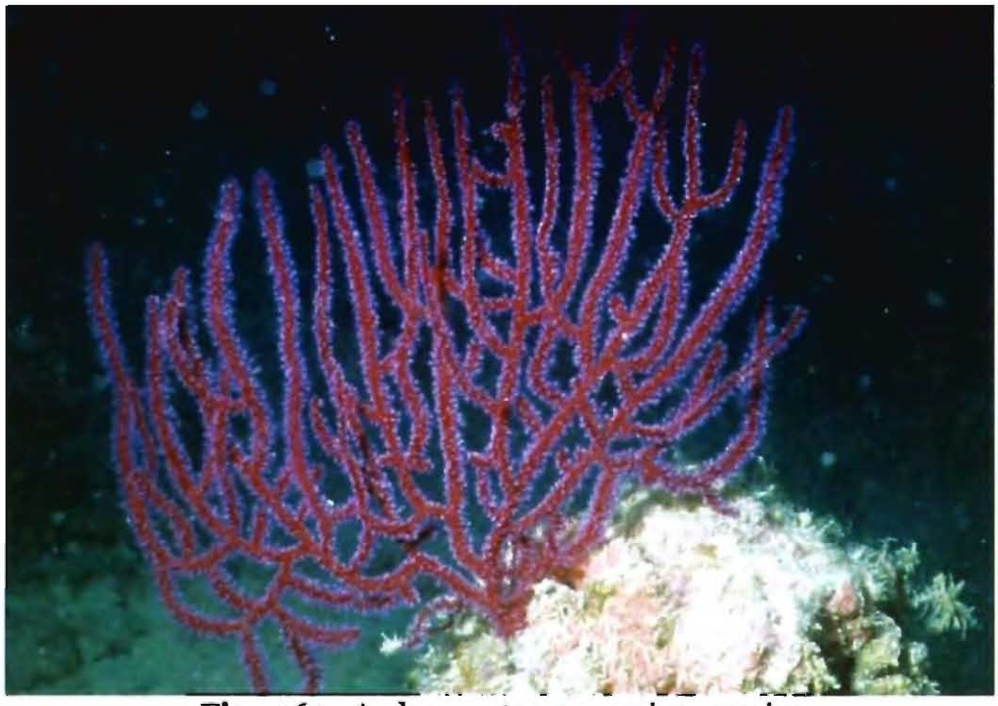

Fig. 161. A deep-water gorgonian species

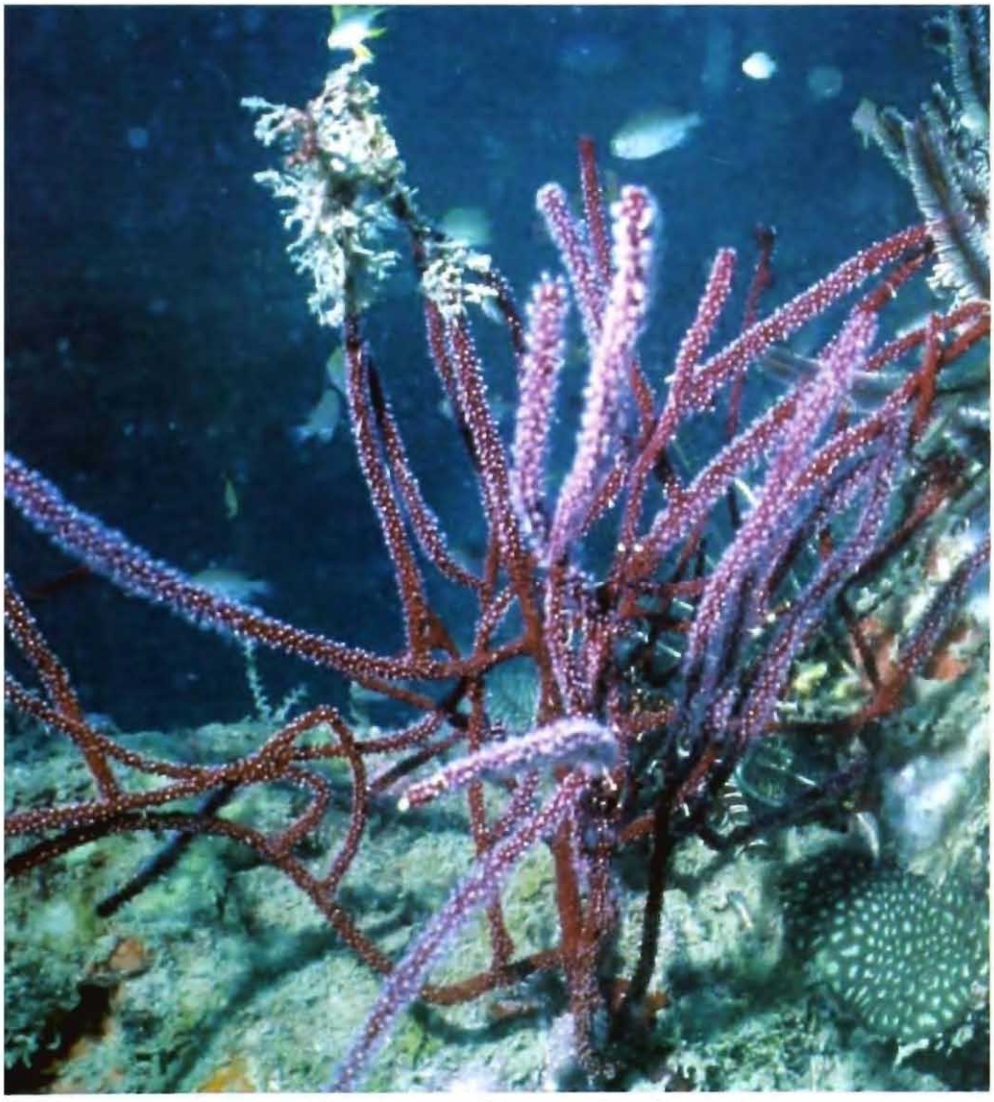

Fig. 162. Whip coral colony

Fig. 163. Whip coral, *Juncella* sp. and bivalve, *Spondylus* sp.

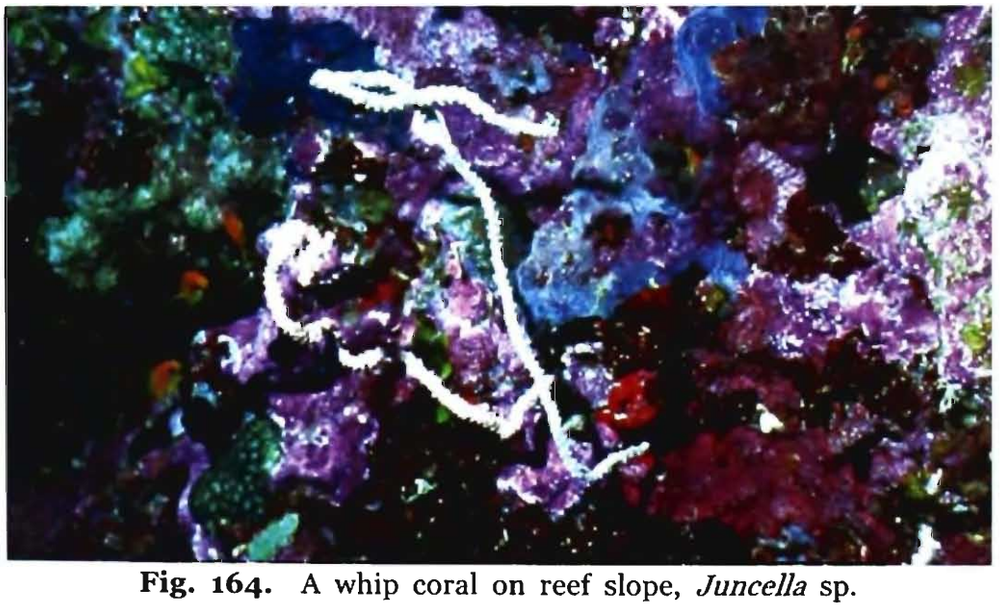

Fig. 164. A whip coral on reef slope, *Juncella* sp.

REEF WORMS
(Cryptic creatures of the reef)

The worms are very inconspicuous and found abundant, but are the most important components of the reef ecosystem. They live in a variety of microhabitats and most of the worms are burrowers that live in dead rocks, coral stones or on silt, sand or rubble bottoms of the reefs. The burrowing forms are more destructive in nature. They weaken the reef base and destroy the hard substrata by making holes and endless tunnels. Polychaetes (Annelida), flatworms (Platyhelminthes) and ribbonworms (Nemertea) are the most important and common worms encountered on reefs.

Polychaetes : Polychaetes are very common segmented marine worms found plentiful in reefs. Due to their secretive habits, the casual observers easily overlook the worms. They have a variety of shapes and life styles. Over 5400 species of polychaetes have been described so far world over. The majority of them are less than 10 cm in length. Many polychaete worms are beautiful and strikingly coloured red, green or pink or with a combination of different colours and some are iridescent. The most common and visible polychaetes found on coral reefs are feather dust and Christmas tree worms. The body is cylindrical and segmented each bearing a pair of lateral paddle-like appendages known as parapodia. Anterior end bears well developed eyes, antennae and a pair of palps. The worms are either free-living or sedentary. The free-living or surface dwelling crawling worms live beneath coral stones and shells, in coral crevices and rocks, in algae, and among hydroids, bryozoans etc. The *Nereis* is the common worm found under rocks, among coral stones or crevices. Many scale polychaetes found live on body of other organisms. The scale worms are so named because of the presence of peculiar scales on the dorsal surface of the body. They are often overlapping and cover the entire dorsal surface. Some worms are pelagic and planktonic. The planktonic forms are transparent and swim with the help of parapodia. More sedentary polychaetes have become adopted for burrowing. They construct mucus-lined galleries, within which they live. Some occupy more or less fixed simple vertical or U-shaped burrows excavated in the sand or mud substratum. Tubicolus polychaetes live in tubes composed of sand grains or shell fragments cemented together with the secretions. The most beautiful sedentary polychaetes are the feather dusters or fan worms (Serpulids) and Christmastree worms (Sabellids). Their prostomium or anterior part of the head developed to form a funnel-shaped or spiral crown consisting of several ciliated pinnate processes called radioles. The radioles are rolled up when the worm withdraws its head into the tube. Sabellids build membranous or sand grain tubes and Christmas tree worms secrete calcareous tubes that are attached to rocks, coralss and shells. The boring polychaetes, representatives of different families including Eunicidae, Terebellidae and Sebellidae, make burrows within dead or live molluscan shells and corals. Young worms settle on coral heads and secrete a tube that kills the underlying polyps. Subsequently, the new coral growth quickly surrounds the tube. Meanwhile the worm secretes additional tube material to keep pace with the growing coral and lives permanently in this tube. Only the brightly colored, feather-like feeling tentcles protrude from its burrow. The Christmas tree

worms, *Spirobranchus*, with brightly coloured spiral tentacles are seen in large numbers on living coral heads. The tube-building polychaetes like *Chaetopterus* sp. sometimes smother variety of corals and weaken the coral skeletons. Many polychaete worms proved destructive to corals bed but many Sabellariid polychaete worms construct mound-like and tubular aggregations, some times forms distinct reefs. The commensal polychaetes live in tubes and burrows of other polychaetes and on crustaceans, hermit crabs, echiuroid worms, corals, seaurchins, seacucumbers and seastars. Many scale polychaetes found associate with sea cucumbers, sea stars and molluscs. These worms display the colours similar to those of the host and their setae modified for clinging.

Polychaete worms are predacious, but some are herbivorous, scavengers or deposit feeders. Sexes are separate in majority of the worms. The synchronous release of sperm and eggs into water takes place for fertilisation. The fertilized eggs develop into free-swimming larvae known as trochophore. After a brief period of planktonic existence, the larvae settle onto the bottom and transform into an adult worms.

Fig. 165. Tube dwelling polychaetes *Sebella melanostigma*

Fig. 166. *Porites* coral with Christmas tree worms, *Spirobranchus giganteus*

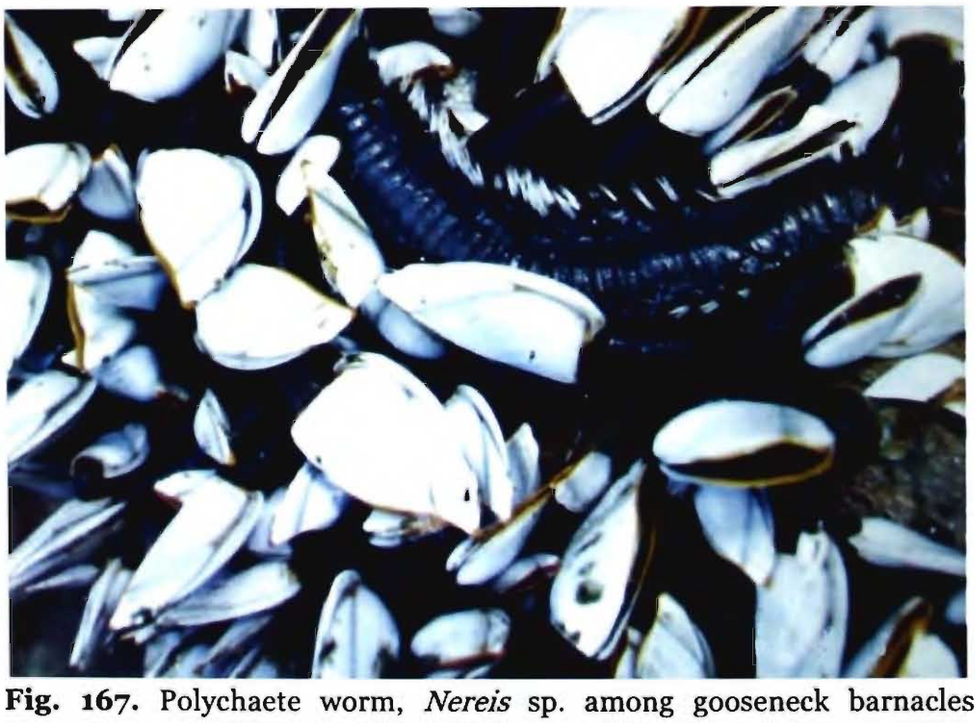

Fig. 167. Polychaete worm, *Nereis* sp. among gooseneck barnacles

Flatworms : The flatworms belong to the phylum Platyhelminthes comprise free-living flatworms (Polyclads), and entirely parasitic flukes and tapeworms. The members of the phylum are thin oval bodied and dorso-ventrally flattened. The polyclad flat worms of the class Turbellaria are primarily marine inhabitatnts. They are bottom dwellers that live on coral reefs, in sand, mud, undertones and on seaweeds. It is extremely difficult to notice them in their habitat. The body is very flat and more or less oval in shape. Their size ranges from 3 to 60 mm in length. A pair of small dorsal tentacles may be present. The minute cilia present on the ventral surface of the body help in creeping. Many flatworm species exhibit very striking colour patterns and shades of black or brown. Their bright colors probably warn predators that they are toxic or distasteful. They are predacious; feed on protozoa, rotifers, small annelid worms, barnacles and some on living oysters. The flat worms have tremendous regeneration capacity; the fragmented body pieces can grow into a new animal. Apart from this, they can also reproduce sexually.

Ribbon worms : The Ribbon worms (Nemertinea) are also familiar inhabitants of coral reefs. Most of them are marine forms but few species are parasitic or commensals within the gill chambers of crabs and in the mantle cavities of bivalve molluscs. Their bodies are flattened, un-segmented and elongated. They are also known as proboscis worms because of the presence of extendible proboscis used in capturing food. Most species are usually 2-4 cm, but few species grows to a length of 5 to 20 cm. There is no distinct head, but anterior end with side lobes are lanceolated. Most nemerteans are pale but some are brilliantly coloured. Usually reef species live under coral blocks, rock crevices, algae and some burrow in soft bottoms. They move by a combination of cilia and muscular undulations. They feed on small living or dead invertebrates like annelids, molluscs and crustaceans. Sexes are separate in most flat worms. Fertilisation is external. Development may be direct or through larval stage.

Peanut worms : Sipuncula is a relatively small phylum of free-living marine worms known as peanut worms. Over 165 species belonging to 17 genera and six families so far recorded in the world. About 37 species under 10 genera and five families are known from the Indian coast, of which about 29 species are recorded from Andaman and Nicobar Islands (Haldar, 2004). It is a common and widespread group frequently occurring in large densities from intertidal to deep waters. They live in cryptic habitats such as burrows in sand, under rocks or crevices in the coral rocks. Sipunculan worms are common inhabitants of dead coral and calcareous rocks of the reefs and play an important role in the erosion of the substratum, but they occur less frequently with living corals. They are considered to be the significant component of the coral reef communities as they are one of the key destructive agents of the reefs. The breakdown of reef blocks is a result of the boring activity of sipunclulans.

Sand burrowing forms belong to the genera *Sipunculus* and *Siphonosoma* are found in all the coral habitats. These are usually large and cylindrical in shape. The most common species, *Sipunculus nudus* is found under dead coral blocks, while *Sipunculus indicus* is found in large numbers on sand flats. *Siphonosoma cumanense*, another common species, is found in coralline sand under rocks and dead coral blocks. The sand burrowing sipunculans convert the coralline sand into

mud. The most common rock boring bio-eroders are the *Aspidosiphon steenstrupii*, and *Phascolosoma perlucens, P. albolineatum Antillesoma antillarum, Cloeosiphon aspertillus* and *Themiste lageniformis*. They occur with great abundance and diversity in intertidal to shallow subtidal waters. Each burrow has only one opening and the sipunculan occupies the burrow with its anterior end directed towards the opening. The animals fit tightly into the burrows. A single rock may contain a number of burrows harbouring two or more species. The burrows of some species are long, narrow and sinuously meandering extending far into the rock. The actual mechanism of boring by sipunculans is still not known clearly. It may be through the process of chemical secretions and mechanical action of the worms. Sipunculans are one of the principal components in the diet of few predators associated with coral reefs and adjacent habitats. Large number of reef dwelling fishes feed on sipunculans in addition to other invertebrates. Among the invertebrates, only a few are known to prey on sipunculans such as gastropods like *Mitra* spp., *Xanchus* spp., some species of asteroids and crustaceans like *Carcinus* and *Eupagurus* crabs. There are several instances of human consumption of sipunculans in the past history by the natives of Java, West Carline, Palau and China. The natives of Zanzibar, Madagascar, Maldives and Lakshadweep use the sipunculans as bait for collecting fish and crabs.

Fig. 168. Flatworm of coral rubble areas

Fig. 169. Common Flatworm of silty reef areas

Fig. 170. Peanut worm (Sipunculid) found in coral bocks

Fig. 171. A rare worm of reefs

CRUSTACEANS
(Hard creatures of the Sea)

The crustaceans are the common and dominant group on the reefs after fishes and molluscs. They play an important role in the reef ecosystem and occupy a basic position in aquatic food chains. These creatures are very alert and cryptic. It is very difficult to detect and catch them in their habitat. Their sizes, shapes, colours and mode of life are extremely varied. The most familiar forms like crabs, shrimps, lobsters, and isopods to microscopic organisms (copepods) are members of the class Crustacea belongs to the Phylum Arthropoda. The major portion of the plankton and interstitial fauna consists of microscopic crustaceans only.

Most of the crustaceans are marine forms except few semi-terrestrial, terrestrial and freshwater. So far, more than 30,000 species have been included in the class. All crustaceans are characterized by presence of segmented body, jointed limbs or appendages and presence of hard calcified external skeleton known as carapace. Because of the continuous growth of the animal, the shell or carapace shed at regular intervals and replace by the process known as moulting. The body consists of two regions, the cephalothorax and abdomen. Usually the lateral margins of carapace overhang the sides of body to some extent, and in some cases completely enclose the entire body like the valves of a clam. One of the unique features of the crustaceans is presence of two pairs of antennae and pincer-like claws. The appendages are capable of moving in all directions. These appendages help in locomotion, feeding, sensory, respiration, sperm transmission and egg brooding. Majority of the crustaceans are adapted for crawling and burrowing habit but few are able to swim (swimming crabs) with the help of modified swimming appendages.

Usually crustaceans are dioecious, but barnacles and members of few other groups are hermaphrodite. Sperm transfer occurs through copulation by modified appendages of males. They brood their eggs for different lengths of period. Presence of a free-swimming planktonic larval stage, known as 'nauplius', is characteristic feature of the marine crustacean forms. The young crustacean is known as postlarva. In many forms the intermediate larval stages such as metanauplii, protozoea, zoea is present. In some cases, the postlarval stages are distinctive, often referred with different names such as the megalops of crabs, mysis of lobsters etc.

Decapods or ten legged crustaceans : Decapods such as crabs, lobsters, shrimps or prawns are the most familiar and diverse crustaceans seen on coral reefs. Many of them are encountered in shallow to deep waters. Usually they hide under stones, crevices, burrows, coral rubble or seaweeds for a long period and come out at night for feeding. They form an integral part of food chain on reefs. Predators like fish feed on crabs and shrimps in large quantities.

Shrimps and lobsters : Shrimps and lobsters are bottom dwellers and swim sporadically. They live among algae, seagrases, beneath the stones, and within holes and crevices of coral rocks. The commercially important *Penaeus* sp. rests on the surface or buried during the day in the sand or mud and active at night. The pistol or shooting shrimps belongs to the family Alphaeidae are common and widely distributed on coral reefs. While walking on the reef, one can hear the peculiar shooting noise *-tup-tup-* is produced by these shrimps. Some shooting shrimps, *Alpheus* sp. construct tubes by using filamentous algal mats. The shrimp pulls the

mat around itself, using one of the slender pointed legs as a needle and the algal filaments as thread, stitches the edges of the mat together. Many snapping shrimps as well as other shrimp species live in associate with sponges, tunicates, corals, bivalves, seaurchins, and sea anemones. The so called 'cleaner shrimps' *Stenopus* sp. fearlessly enter the mouth and gill cavity of many coral reef fishes, such as groupers, triggers and moray eels, remove ectoparasites and other unwanted material from surface of the bodies. The lobsters and cryfish are the most commercially important crustaceans throughout the world. Their long abdomen contains large amount of meat. In the tropical waters the spiny lobster *Panulirus* sp. are common. They are nocturnal and inhabitants of rock holes, reef caves and bottom of the coral blocks. Their carapace is always longer than width bearing a depressed rostrum with very large spiny antennae. They crawl with the legs but can move rapidly backward to escape by flexing the abdomen ventrally.

Fig. 172. Shallow reef lobster, *Panulirus versicolor*

Fig. 174. Reef lobster, *Panulirus longipes*

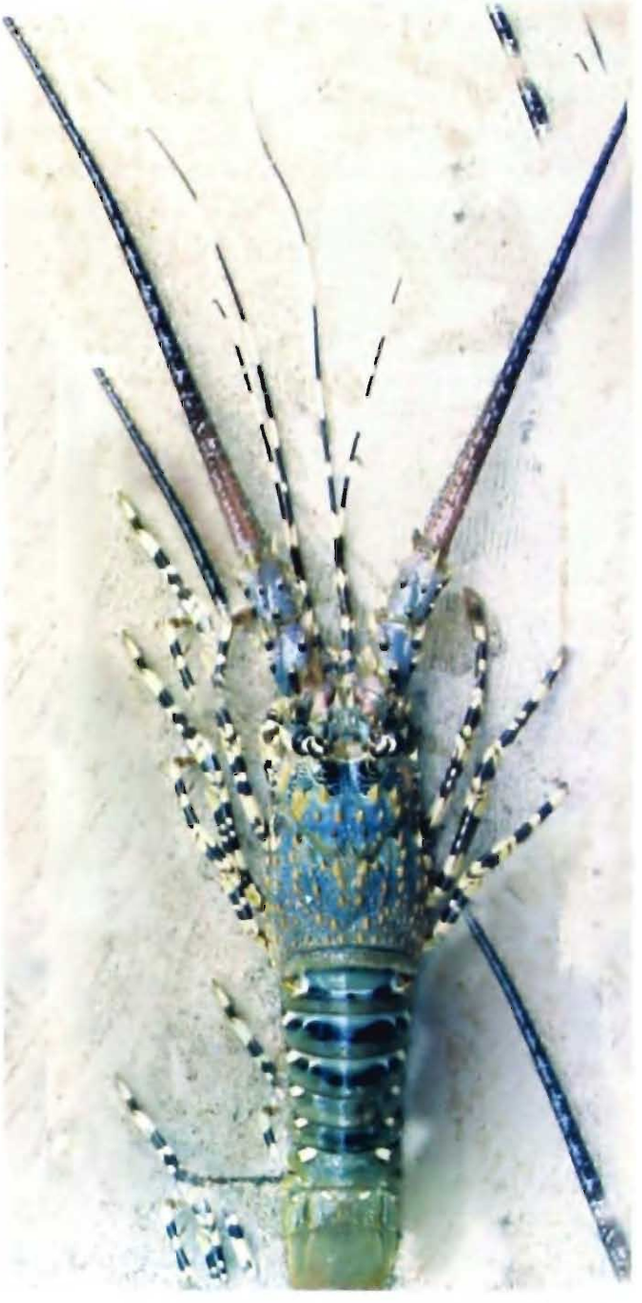

Fig. 173. Reef lobster, *Panulirus ornatus*

Fig. 175. Reef lobser, *Panulirus* sp.

Fig. 176. Slipper lobster, *Thenus orientalis*

Fig. 177. Cleaner shrimp of corals reefs, *Stenopus* sp.

Fig. 178. Piston shrimp, *Alpheus macrosceles*

Crabs : The Brachiurans or true crabs have highly specialised short body forms. The abdomen is greatly reduced and fits tightly beneath the cephalothorax. The body is almost flat due to broad carapace, often as wide as it is long. Crabs commonly move side ways, especially when crawling rapidly. Crabs are encountered in all types of habitats such as coral reefs, mudflats, rocky shores, sandy shores and mangrove belts from shallow to great depths. The ghost and fiddler crabs (family Ocypodidae) are readily distinguished by large erect eyestalks. The Ghost crabs *Ocypode*, which lives in burrows above the high tide mark on sandy beaches, are among the fastest running crabs. The Xanthids or dark-fingered crabs (family Xanthidae) are the most diverse forms and found in large numbers in reef habitats. Many species have dark or dark-tipped claws. Common tropical shore crabs belongs to the family Grapsidae are easily recognized by the presence of broad-fronted, square-backed body, which lives just above the water on wave-washed rocks, climbs and clings to vertical surfaces of the rocks and rock caves. Most crabs cannot swim, but members of the family Portunidae, which includes the common edible mud or mangrove crab *Scylla serrata*, *Portunus pelagicus*, etc. are the most agile and powerful swimmers of all crustaceans. Their last pair of legs broadly flattened for swimming and burrowing. They can swim sideways, backward, and sometimes forward with great swiftness.

Although the strong claws of chelipeds are important in defense, other protective devices and habits are also seen in many brachyurans. Some species carry sea anemones with their chelipedes. The triangular convex bodies and slender legs of some spider crabs are covered with hooked setae to which foreign objects become attached. Some small crabs belongs to the family Dorippidae decorate their backs and legs with coralline algal filaments and other material like sponges, shell pieces, etc. to camouflage. It is extremely difficult to detect in their habitat unless keenly observed when they move. In some species, the body becomes completely overgrown with sponges and other sessile organisms. Some species of small crabs live in the mantle cavity of bivalves, snails, cloaca of sea cucumbers, on sand dollars, in the tunnels of burrowing shrimps and on other animals. Many small crabs of porcelanid, parthenopid, pinnoterid, galatheid etc. found associate with sponges, softcorals, sea pens, gorgonians, crinoids, holothurians, hard corals particularly branched and digitate forms and maintain symbiotic relationship. They feed on trapped food particles present on the host body and get shelter and protection from other predators. The crabs *Porcellanella quadrilobata* and *P. gakwari* found associate with soft corals and *P. triloba* on Seapens and *Harrovia albolineata*, *Galathea elegans* are commonly found associate with crinoids. The commensal crabs belongs to the family Pinnotheridae known as pea crabs such as species of *Pinnotheris*, *Tetrias* found assiciate with seacucmbers. They usually found remain inside the body near cloaca. The shrimps, *Pereclimenes brevicarpalis*, and some porcellanid crabs always found moving close to the mouth of the sea anemone. These small animals take shelter and protection from the predators by hiding among the tentacles of the anemone.

Usually many estuarine and marine crabs are edible such as *Scylla serrata*, *Portunus pelagicus*, *P. sanguinolentus*, *Charybdis cruciata*, *C. annullata*, *C. miles*, *Thalamita crenata*, *T. prymna* etc. But the flesh of many species of crabs found in and around reef areas are proved poisonous and highly neurotoxic. There are many other species of crabs which are highly toxic throughout the year. The poisonous crabs are brightly coloured and mostly belongs to the family Xanthidae confined to shallow coral reef and rocky habitats (Deb, 1989). The most important poisonous crabs of the reefs are *Atergatis floridus*, *A. dilatatus*, *A. integerrimus*, *Platyodia granulose*, *Zozymus aeneus*, *Carpilius convexus* and species of *Demania*, etc.

Fig. 179. Small reef crab, *Arcaria septemspinosa*

Fig. 180. Shallow reef crab, *Aulacolambrus* sp.

Fig. 181. Shallow sandy reef crab, *Calappa lophos*

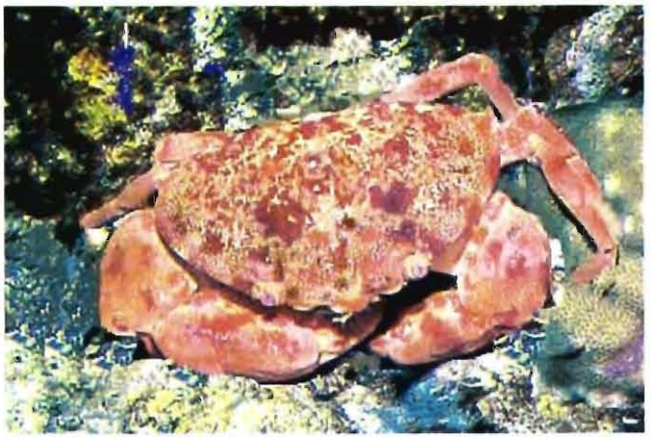

Fig. 182. Reef crab, *Carpilus convexus*

Fig. 183. Poisonous reef crab, *Carpilus maculates*

Fig. 184. Swimmer crab, *Charybdis* sp.

Fig. 185. Small reef crab, *Chlorodiella nigra*

Fig. 186. Shallow reef crab, *Atergatis floridus*

Fig. 187. Common reef crab, *Pilodius pugil*

Fig. 188. Pelagic crab, *Grapsus albolineatus*

Fig. 189. Pelagic crab of rocky reefs, *Grapsus grapsus*

Fig. 190. Shallow reef crab, *Leptodius exaratus*

Fig. 191. *Matuta planipes* found in weedy areas

Fig. 192. *Common* reef crab, *Matuta lunaris*

Fig. 193. Mudcrab, *Scylla serrata*

Fig. 194. Ghost crab of muddy reef areas, *Ocypode ceratophthalma*

Fig. 195. Crab of sandy-mud reefs, *Ocypode macrocera*

Fig. 196. Ocypode crab, *Ocypode sp.*

Fig. 197. Pelagic reef crab, *Portunus pelagicus*

Fig. 199. Swimmer crab, *Charybdis feriatus*

Fig. 198. Shallow pelagic crab, *Portunus sanguinolentus*

Fig. 200. Porcelain crab

Fig. 201. Reef crab *Thalamita* sp.

Fig. 202. Reef crab, *Trapezia formosa*

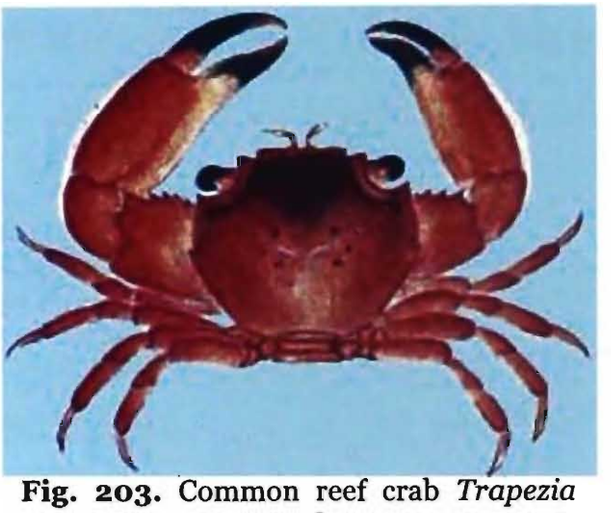

Fig. 203. Common reef crab *Trapezia cymodoce*

Fig. 204. Rocky shore crab *Grapsus* sp.

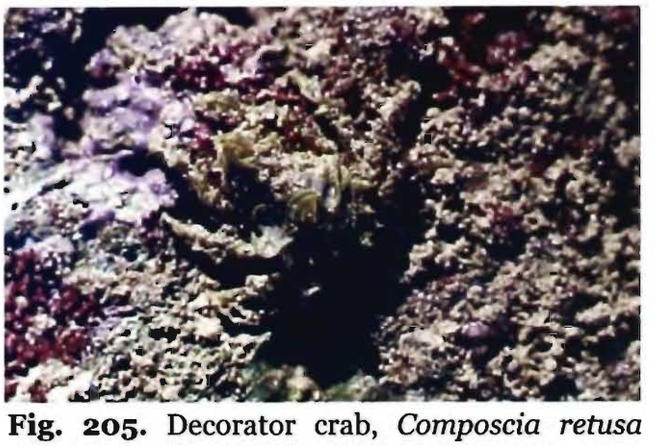

Fig. 205. Decorator crab, *Composcia retusa*

Fig. 206. Common coral crab, *Etisus dentatus*

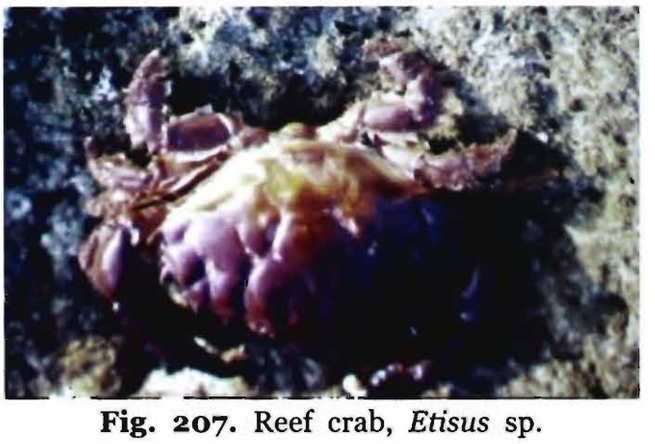

Fig. 207. Reef crab, *Etisus* sp.

Non-decapod crustaceans : Other than brachyurans all other crustaceans, microscopic copepods to large sized robber crabs, are classified as non-decapods or anomurans. Their abdomen is not reduced as in brachyuran crabs, and uropods are usually present. They found in different habitats from shallow to deep burrows, some are planktonic and some are benthic, free or attached to substratum. The burrowing or mud shrimps are shallow water forms that live in long burrows excavated in mud or sand.

The Pagurids or hermit crabs developed the habit of housing their abdomen within the empty gastropod shells. The abdomen is modified to fit within the spiral chamber of the shell. Hermit crabs never kill the original occupant of the shell. Instead, they use empty shells for shelter. Depending on the availability of empty shells in the vicinity, they occupy any type of gastropod shell. When the crab becomes large due to growth, it moves into another shell but does not leave the old shell until a suitable shell is found. The chelipeds of hermit crabs are adapted for blocking the aperture of the shell when the crab is withdrawn. The small porcelain crabs looks like brachyuran crabs live beneath coral stones and in between the branches of corals. The Anemone Hermit crab, *Dardanus deformis*, attaches sea anemones to their legs or shell. Some small shrimps and crabs take shelter among the tentacles of sea anemones to avoid predatory fishes.

Isopods are benthic animals, most of them are marine inhabitants, but few are terrestrial. They are widely distributed and found in all types of habitats. Some are parasitic, known as fish lice, often seen attached to the body of reef fishes. Their size ranges from 5 to 40 mm. Some deep-sea forms may reach to a length of 42cm. Most of them are in shades of gray. Body is dorso-ventrally flattened and adapted for crawling. They can run rapidly over exposed wharf pilings and rocks. Aquatic isopods swim as well as crawl. Some burrowing species construct tunnels through the substratum. *Sphaeroma* sp. bores into the prop roots of mangroves.

Mantis shrimps are the most common and prominent non-decapod crustaceans found on the coral reefs belongs to subclass Stomatopoda. Body dorso-ventrally flattened and elongate; abdomen is large, broad and distinctly segmented. Many stomatopods are brilliantly coloured. Green, blue, and red with mottling are common, and some species like *Lysiosquilla maculata* is striped black. Most stomatopods live in burrows on the bottom or in rock or coral crevices. They come out from their hiding places for feeding and swim with a looping motions. Sometimes they are seen moving fast across the bottom and retreating quickly in to their burrows or sheltered corners of the coral blocks when distrubed. They are greedy predators; feed on small fish, shrimps, crabs, worms and molluscs. More than 70% of the plankton constitutes crustaceans like copepods, ostracods, amphipods, isopods and mysids and play a vital role in the food chain of reef dwellers.

The other familiar and common marine animals are barnacles; the only sessile group of crustaceans belongs to the class Cirripedae. They are found attached to rocks, corals, shells, floating logs and to any other floating objects including ships. Many species of barnacles are parasitic but some are commensal on whales, turtles, fish and other animals. The body externally covered with a series of calcareous plates. The opening of the carapace directed upward and enables the animal to

project its long thoracic appendages for scooping planktonic forms. The stalked barnacles known as gooseneck barnacles usually attach to substratum with the help of a leathery stalk. The hard-shelled acorn barnacles look like volcano projections are stalkless, attached to intertidal rocks and roots of mangrove trees.

Fig. 208. Hermit crab out of shell, *Dardanus magistos*

Fig. 209. Hermit crab, *Clibanarius* sp.

Fig. 211. Common mantis shrimp, *Harpiosquilla* sp.

Fig. 210. *Mantid shrimp, Heterosquilla spinosa*

Fig. 212. Mantis shrimp, *Oratosquilla* sp.

Fig. 213. Green squilla, *Squilla* sp.

Fig. 214. Mantis shrimp of coral rubble, *Squilla* sp.

Fig. 215. Banded mantis shrimp, *Lysosquilla maculata*

Fig. 216. Barnacles, *Tetraclita* sp.

Fig. 217. Acorn Barnacles, *Tetraclita sp.*

Fig. 218. Gooseneck barnacles, *Lepas* sp.

Fig. 219. Parasitic isopods on reef associate scombrid fish

MOLLUSCS (Sea shells)
(Incredible sea creatures)

Molluscs or seashells are the world's largest group next to arthropods in abundance of species and number. Next to vertebrates, they are the best known animal group. They are distinguished by the presence of a muscular foot, a hard calcareous external shell secreted by the mantle and a feeding organ with a band of recurved chitinous teeth, known as radula. Their diversity, colours and patterns and adaptability are so amazing that they are encounterd in all habitats *viz.* freshwater, marine and terrestrial. Over 100,000 species have been described so far apart from fossil forms from the world. Large number of molluscs comprising gastropods, bivalves, nudibranchs, chitons and cephalopods are found and live in association with coral reefs.

Gastropods : Gastropods are the most common and conspicuous shells found on coral reefs particularly on coral rubble, dead coral blocks, rocks, boulders, sand, mud and seaweed areas than on live coral beds. Over 75,000 species have been described so far. Of which more than 50% gastropods are encountered in reef areas. They possess an asymmetrical spiral shell, which offers protection from predators and adverse conditions. The entire body concealed inside the shell. The muscular foot helps in locomotion; the only part comes out from the shell. The mucus secreted by the foot reduces the friction and helps in smooth and secure crawling. When it disturbed, the foot is completely retracted into the shell and a thick membranous sheath known as operculum firmly covers the aperture of the shell. The mantle layer of the animal secretes the calcium carbonate matrix of the shell throughout the lifespan. The varied shell shapes, colours, and pattern are simply superb. Gastropods have wide range of feeding habits. Usually they feed on algae and detritus. Trumpet shells, frog shells, and helmet shells feed on starfishes, seaurchins, sanddollars, sponges, worms etc. Murex shells feed on other small molluscs and barnacles, auger shells feed on small invertebrates while cone shells feed on worms, small shells and fishes. The dog whelks live on sand and mud bottom feed on dead animals. Some *Drupa* shells feed on coral polyps. The top shells, turban shells, strombs, murex shells, cones, scorpion shells, abalones, helmet shells, trumpet shells, chanks, cowries, olives shells, agur shells etc. are the most common and commercially important gastropods found in large numbers on coral reefs.

Fig. 220. Turban shell, *Turbo marmoratus*

Fig. 221. Topshell, *Trochus niloticus*

Fig. 222. Common tigercowry, *Cypraea tigris*

Fig. 223. Deer Cowry, *Cypraea vitellus*

Fig. 224. Lynx Cowry, *Cypraea lynx*

Fig. 225. Carnelian Cowry, *Cypraea corneola*

Fig. 226. Arabic Cowry, *Cypraea arabica*

Fig. 227. Money cowry, *Cypraea annulus*

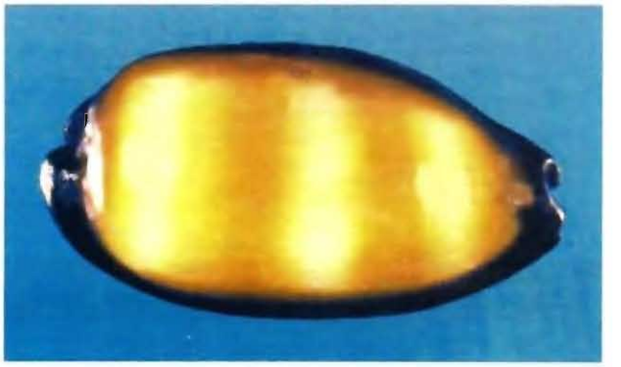

Fig. 228. Money cowry, *Cypraea talpa*

Fig. 229. Cowry, *Cypraea* sp. on reef

Fig. 230. Variety of cowries on reef

Fig. 231. Coneshell on dead coral rock, *Conus* sp.

Fig. 232. Cowry shell, *Cypraea* sp.

Fig. 234. Cowry, *Cypria* sp.

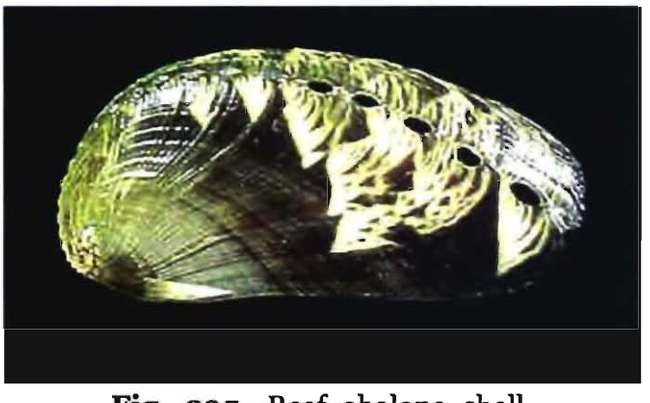

Fig. 235. Reef abalone shell, *Haliotis asinine*

Fig. 236. Scorpion shells, *Lambis chiragra*

Fig. 237. Common spidor shell, *Lambis truncata*

Fig. 238. Scorpion conch, *Lambis scorpinus*

Fig. 239. Rare reef gastropod, *Mitra mitra*

Fig. 240. Nerite shells of rocky reefs, *Nerita costata*

Fig. 241. Thais tuberosa

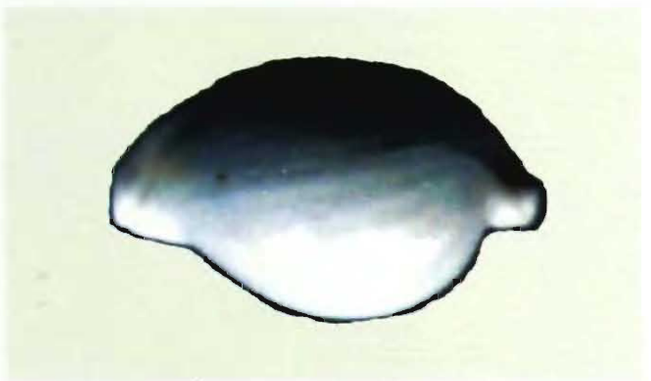

Fig. 242. Egg cowry, *Ovula ovum*

Fig. 243. Olive Dog whelk, *Nassarius pullus*

Fig. 244. Musicaria Agurshell, *Terebra areolata*

Fig. 245. Spindle shell, *Fusinus* sp.

Fig. 246. Common reef shell, *Fasciolaria* sp.

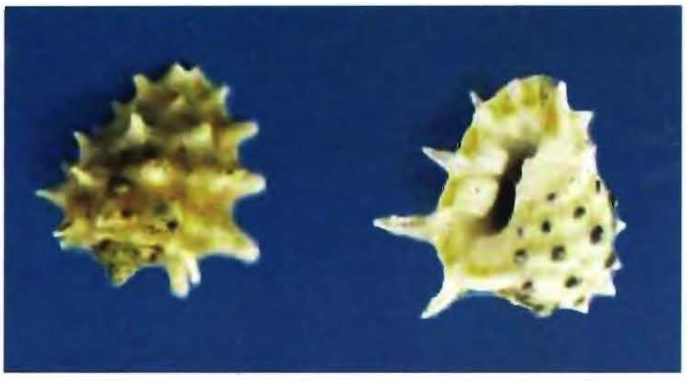

Fig. 247. Small gastropods of reef, *Drupa ricinus*

Fig. 248. Ramose murex, *Chicoreus ramosus*

Fig. 249. Common Reef shell, *Chicoreus* sp.

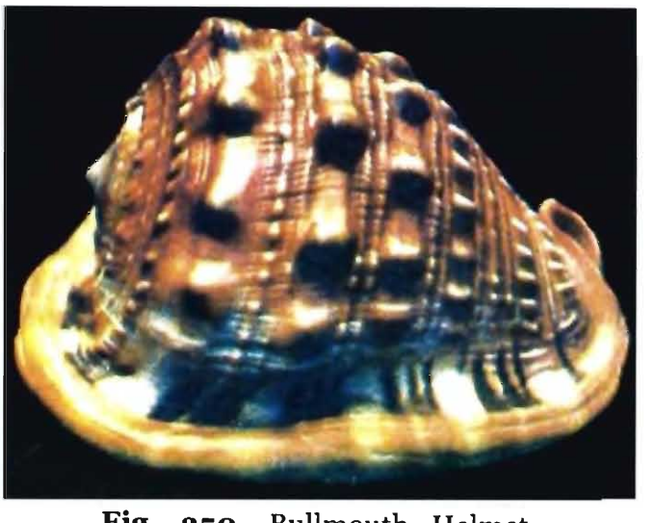

Fig. 250. Bullmouth Helmet, *Cypraecassis rufa*

Fig. 251. A common *Conus* sp. of sandy-mud areas

Fig. 252. Horse conch shell, *Pleuroploca trapezium*

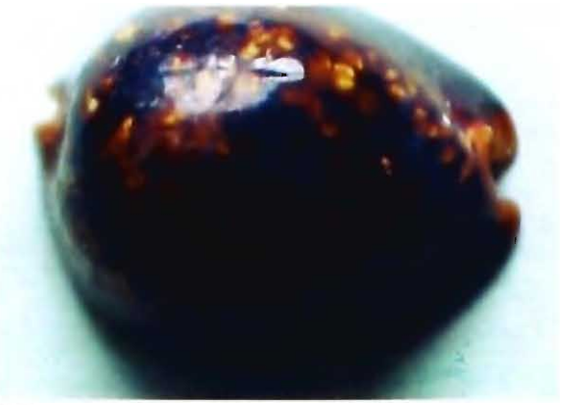

Fig. 253. Humpback cowry, *Cypraea mauritiana*

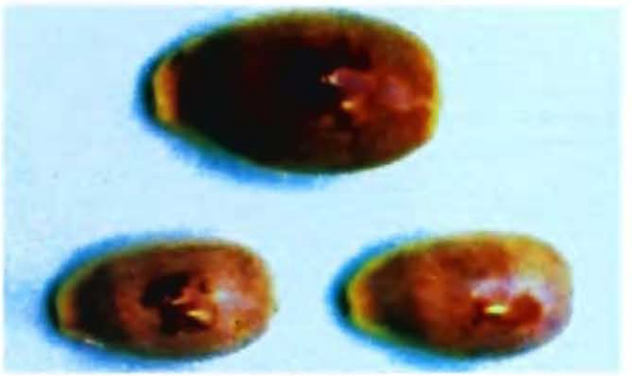

Fig. 254. Wandering cowry, *Cypraea errones*

Fig. 255. Serpent's head cowry, *Cypraea caputserpentis*

Fig. 256. Moore Olive, *Oliva vidua*

Fig. 257. Radiate top, *Trochus radiatus*

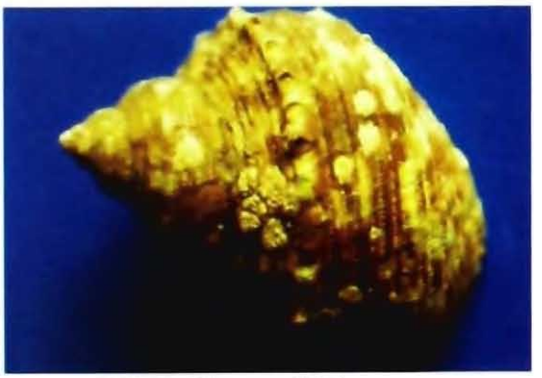

Fig. 258. Brown Pacific Turban, *Turbo bruneus*

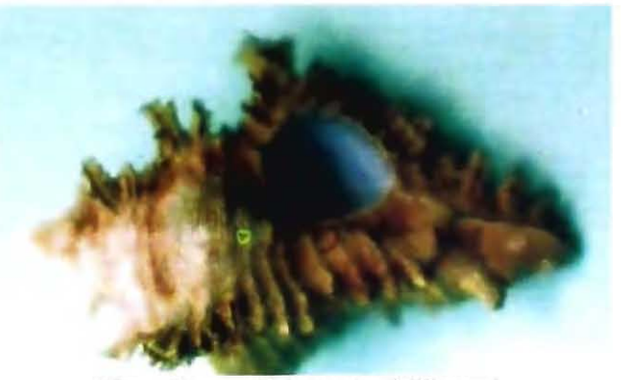

Fig. 259. *Chicoreus kilburni*

Fig. 260. Nerite shell, *Nerita plicata*

Fig. 261. Common Earshell, *Haliotis varia*

Fig. 262. Carded turban, *Turbo (Marmarostoma) sparverius*

Fig. 263. Tuberculara Gyre Triton, *Gyrineum natator*

Fig. 265. Hebrew cone, *Conus ebraeus*

Fig. 264. Chocolate Spotted Auger, *Terebra subulata*

Fig. 266. Turtle limpet, *Cellana testudinaria*

Fig. 267. Pacific sugar limpet, *Patelloida saccharina*

Nudibranchs or Seaslugs : The Seaslugs, members of the order Nudibranchia belongs to Class Gastropoda, are the most spectacular and beautiful molluscs. Majority of the nudibranchs, commonly known as seaslugs, are found in all reef habitats. Eventhough they are gasropods, the shell, and mantle cavity are absent. The body is bilaterally symmetrical. The dorsal surface of body is covered with numerous projections called cerata. The cerata may be club-shaped, branched or like clusters of grapes. In some forms secondary gills are present around anus in a circle when cerata are absent. Seaslugs are usually brilliantly coloured red, blue, yellow, orange or green, or a combination of colours. The most common nudibranchs are harlequin nudibranchs characterized by the presence of a pair of tentacles on head and a tuft of gills on rear part of the back. Some nudibranchs are known as phillidiids lack conspicuous gills but possess lumpy ridges on the back. Tuberculated nudibranchs are covered with many finger-like tubercles. Some have leathery gills along the sides of back and tentacles in a cup-like sheath. But some nudibranchs are characterized by presence of expanded fleshy lobe on head and longitudinal ridges on the back. Due to absence of shell and slow moving nature, they have developed different defense mechanisms. Some slugs produce distasteful and toxic secretions from skin glands to avoid predators like fish and some have the brilliant warning colouration. Some show excellent camouflage colouration to avoid detection. The nudibranchs which live among certain cnidarians, sponges, seaweeds and coral rubble often blend with the surroundings effectively. They feed on sponges, bryozoans, ascidians, soft corals, gorgonians, hydroids, algae etc. Nudibranchs are hermaphrodites; both the sexes are present in the same animal. During copulation sperm sacs are exchanged. The fertilised eggs are deposited in colourful ribbon-like strands. Development takes place through free-swimming larval stage.

Fig. 268. A colouful nudibranch species found on reefs

Fig. 270. Colourful nudibranch, *Hexabranchus sanguineus*

Fig. 269. Sea slug *Jorunna funibris*

Fig. 271. A nudibranch, *Asteronotus* sp. with egg mass

Fig. 272. A rare Coral Seaslug *Phyllidia xylanica*

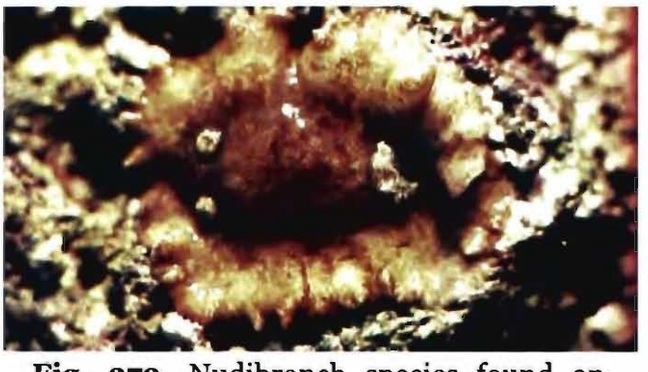

Fig. 273. Nudibranch species found on dead corals

Fig. 274. Small nudibranchs, *Heminoca cymbalum*

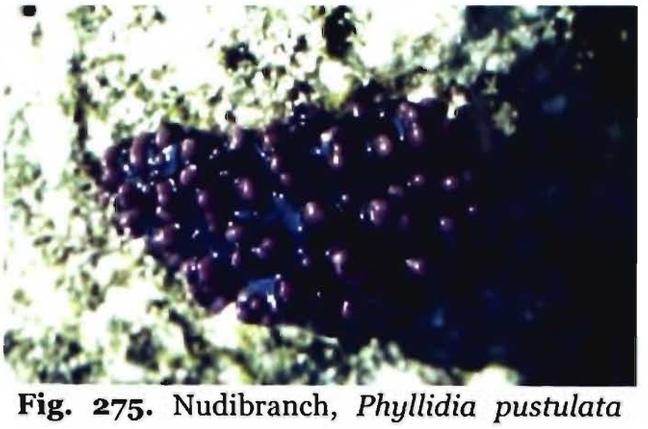

Fig. 275. Nudibranch, *Phyllidia pustulata*

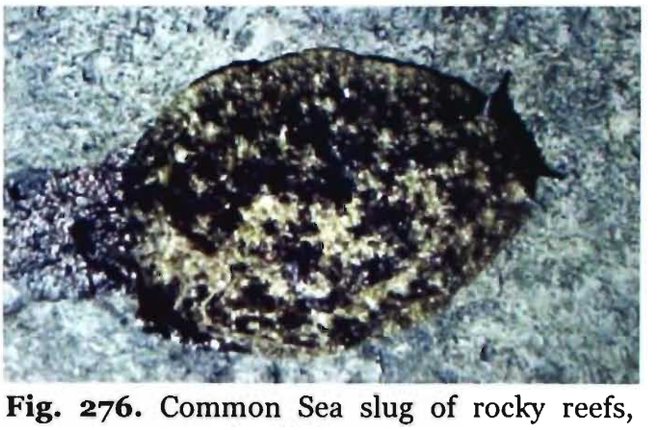

Fig. 276. Common Sea slug of rocky reefs, *Onchidium* sp.

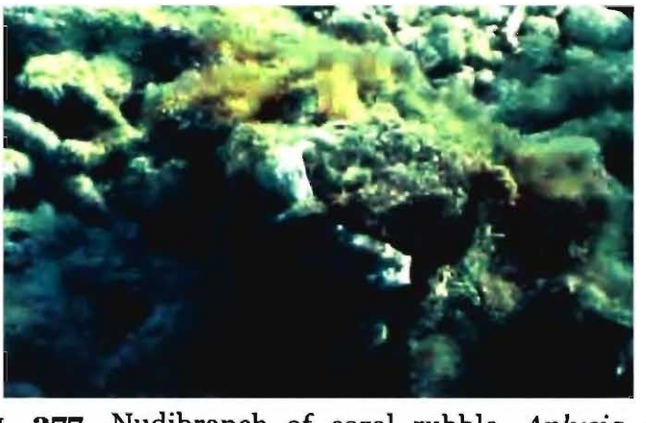

Fig. 277. Nudibranch of coral rubble, *Aplysia* sp.

Bivalves : Bivalves like clams, oysters, cockles and mussels are the common and familiar inhabitants of coral reefs. All bivalves are laterally compressed animals. The body completely enclosed in a two-valved shell hinged dorsally. The shells are more or less oval and convex. The foot is laterally compressed and hatchet-like. The head is greatly reduced, mantle cavity is very spacious and gills are usually very large. They relay on their elaborate gills to filter out food organisms and for gases exchange. Their shells exhibit a great variety of sizes, shapes, surface configuration and colours. They may range in size from tiny seed shells of 2 mm in length to over a meter and weigh over 1000 kg and live over 120 years as Giant clam *Tridacna* sp. Occasionally, when some foreign objects such as sand particles or parasites lodges between the mantle and shell, the nacreous inner layer secretes glittering concentric layers around it and produce a pearl. Those shells having inner nacreous layer can only produce pearls of commercial value. The finest natural pearls are produced by the pearl oysters, *Picnctada* sp.

Majority of the bivalves live in soft bottoms. Some are burrowers or attached to any substratum and some species are unattached surface dwellers. Those live on hard substrate attach themselves by byssal threads or by cementation of one valve to the substratum like coral, rock, man-made sea walls, jetties and pilings. The byssal threads are tough, horny threads secreted by a gland in the foot. The mussels, ark shells and winged oysters are the most familiar bivalves use byssal threads for attachment. Species of *Mitilus*, *Modiolus*, pen shells *Pinna* and *Atrina* partially burry themselves in coarse or soft substrate use byssal threads to anchor firmly. Some borer bivalves have the ability to drill into hard substrates like rocks, coral, shell, wood etc. All clam shells, (*Tridacna* sp.) usually inhabits reefs live vertically oriented with the hinge side down. The opening side of all tridacnids is directed upward and with the large mantle surface protruded across shell. The mantle contains symbiotic zooxanthellae that provide the clam with a supplementary source of nutrition. The clam *Tridacna maxima* bores in coral or coralline rocks contains brilliant colour pigments like blue, green, red, brown or violet in the mantle enhance the beauty of coral reefs.

Fig. 278. A rock oyster among corals, *Hyctissa* sp.

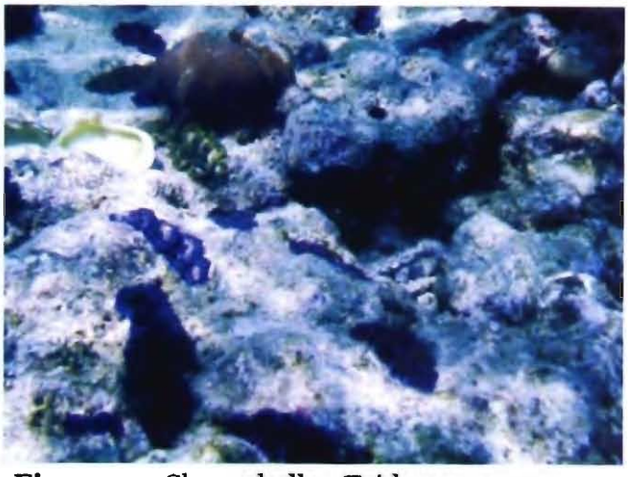

Fig. 279. Clam shells, *Tridacna crocea* on coral rocks

Fig. 280. Giantclam, *Tridacna squamosa*

Fig. 281. Giantclam, *Tridacna maxima*

Fig. 282. Clam shell, *Tridacna squamosa*

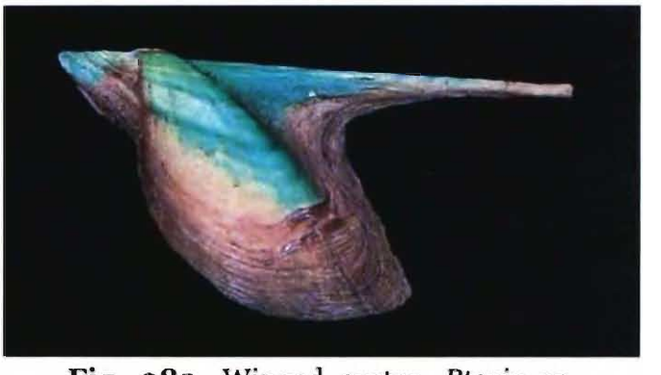

Fig. 283. Winged oyster, *Pteria* sp.

Fig. 284. Rock borer bivalve in coral blocks

Fig. 285. Flame shell, *Lima fragilis* found under coral blocks

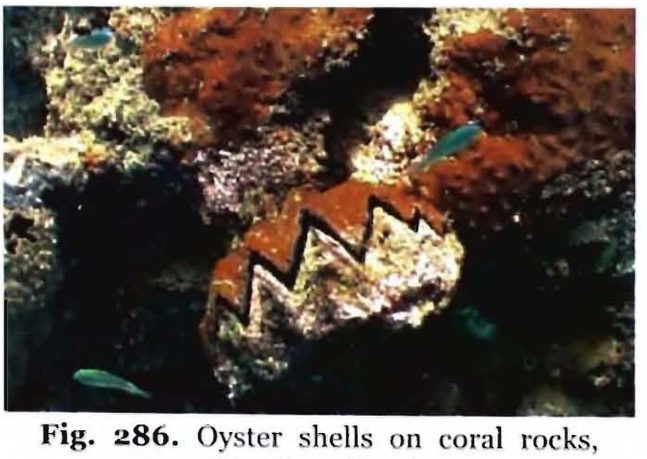

Fig. 286. Oyster shells on coral rocks, *Hyctissa hyctis*

Fig. 287. Mangrove oysters on prop roots

Fig. 288. Spiny bivalve of reefs, *Spondylus* sp.

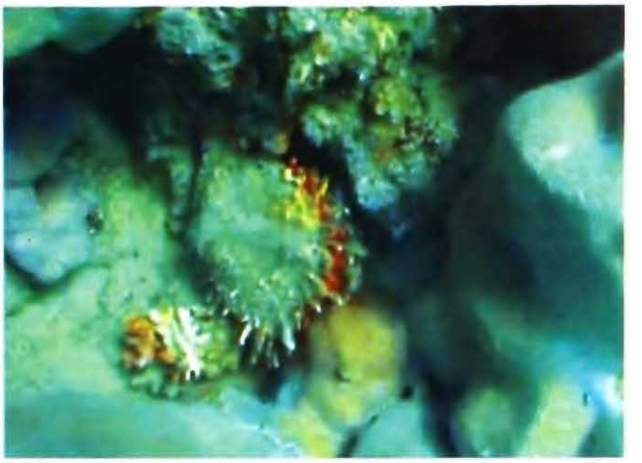

Fig. 289. Spiny bivalve, *Spondylus hysrix*

Fig. 290. Pearl oyster, *Pinctada margaritifera*

Fig. 292. Penshell, *Atrina vexillum* among corals

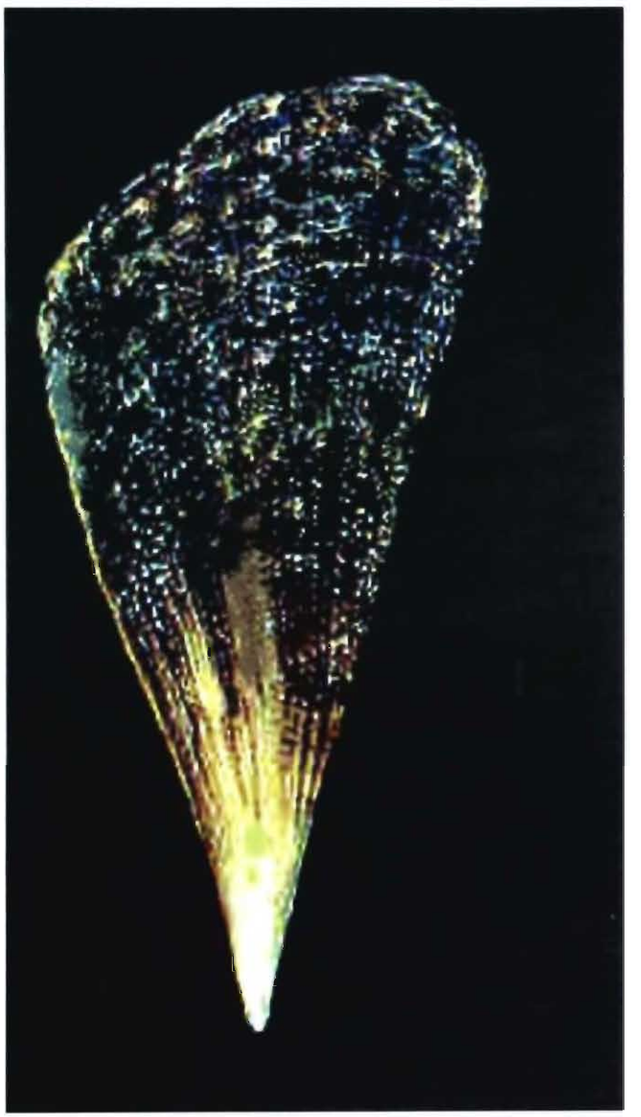

Fig. 291. Penshell, *Pinna bicolor*

Chitons : Chitons are highly specialized molluscs, quite distinct from gastropods and bivalves, adapted for adhering to rocks, coral boulders and shells. They are bilaterally symmetrical, with an ovoid dorso-ventrally flattened body. Head is indistinct, no eyes and tentacles. The foot is very broad and flat occupies most of the ventral surface. The foot helps in adhesion to hard substrate and locomotion. The most distinctive characteristic feature of the chitons is the shell, which is divided into eight overlapping transverse plates. The margins of plates are covered by mantle tissue. The peripheral area of the mantle known as girdle may be smooth or covered with dense bristles, scales or calcareous spicules. It is extremely difficult to remove the animal when it is attached to the substratum. They roll up into a ball if disturbed or dislodged from their place. Chitons are sluggish animals and remain in one place for a long period. They are common rocky inter-tidal inhabitants. Few species inhabits coral reefs. They feed on fine algae and other small organisms that they scrape from the surface of the rocks and shells on which they live.

Fig. 293. A spiny chiton, *Acanthopleura spiniger*

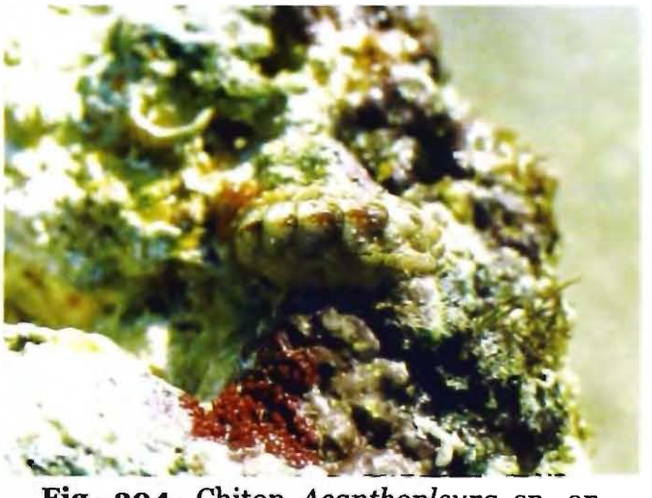

Fig. 294. Chiton *Acanthopleura* sp. on coral rocks

Cephalopods : The cephalopods are most specialized and highly organized members of all the molluscs. The most common and familiar cephalopods are nautili, squids, cuttlefish and octopuses. Even though they do not possess external shell, they have the basic structure of molluscan body with unique modifications. All the cephalopods are pelagic, adapted for raptorial existence, except octopus a less active bottom dwelling form. The head projects into a crown bearing a circle of large prehensile tentacles or arms. *Nautilus* possesses 38 tentacles and lack adhesive suckers or discs, while cuttlefish and squids have only 10 arms. Octopuses (Octopods) have only eight equal lengths of arms. Body becomes greatly lengthened on dorso-ventral axis. They grow to a length of 6 to 70 cm including tentacles. The giant squids of North Atlantic even reach to a length of over 15 meters. Usually the tropical reef species are smaller than 1.5 meters. There are only about 650 species of living cephalopods are recorded. Most of them are of oceanic or in abyssal depths. Relatively few species are found in reef areas, of which the octopus species are the common dwellers.

A completely developed shell is found only in the living species of *Nautilus* distributed in tropical western-Pacific. The shell is divided by transverse septa into internal chambers and only the animal occupies the last chamber. As the animal grows, the mantle secretes a new septum. The septa are perforated in the center and are filled with air, making the shell buoyant. The squids and cuttlefish have a reduced shell in the body. Cuttlefish generally have a stouter body with a flat calcium carbonate bone dorsally in the mantle known as cuttlebone. The white elongate flat discs frequently found washed ashore on beaches are nothing but cuttlefish bones. Squids also similar to cuttlefish, but they are elongate and do not posses cuttlebone. The *Octopuses* (octopods) have neither external nor internal shell in the body.

Cephalopods swim by rapid and forcible expelling of water from the mantle cavity by contraction and expansion of mantle muscles. The squids and cuttlefish are best adapted for rapid swimming either backward or forward. They have a pair of membranous lateral fins, acts as stabilizers during swimming and their undulating movements help in propulsion of the body. *Nautilus* is active at night and rests on the bottom during the day, attached with its tentacles to the walls of crevices or rubble. Usually they swim backward, except when feeding. The octopods have adapted to more sedentary habits. Although they are capable of swimming by water jets, they more frequently crawl over the coral rocks and rubble with the help of arms provided with powerful suction discs. Many epipelagic and mesopelagic cephalopods moving upwards during night and rests at lower levels during day.

Cephalopods are adapted for raptorial feeding and carnivorous diet. Locate their prey with the help of eyes and powerful tentacles or arms. The highly mobile and strong tentacles shoot out with great speed to capture the prey. The suckers or curved claws of the tentacles help in holding the prey firmly. The diet of cephalopods depends upon the habitats in which they live. Pelagic squids feed on fish and shrimp. Cuttlefish swim over bottom and feed upon surface-inhabiting invertebrates like shrimp and crabs. Octopods feed on molluscs, fish and crustaceans. The cephalopods, other than *Nautilus*, spray an inky smoke screen when disturbed or to avoid predators. The ink-producing gland located at posterior end of the body, and the ink is ejected from a muscular siphon. The ejected ink creates a black clowdy screen in the water, which confuses the predator for a short period and escapes immediately from the sight. Sexes are separate. They exhibit head-on copulation, in which one of the male arms transfers spermatophores to the female. The encased eggs are either released into the water or deposited on the hard substratum. Squids lay finger-shaped egg sacs that are attached to the rocks, shells etc. Cuttlefish deposit grape-like eggs among seaweeds, sponges or on hard substratum. Octopods deposit clusters of eggs in protected areas or rock crevices. Development is direct and the young ones resemble the adults.

Fig. 295. Chambered Nautilus, *Nautiluas pompilus*

Fig. 296. *Octopus* species of shallow reef areas

Fig. 297. Reef octopus, *Octopus luteus* stuck to the body of a diver

Fig. 297a. Egg case of Cuttlefish, *Sepia* sp.

ECHINODERMS
(Spiny skinned creatures)

Among the coral reef associates echinoderms are very conspicuous elements on account of their size, abundance and their role on the reef ecosystem. The most striking characteristic feature of this group is their pentamerous radial symmetry of body and presence of endoskeleton composed of calcareous ossicles. The body surface is spiny or warty, hence the name echinoderm *i.e. spiny skinned.* Echinoderms inhabit both hard and soft substrata and a variety of suitable habitats of the reef ecosystem. They interact through dwelling, feeding and reproductive activities, both with corals and other life forms of the ecosystem. The association of echinoderms with corals is mostly facultative, the echinoderm take advantage of all the facilities available in the reef habitats without much damage. All the members of this group such as sea stars (Class Asteroidea), brittle stars (Class Ophiuroidea), sea urchins, sand dollars (Class Echinoidea), sea lilies, feather stars (Class Crinoidea) and holothurians (Class Holothuroidea) are well known and beautiful creatures of the reefs. Interestingly many other organisms like shrimps, crabs, and fish found associate with echinoderms. Though the echinderm hosts are provided with varied defensive mechanisms such as secretions, spines, pedicellariae, and cuverian tubules etc. the symbionts seem to have adapted themselves to the protected devices of the echinoderms and made them a hospitable habitat. In many cases these symbionts or associates gets protection and food from the host echinoderms. They make their presence inconspicuous by means of concealing colouration and some are transparent and suits to any background colouration of the host.

ASTEROIDS
(Seastars)

Members of class Asteroidea are usually known as 'seastars' have a central disc bearing five projecting arms. A few, however, have more than five arms regularly or as an exception. The length of arms varies in different species. The arms are small in many stars, but like *Linckia* have slender long arms. In cushion stars (*Culcita* sp.) the arms are very short and almost the body appears like pentagonal cushion. The arms can bend and twist, permitting the star to move over irregular surfaces and hold the prey firmly. The mouth is located in the center of underside of the disc known as oral surface. The upper side of body is the aboral surface. There is a distinct groove extends radially from mouth into each arm. Each groove contains two or four rows of small tubular projections, called tube feet. The tube feet are equipped with small suckers help in the slow movement or crawling of the star. Body surface is generally rough with tubercles, ridges or spines. The reef dwelling crown-of-thorns sea star, *Acanthaster planci* has long sharp and toxic spines on the aboral side. Usually sea stars are dull coloured, but many species exhibit variegated or bright colours of red, blue, purple, green and dark shades. They crawl over rocks and shells or live on sandy or soft substratum. The inhabitants of hard substratum take shelter under dead coral bases or in the rock crevices. Even the large sized crown-of-thorns sea star lies hidden under boulders and massive coral colonies. However the large sized *Linckia guildingi, L. laevigata, Culcita, Pentaceraster* and *Protoreaster* found in open places mostly on hard and sandy substrata.

The feeding habits of sea stars are varied. Some feed on organically enriched surface film that covers dead coral and rubble or exhibit a combination of different feeding habits. Some feed on oysters while others feed on sponges, ascidians, bryozoans, small crustaceans, molluscs, algae and other encrusting organisms. Some feed on algae, meiobenthos as well as substrate film. Only a few sea stars like *Culcita* and *Acanthaster planci* are known to feed on polyps of hydroids and corals. The Crown-of-thorns sea star voraciously feed on live coral polyps of branching and plate corals. Periodic infestations of this sea star destroy vast areas of corals reefs. During feeding some sea stars evert the stomach and partially digest the prey outside and later the stomach is withdrawn into the body along with the semi-digested tissue. The sea stars exhibit an amazing power of regeneration. Any part of the severed arm can be regenerated, and the destroyed parts of the central discs are replaced, but the regeneration process is slow and may take as long as one year or more for complete re-formation. The asexual reproduction involves a division of the central disc into two parts. Each part regenerates the missing part of the disc and arms. Sexes are separate and fertilization is external. Development is indirect and involves the formation of planktonic larval stage.

Fig. 298. Blue reef Seastar, *Linckia laevigata*

Fig. 299. Crown of Thorns Starfish, *Acanthaster planci*

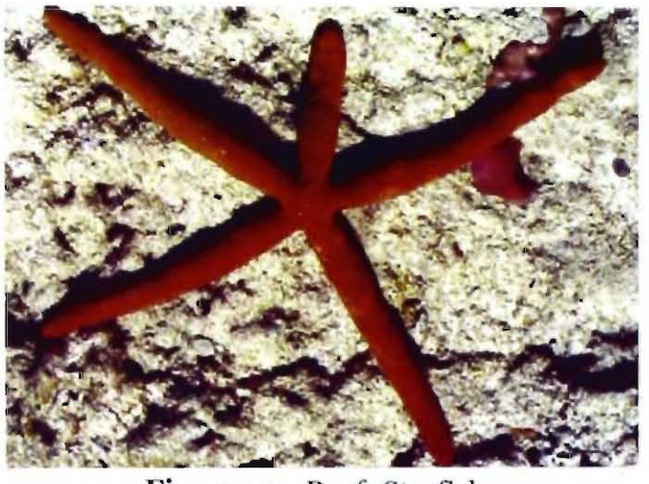

Fig. 300. Reef Starfish, *Lincki guildingi*

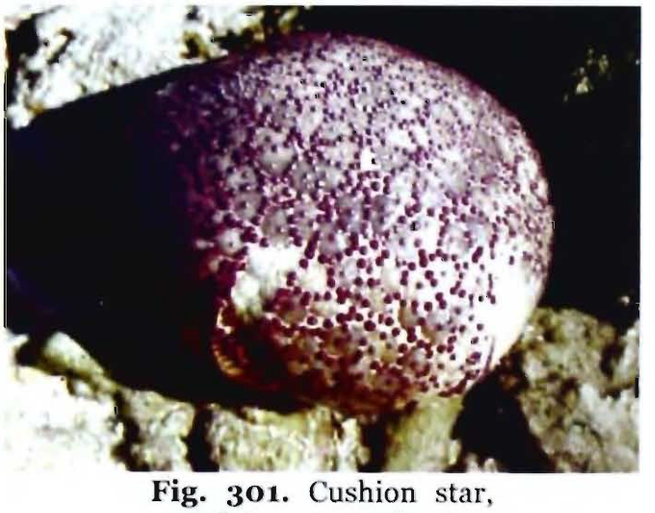

Fig. 301. Cushion star, *Culcita novaegineae*

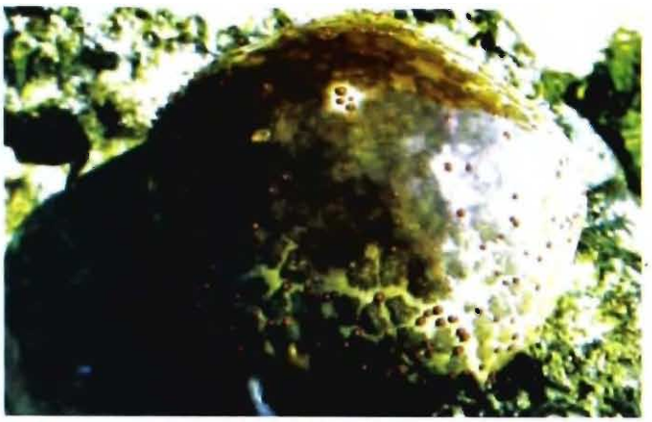

Fig. 302. Cushion star, *Culcita schmideliana*

Fig. 303. Pink Seastar, *Linckia laevigata*

Fig. 304. Cushion star in deep waters, *Culcita schmideliana*

Fig. 305. Sea star, *Fromia indica*

Fig. 306. Seastar *Leiaster glaber*

Fig. 307. Sea star of coral reef areas

Fig. 308. Sea star, *Fromia* sp., oral side

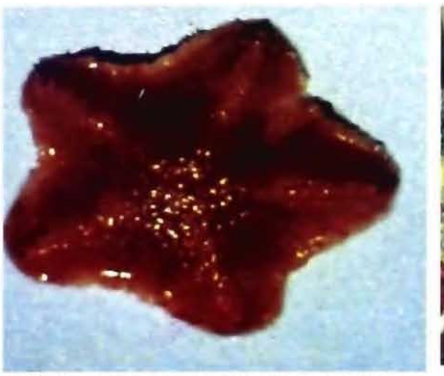

Fig. 309. A small seastar, *Asterina lorioli*

Fig. 310. Seastar, *Fromia monilis*

OPHIUROIDS (Brittle Stars)
(Breakable creatures)

The ophiuroids, commonly known as 'brittle stars', 'basket stars' or 'serpent stars' are the largest group of echinoderms. They are relatively small sized echinoderms. The central disc is very small and flattened. The arms are segmented, distinct, quite long and flexible. All are five armed, however, in basket stars the arms are branched at base or repeatedly branch to produce mass of branches resemble tentacles. The podia play a little role in locomotion but they are highly mobile forms. They move rapidly in jerks or leaps by pushing and pulling of their flexible arms. The colouration of brittle stars is often inconspicuous because of their small size, the mottled and banded patterns. Ophiuroids are scavengers, deposit feeders, or filter feeders. The tube feet produce slimy mucus that helps to trap the organic detritus and microorganisms of the bottom. Filter feeders filter the microorganisms and silt of the water currents with their arms, thus help in cleaning the waters and reducing silt load on corals.

Most of the brittle stars are nocturnal, hide under stones, coral blocks, rubble and crevices during day. Some species are associated with algae, alcyonarians and sponges of the reefs. Serpent stars found coiled in snake-like around the branches of gorgonians. Species with very long arms like *Macrophiothrix longipeda* bury the disk and one or two arms under the rubble, projecting the remaining arms out into the waters for feeding. Some are found on a number of coral species of *Acropora, Pocillopora, Stylophora, Pavona, Porites, Favia, Galaxea* etc. The britlestar *Ophiolepis superba* with an attractive brilliant star shaped dark marking on disc is common on branching corals. Many brittle stars can cast off one or more arms if disturbed or captured by a predator. The lost portion is then regenerated slowly. Sexes are separate, but no sexual dimorphism. Fertilisation and development takes place externally. In some cases brooding is common. The development is through free-swimming larva known as ophioplutes in nonbrooding forms.

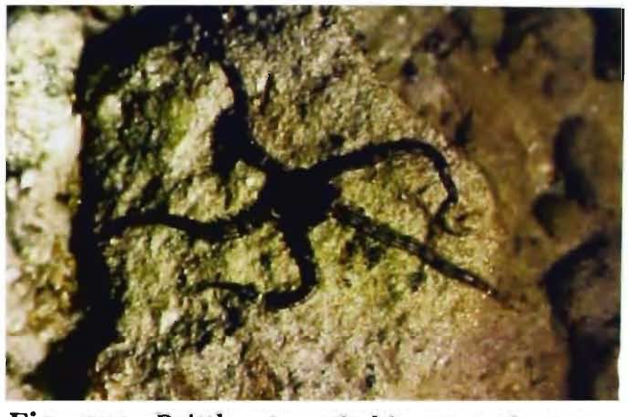

Fig. 311. Brittle star, *Ophiocoma dentata*

Fig. 312. Brittle star, *Ophiarthrum elegans*

Fig. 313. Brittlestar, *Ophiocoma erinaceus*

Fig. 314. Long armed brittlestar, *Ophiocoma scolpendrina*

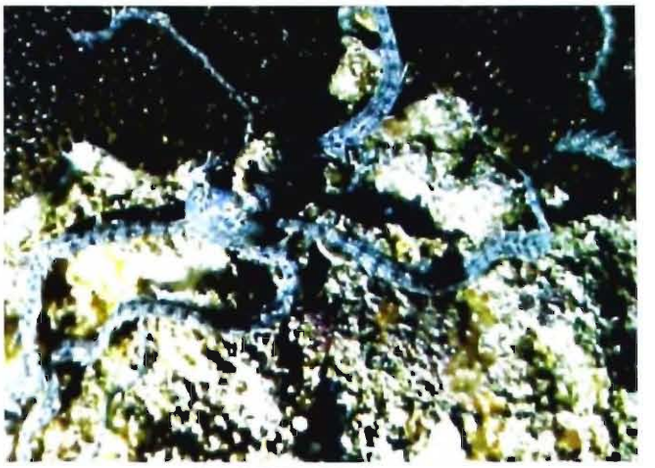

Fig. 315. Brittle star, *Macrophiothrix* sp.

Fig. 316. Brittlestar, *Ophiomastrix annulosa*

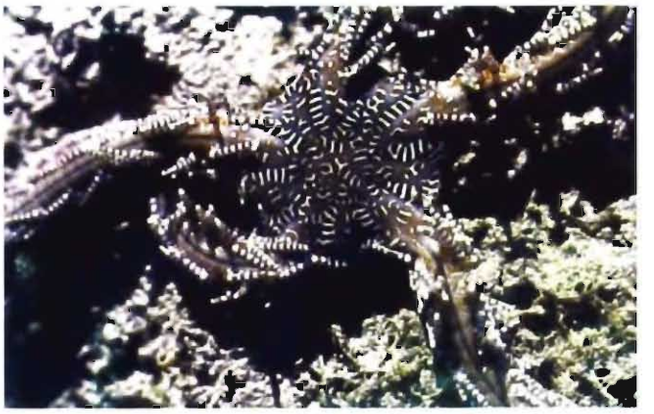

Fig. 317. Reef Ophuiroid, *Ophiarthrum pictum*

CRINOIDS (Feather Stars)
(Flowers of the Reefs)

Crinoids are the most attractive and fascinating echinoderms found on the reefs. Members of this group are called 'feather stars' lead a free life in shallow waters mostly on hard substrata. They are abundant on reefs and generally appear dark green or black though a few exhibit attractive red, white or yellow patterns. Some crinoids are stalked known as 'sea lilies', are inhabitants of soft substrata in the deep waters. They lead a sedentary life with the stalk attached to a hard object or buried in the substratum but do not occur in coral reef areas. The feather stars are very common among the dead branches and bases of corals, cryptic during daytime. They firmly hold the substratum with the help of the cirri. A few species found in hollows of massive coral colonies, gorgonians, plate corals or on the branches of Acroporan corals and sponges. They swim or crawl only for about short distances.

The Crinoids have arms in multiples of five at the base, which later branch regularly resulting in odd number of arms. The arms are beset with side branches called pinnules give the animal a feathery appearance. They help in swimming, feeding and reproduction. Along with the microorganisms they trap the suspended particles and reduce silt settlement on the corals. They possess considerable powers of regeneration like other echinoderms. Part or all arms can be cast off if held and

Fig. 318. Feather star of coral reefs *Himerometra* sp.

Fig. 319. Feather star, *Comatula* sp.

Fig. 320. Feather star of shallow waters, *Comaster* sp.

Fig. 321. Common feather star, *Lamprometra* sp.

Fig. 322. Feather star, *Heterometra* sp.

Fig. 323. Bright yellow featherstar, *Himerometra magnipinna*

Fig. 324. Featherstar, *Himerometra* sp. on *Zoanthid mats*

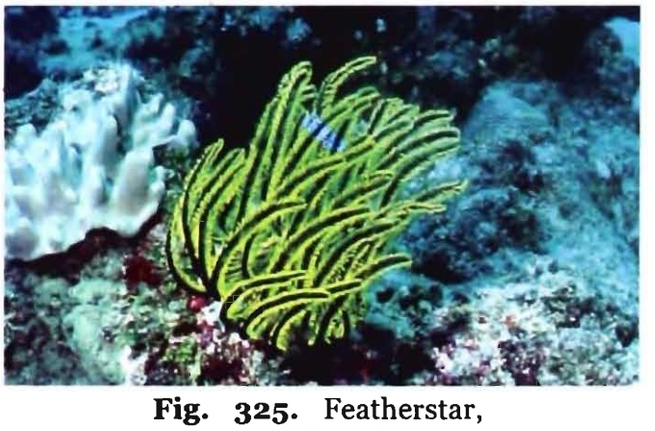

Fig. 325. Featherstar, *Oxycomanthus bennetti*

are easily regenerated. All feather stars are dioecious. Development takes place through free-swimming barrel-shaped vitellaria larva.

There are several instances of decapod crustaceans living in association with crinoids known from the reef areas. The shrimps *Periclimenes* (*Harpilius*) *spiniferus* and *Synalpheus stimpsonii* usually found in coral reef areas are reported to associate with crinoids. The crabs like *Galathea ele*gans (Galathidae), parthinopid crabs, *Harrovia albolineata*, species of *Aulacolambrus*, *Lambrus*, etc. frequently found on the crinoids. The crabs are well camouflaged among the crinoid arms and are hardly noticeable due to the similarity in the colour pattern. These crabs do not move out from the host crinoid. But the nature of mutual benefit derived by the partners is not clearly known. It may be possible that in return for the camouflaged vantage position and shelter the crabs gets, the crinoid should be indirectly benefited in the procurement of food for itself.

ECHINOIDS (Sea Urchins) (Natural pincushions)

Echinoids are beautiful and fascinating free-living creatures. They look quite different from other echinoderms. These are variously known as sea urchins, sand dollars, cake urchins and heart urchins depending on the shape. Their body does not possess arms. The endoskeleton of the echinoids known as test, is a rigid box of calcareous plates arranged in a series studded with long movable sharp or blunt spines. The common sea urchin *Diadema* found on reefs has very long needle-like venomous spines. This urchin inflicts painful wounds if stepped upon. The spines of slate pencil sea urchin are heavy and blunt. The shape is circular or oval and body is spherical or flattened along oral-aboral axis. The regular echinoids, which have the anal opening in the apical system, are hemispherical in shape with a flat oral side. Sea urchins are very colourful usually brown, black, green, purple, white or red but some are multicoloured.

Most echinoids are inhabitants of hard substrata and are common in the reef environments. Generally hide under rocks, coral bases or in hollows of massive corals and extending out their long needle like spines from hollows. The sea urchin *Temnopleurus toreumaticus* prefers sandy sea grass beds. *Stomopneustes variolaris* inhabits undersurfaces frequently boring into rocks, shells and dead coral blocks for protection from wave action. *Colobocentrotus atratus* inhabits shallow depressions on rocks exposed to lashing waves. As an adaptation to heavy wave action, the short and flat aboral spines form a mosaic to absorb the wave energy. The irregular shaped echinoids include the heart urchins, cake urchins and sand dollars. Most of them are adapted for burrowing in sand. Their body studded with much smaller spines. Heart urchins are oval in shape while the sand dollars and cake urchins are flattened. Most of the sea urchins take shelter under the stones and in depressions of the coral stones. Some actually bore into the dead bases and conglomerates. Thus they destroy the substratum for their settlement. To some extent, this activity also helps in the formation of beach sand and soft substratum for other benthic organisms.

The sea urchins are nocturnal in habit. They are mainly herbivores, feed on a variety of algae and occasionally on encrusting organisms like sponges, ascidians and bryozoans. Seaotters, some gastropods and sea stars are the potential predators

of sea urchins. All echinoids are dioecious and only few display sexual dimorphism. Fertilisation takes place in the seawater. The heart urchins and some species of sand dollars brood their eggs. The development is through free-swimming larval stage known as echinoplutes. Many small crustaceans and apogonid fishes found associate with the sea urchins apparently for gaining protection and shelter. The alpheid shrimps *Athanas dorsalis*, *A. indicus* and parthenopid crab *Echinoecus pentagonus* found associate with sea urchins of *Stomopneustes varolaris*, *Echinometra mathaei* and *Echinothrix diadema* and *E. calamaris* respectively.

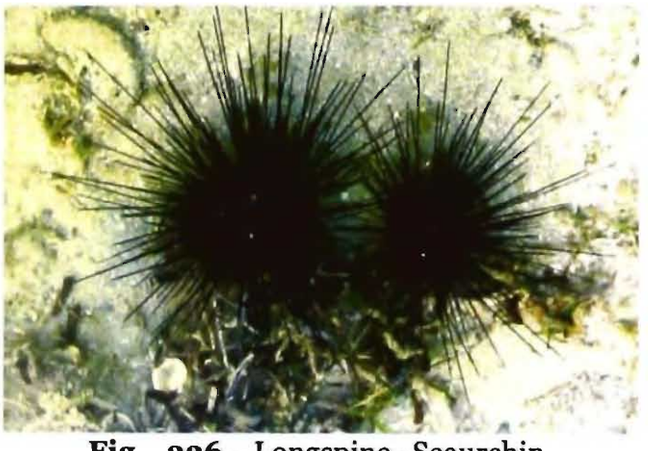

Fig. 326. Longspine Seaurchin, *Diadema setosum*

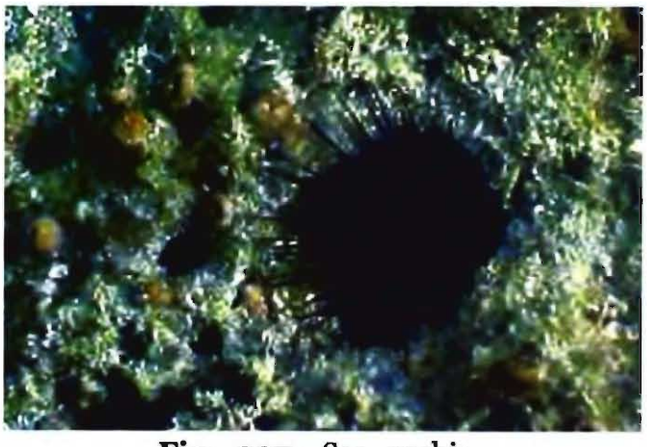

Fig. 327. Sea urchin, *Echinostrephus molaris*

Fig. 328. A beautiful globe urchin, *Mespilia globules*

Fig. 329. Large spined-seaurchin, *Diadema savignyi*

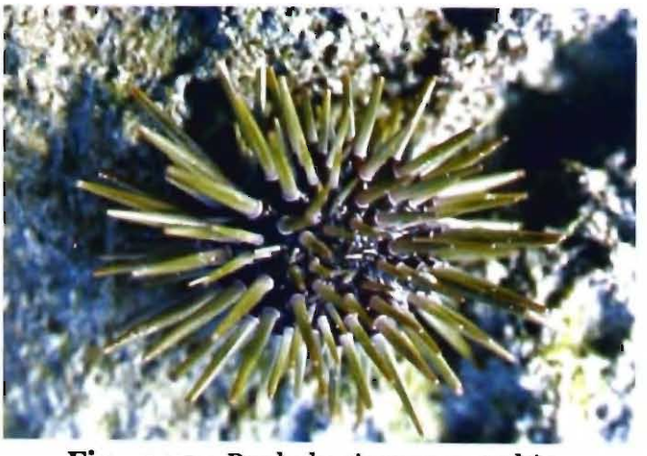

Fig. 330. Rock boring sea urchin, *Echinomera mathaei*

Fig. 331. Hatpin Seaurchin, *Echinothrix calamaris*

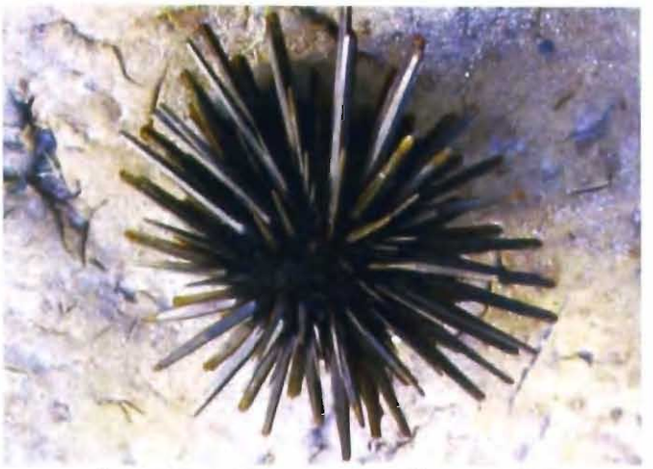

Fig. 332. Blunt-spined seaurchin, *Heterocentrotus trigonarius*

Fig. 333. Rare pencil seaurchin, *Phyllacanhus imperialis*

Fig. 334. Cake urchin, *Tripneustes gratilla*

Fig. 335. Seaurchin of sandy-weed areas, *Temnopleurus* sp.

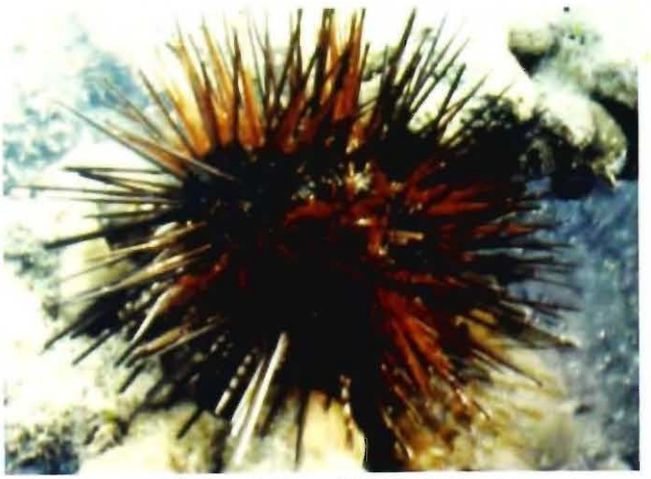

Fig. 336. Seaurchin, *Echinothrix* sp.

Fig. 337. *Colobocentrotus atratus* found on rocky areas

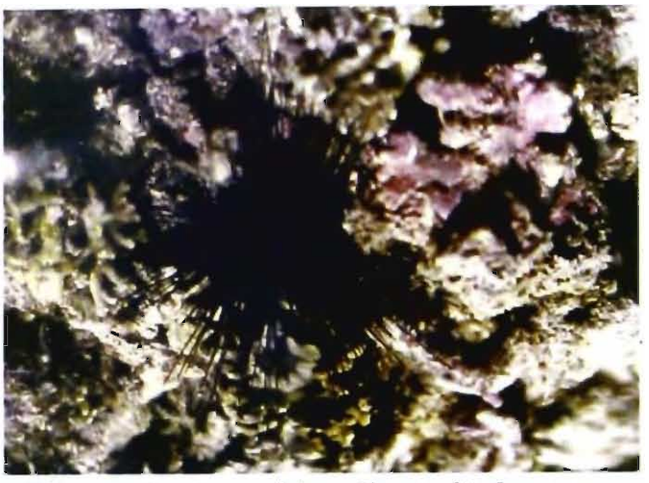

Fig. 338. Seaurchin, *Chaetodiadema* sp.

Fig. 339. Sand dollar, *Laganum laganum*

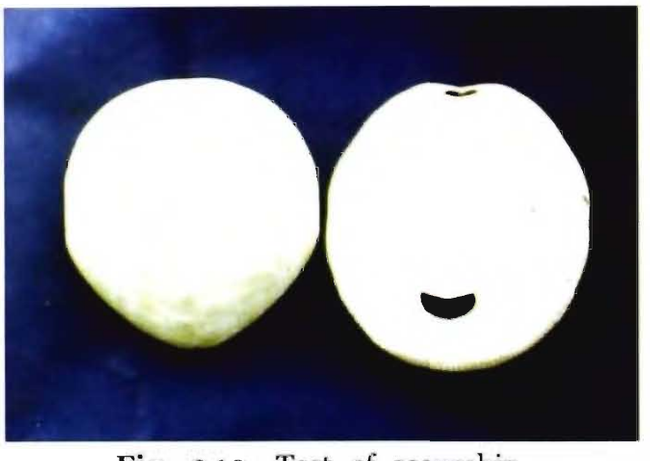

Fig. 340. Test of seaurchin, *Metalia* sp.

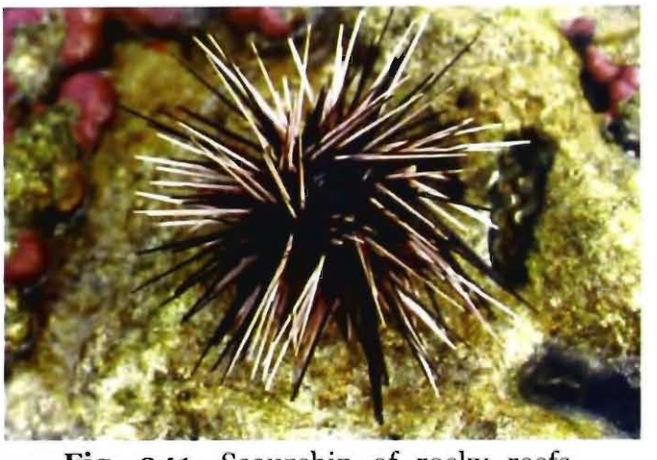

Fig. 341. Seaurchin of rocky reefs, *Echinothrix* sp.

HOLOTHUROIDS (Sea cucumbers) (Lazy creatures)

The members of Holothuroidea are commonly known as 'sea cucumbers', distinguished by cylindrical stout bodies, where the oro-anal axis is greatly elongated. The body wall is very thick and leathery. The cucumber shaped body forces the animals to lie on the side and made them more sluggish. The tube feet are well developed particularly on the ventral side and helps in locomotion. The tube feet around the mouth are modified into tentacles helps in burrowing and feeding. Generally sea cucumbers are black, brown or olive-green, but some are pale orange and violet, the striped or mottled patterns are also common. The size considerably varies from 3 to 50 cm in length. Some species of *Synapta* reaches to a length of over 5 meters. Body shape varies from spherical as in *Holothuria*, to long wormlike, as in *Synapta*. Holothurians are relatively slow-moving animals; inhabit the protected places of hard and soft substrata of reefs, weeds and sea grasses. They take shelter under the coral bases or burrow into the soft substrata. But some live open on soft bottom. Species of *Holothuria* and *Actinopyga* expel mass of long sticky tubules known as 'Cuvierian tubules' from anal region when they are disturbed or attacked by predators.

The regeneration powers of holothurians are very limited. In many forms the cloacal region is the center of regeneration. If the animal is transversely bisected, each half regenerates, but if the body cut into numerous sections, only the piece containing cloaca, regenerates. In synaptids the section containing anterior body part is capable of regeneration. Most of the holothurians are substrate feeders ingest sediments from surface. Some species filter microorganisms from the water with a network of highly branched tentacles. By ingesting organic matter of the substrate and trapping the suspended particles they help in reducing organic load of the habitat and silt settlement on the coral polyps. Many symbiotic organisms like fish, crabs, shrimps and scaly polychaetes associate with seacucumbers. The fishes of the family Carapidae are very slender, small and transparent found in the cloacal region of the sea cucumbers like *Bohadschia* and *Stichopus*. Most of the seacucumbers are dioecious possess a single gonad. Except in some brooding species development takes place in the seawater. Like other echinoderms, sea cucumbers also pass through a free-swimming barrel shaped planktonic larval stage known as doliolaria.

Fig. 342. Seacucumber, *Holothuria atra*

Fig. 343. *Holothuria hilla* found under coral stones

Fig. 344. Sea cucumber of rock pools, *Holothuria* sp.

Fig. 345. *Holothuria scabra*

Fig. 346. *Bohadschia marmorata* found in weedy mud areas

Fig. 347. Sea cucumber of Rocky reefs, *Holothuria nobilis*

Fig. 348. *Holothuria impatiens*

Fig. 349. *Holothuria pyxis* found in muddy reef areas

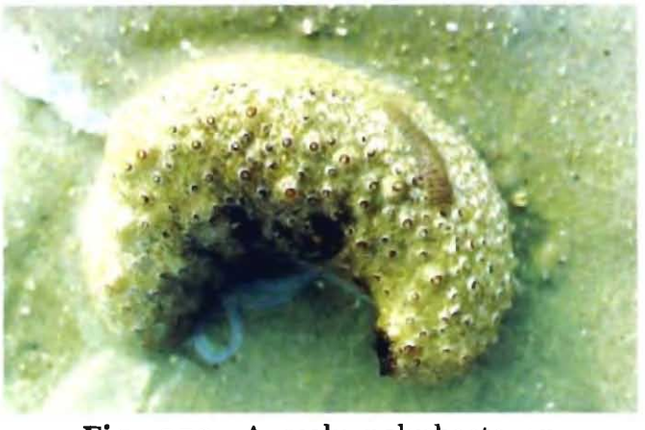

Fig. 350. A scaly polychaete on *Holothuria* sp.

Fig. 351. *Holothuria leucospilota*

Fig. 352. *Holothuria edulis*

Fig. 353. *Holothuria arenicola* under coral rocks

Fig. 354. *Actinopyga* sp. in rock pool

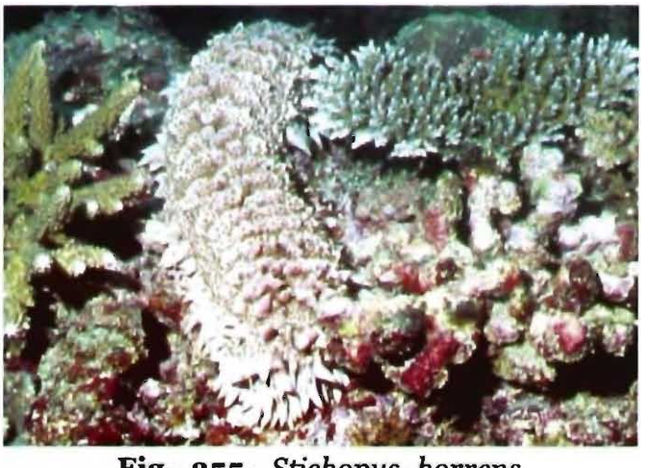

Fig. 355. *Stichopus horrens*

Fig. 356. Sticky Cuverian tubules of *Bohadschia marmrata*

Fig. 357. Associate gastropods on the body of *Holothuria atra*

Fig. 358. *Holothuria* sp. found in shallow reefs

Fig. 359. Scaly polychaete on *seacucumber, Lebidodemas* sp.

Fig. 360. Sea cucumbers, *Stichopus chloronotus*

Fig. 361. *Stichopus vastus* found on weedy reef areas

Fig. 362. Snake like seacucumber, *Synapta maculata*

Fig. 363. Seacucumber of weedy areas, *Synapta striata*

Fig. 364. *Actinopyga* sp.

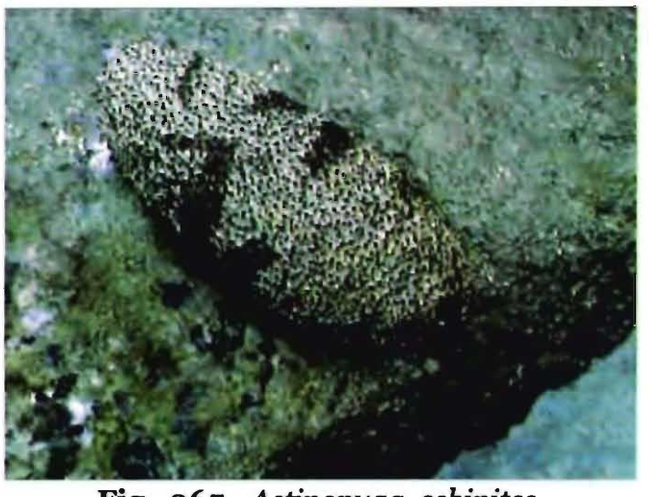

Fig. 365. *Actinopyga echinites*

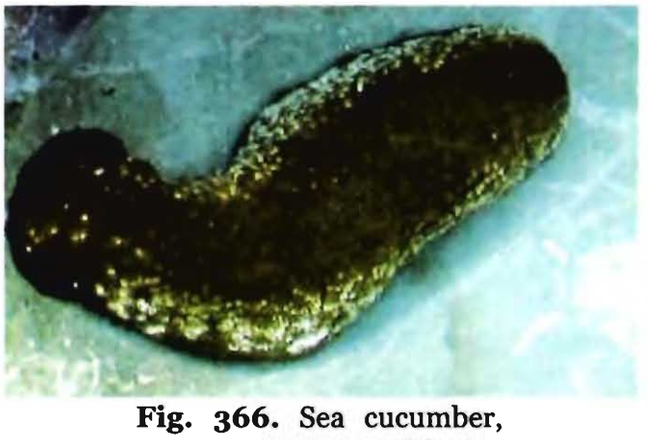

Fig. 366. Sea cucumber, *Actinopyga mauritiana*

Fig. 367. *Actinopyga* sp.

Fig. 368. *Bohadschia* sp. grazing on reef

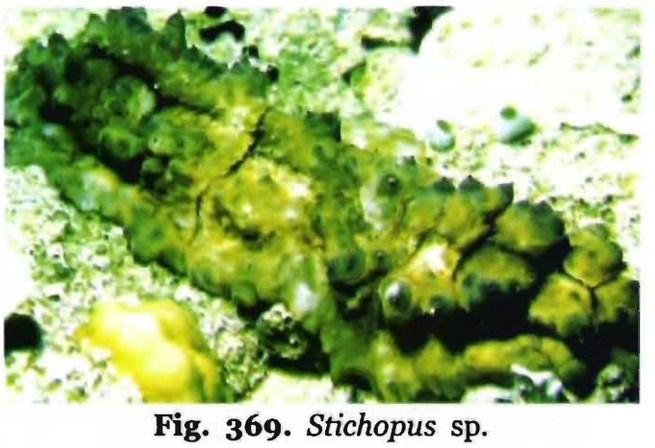

Fig. 369. *Stichopus* sp.

REEF FISHES
(Crowning Glory of Reefs)

Fishes are the most common, abundant and well-known inhabitants of the coral reefs. One may fail to spot any group of animal on the reef but not the fish. No doubt, the beauty of the coral gardens lies in the presence of graceful and colourful fish. The habits and adaptations of reef fishes are extremely variable, directly reflecting the diversity of habitat and availability of food on the reefs. The colouration, mimicry and camouflage, feeding habits, territoriality, diurnal and nocturnal habits, etc. are some of the important factors made the fish one of the most successful inhabitants of the reefs.

Body Shapes : The fishes living in different habitats of the reefs often exhibit a range of body shapes perfectly suited for swimming through narrow passages of the reefs and rocks. Many are compressed with disc-like bodies as in butterflyfishes, batfishes, moorish idols and angelfishes; streamlined as in snappers, groupers, jacks and triggers; depressed as in flatfishes, rays and skates; rounded or spherical as in porcupine and puffer fishes; box-shaped as in boxfishes; razor blade-like as in shrimpfishes; stone-like as in stonefishes; needle-like or leaf-like as in pipefishes and ghost pipefishes; elongate and snake-like as in eels. Many species of eels, blennies and gobies take shelter in burrows on sandy areas of the reef. They use their tail for making burrows. The shrimpfish *Aeoliscus* and *Centriscus* are extremely thin, swim vertically with elongated snout pointing downwards thorough the narrow reef passages and coral branches. The body of the ghost pipefish *Solenostomus* is almost similar to the seaweeds. The boxfishes, porcupine and puffer fishes with their unusual appearance are very conspicuous. The puffer and porcupine fishes have the ability to inflate their body to a size several times greater than normal to scare their enemies, while the hard body of the boxfishes is not considered as a priority food item by their predators.

Colouration : The most important characteristic feature of the reef fishes is possession of brilliant and stunning colour patterns, which are not found in any other marine animal group. The colour pattern of many wrasses, butterfly fishes, groupers, snappers, sweetlips, coral breams, batfishes changes with growth from juvenile to adult. The most striking juvenile-adult colour alteration is found in the Zebrashark (*Stegostoma fasiatum*), coralbream (*Scolopsis bilineatus*), angelfishes, wrasses, parrotfishes, and in some groupers. This type of colour transformation offers some protection against predators. The brilliant poster colour patterns of many fishes such as chaetodontids, pomacanthids, etc. is species-specific and helps them to form feeding assemblages on reefs. The conspicuous dark-light pattern of fishes serves as a disruptive colouration. Presence of 'eye-like spots' on the posterior part of the body or on the fins of butterfly fishes, some damsels and wrasses make the predators difficult to decide which end is forward especially in dim light. In some situations the eyespot portion of fin may suddenly erect and scare predators. Colour pattern of male and female is also different in many reef dwelling fishes such as Pseudochromids. The phenomenon is also evident in fishes that have the habit of changing sex during a certain stage of their life history. These fishes commence their adult life as functional females and able to transform to a brightly coloured functional male at later stage. This is more common among wrasses and

parrotfishes. Colour variation related to depth is more common among groupers. Fishes living in shallow areas of the coral reefs are primarily brown or gray, while the same species living in deeper areas show paler or drab colouration as seen in the flatfishes, anglerfishes and flatheads. They are capable of changing colour gradual to rapid to blend effectively with their background and take advantage in hunting prey as well as remain unnoticed by predators.

Mimicry and Camouflage : The mimicry is one of the most interesting phenomenon exhibit by many of the coral reef fishes. It involves two or more species, belonging to different genera or even families that resemble one another in colour pattern and shape. The young ones of snapper *Lutjanus bohar* mimics damselfishes of the genus *Chromis*, which forms small schooling and ignored by other prey fishes easily in 'Chromis disguise'. Young of the batfishes *Platax pinnatus* mimic polyclad flatworm, while those of *Platax orbicularis* mimic drifting dead leaves. Juveniles of the sweetlip *Plectorhynchus chaetodonoides* mimic the toxic nudibranchs. The colour pattern and shape of a number of reef fishes make them almost unnoticeable against the surrounding reef habitat. The ghost-pipe fishes *Solenostomus* are masters of camouflage. Their body colouration and shape blend effectively with seaweeds. The anglerfish *Histrio histrio* and pipefish *Syngnathoides biaculeatus* blends well with the seaweeds making it difficult to detect their presence. The scorpaenid fishes exhibit variegated colour patterns merge well with their surroundings and enable them to remain undetected by the prey as well as predators. The reef stonefish *Synanceia* is extremely well camouflaged lie half-buried in sand or coral rubble and do not normally move unless disturbed.

Territoriality : The territorial behaviour is very common among many of the reef fishes. These territorial limits may be based on the availability of food, frequency of predators encountered, spawning patterns, requirement for shelter, etc. Most of the reef fishes are sedentary and strongly territorial. But many fish found in and around reefs move over large areas for feeding and breeding. On the reef, some home-range fish species roam about almost the same route every day and return to the same place, while the major bottom dwelling fish species usually restrict to a limited area defending the boundaries of their territory against encroaching the members of the same species or other fish. Many butterfly fishes are restricted to a relatively small area of the reef. During daytime they roam widely within the confines of their home-range for foraging food. *Chaetodon triangulum* is highly territorial and can alone defend one or more large plate corals against the invasion of the same species as well as other butterfly fishes. The angelfishes (Pomacanthids) are somewhat territorial and spend daylight hours near bottom in search of food. Some surgeonfishes and damselfishes establish fixed feeding territories when young, but abandon them as they mature. Most of the damselfishes (Pomacentrids) carefully guard their boundaries on a large coral head against other algal feeding fishes. This nature of territoriality in reef fishes is, however, more distinct during spawning periods. The surgeonfish *Acanthurus lineatus* unlike other surgeonfishes is solitary and guards its territory against intruders of the same as well as other species also.

Diurnal and Nocturnal habits : It is well known fact that the diversity of reef communities, particularly the fishes, is generally high in reef areas than in any other environment. The behaviour and often the distribution vary within same species of

the same family and same group, enabling them to adjust and survive in their habitat. Fish show an excellent behavioural pattern to avoid struggle for food and shelter on reefs by adopting diurnal and nocturnal mode of life. All the diurnal fishes feed actively during day and withdraw into their hiding places at night, making the entire reef deserted. On the other hand, the nocturnal fishes become active after sunset. It is likely that the diurnal and nocturnal behaviour of fishes is closely linked with the behaviour of food organisms. The fish feeders exhibit their peak activity during morning and evening changeover periods. There are more or less orderly sequences of retreating at dusk among the diurnal fishes. Accordingly the wrasses are the first to disappear from the area. The smaller damselfishes, butterfly fishes, surgeons and rabbit fishes follow them. The parrotfishes are the last to retire and this sequence is more or less reversed at sunrise when the fishes come out from their hiding places. Thus they co-ordinate and judiciously share the reef environment for survival.

Biological Association : Many fish species on the reefs exhibit an interesting partnership between different species or with other invertebrate organism. The common example of commensalism is the relationship between the suckerfish *Echenis naucrates* and the larger fishes such as sharks and groupers. The suckerfish attaches to the host and benefits by saving its swimming energy and feeding on scraps that result from the feeding activity of the host. The pearlfish *Carapus homei* takes shelter within the body cavity of the host holothurian *Stichopus*, causing no visible damage to it. Small apogonids and gobiid fishes cluster among the spines of the sea urchins for gaining protection when they are at rest. The shrimpfishes, *Aeoliscus* and *Centriscus*, seek shelter among the long spines of seaurchin *Diadema* as many of the predators avoid spinous seaurchins. An excellent symbiotic relationship is seen in the case of anemone fishes of the genus *Amphiprion* and *Premnas* that dwell among the deadly tentacles of sea anemone, while the anemone in turn is guarded against its predator by the highly territorial nature of the sheltered fish. The fishes also keep the surface of the anemone free from silt and debris. The relationship between the cleaner wrasse *Labroides dimidiatus* and other members of the reef fish community is another interesting case of symbiosis. This cleaner wrasse establishes cleaning stations on the reefs and feed on the external parasites and damaged tissues of the fishes, thus rendering inadvertently a beneficial health service to its host. There is an interesting association between scorpion fish *Pterois russelli, P. volitans* and the young of *Lutjanus sebae*. The young of lutjanids closely move in association with the scorpion fish. It is difficult to notice the lutjanid fish because of the matching body colour of the fish i.e. brown and white colouration. The disruptive colour pattern of broken white and brown bars of the scorpion fish helps to mask the lutjanid fish and it remains sluggish or moves along with the scorpion fish in slow jerks. The lutjanid fish instantly feed on any unsuspecting small fish pass by the vicinity of the scorpion fishes.

Defense Mechanism : Almost all the fishes of the reef, except the large sharks and rays, must evade and try to escape from predators that hunt them. The protective strategies developed by these fish are extremely varied from simple schooling behaviour, attacking strategies to toxicity etc. Many juvenile fishes, reef grazers like surgeons, rabbit fishes, etc. and daytime resting groups like snappers and jacks use the simple predator-defense strategy and schooling behaviour. In the

presence of predators, the schooling fish form a zigzag pattern or form 'vacuoles' around the predator and create 'confusion effect' so that they can escape from danger of eaten away by the predators. The fish schools may also serve to reduce the frequency of predator-prey encounters, the larger the school the greater the advantage. Many of the reef predator fish use attack strategies. Anglerfishes and some scorpion fishes lure other fish by using their luring apparatus. The lionfish, species of *Pterois*, slowly corners the prey and attacks it, while the groupers, lizardfishes, bigeyes etc. dart rapidly from their hiding places and seize the prey.

Toxicity : It is one of the most interesting strategies adopted by many of the coral reef fishes. It is found that the poisonous and venomous nature of the fishes acts as a defense mechanism against predators. More than 400 species of marine fish are known to be toxic and on consumption proved poisonous to man. The poisonous fish inject venom into the threatening organism through the spines of dorsal, anal or pelvic fins. The long and pointed sting on the tail of stingrays is venomous and inflicts very painful wounds. The squirrelfish *Sargocentron* and *Neonippon* possess a large venomous spine at the corner of the opercle. Having venomous spines for defense mechanism is the characteristic feature of the fishes of family Scorpaenidae. The lionfish *Pterois* spp. threaten the intruders by expanding their extremely long venomous dorsal spines. The stonefish *Synanceia* has pointed dorsal spines with powerful venomous apparatus that can inflict painful wounds. The strong anterior dorsal, anal and pectoral spines of the catfish *Plotosus* species possess a specialized venomous apparatus. Although all the surgeonfishes have a sharp caudal spine, the only surgeon *Acanthurus lineatus* possess a venomous caudal spine. The dorsal spines of the rabbit fish are strong and capable of inflicting wounds.

In some fishes the epidermal glands of the body skin secrete a toxin known as crinotoxin. But these fish are not equipped with any injecting mechanism. The soap fish *Grammistis sexlineatus* is well known for producing the skin toxin **grammistin** that ward off the predators. The boxfish *Ostracion* and *Lactoria*, when under stress secrete a distasteful skin toxin called **ostracitoxin**. These crinotoxins are more common in reef fishes capable of ensuring adequate defense against their predators.

Impact of Fish populations on Coral Reefs : Under normal conditions the reef fish have a positive impact on the reefs than adverse impact. Most of the fishes depend on the reefs for shelter, food and breeding. The trophic relationship of fishes on the reefs is highly complicated and interdependent (Fig. 370). Only few species of fishes directly create a predation pressure on the coral reefs. The role of predation by the fishes in determining the composition and structure of the coral reefs is not clearly known. Uually the damage caused to the corals by grazing of herbivorous fish like mullets, surgeonfishes, parrotfishes, some puffers and triggers is not alarming. In the process of grazing algae small patches of coral polyps may also be removed but the entire colonies are not damaged. But sometimes the parrotfishes cause extensive damage and leave lesions on coral colonies due to repeated biting of the live tissues. In the same fashion, the omnivorous fish such as species of *Abudefduf*; *Kyphosus*, some butterfly fishes, species of *Istiblennius*, triggers, puffers, filefishes, etc. while scraping algae from the coral skeletons may bite off coral polyps and coral skeletons. In this process the coral may regrow polyps to cover the grazed areas. The corallivores, such as some butterfly fishes,

filefish (*Oxymonacanthus longirostris*), puffer (*Arothron hispidus*), triggerfish (*Balistapus undulatus*), etc. exclusively feed on coral polyps and bite off coral skeletons at faster rate. Some times these fish do not allow the damaged corals to grow and remove small coral colonies before they establish thus influence the coral community structure. Some surgeon and parrotfishes, found abundant on reefs, consume dead and living corals and produce considerable amount of coralline sand and sediment on the reefs.

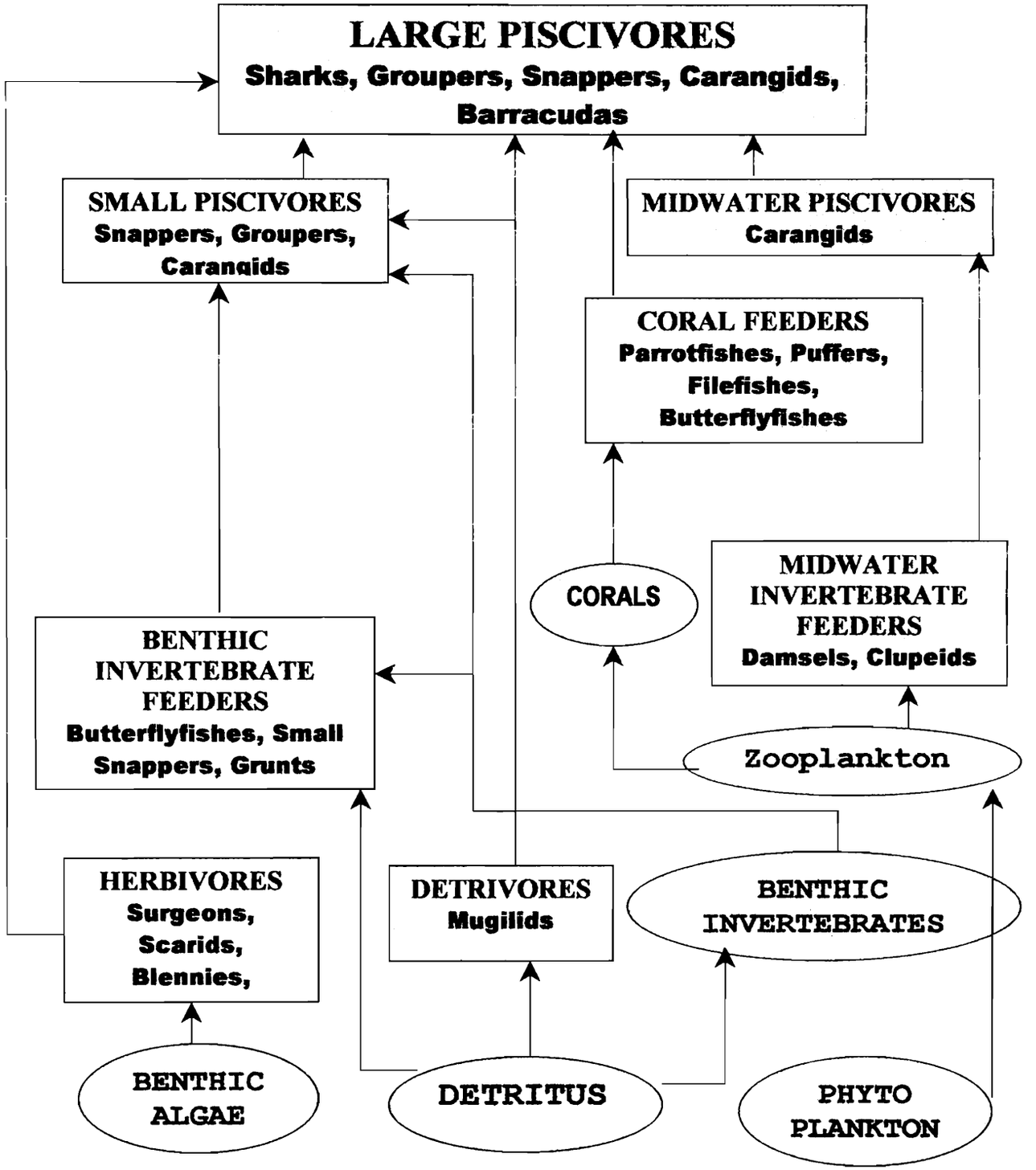

Fig. 370. Trophic relationship of Reef Fishes (After White, 1987)

Diversity : Usually the species diversity of reef fishes is very high in any of the reef regions than the number of individual species. Fishes of the family Pomacentridae are the most dominant followed by wrasses, parrotfishes, cardinal fishes, butterfly fishes, scorpion fishes, etc. Few species of sharks, muraenid eels, hawkfishes, anthids, angelfishes, soap fishes, groupers, snappers, siganids, surgeons, dottybacks, damsels, few species of blennies and gobies, etc. are inhabitant of the coral reefs. Apart from these, many families like Pegasidae, Ophididae, Ancennariidae, Centricidae, Rachycentridae, Haemulidae, Caesionidae, Pempheridae, Ephippidae, Triptervgiidae, etc. represent by few species contribute much for the diversity of fish communities on the reefs.

Reproduction : Sexes are separate. No prominent sexual dimorphism among fishes except in few like wrasses, parrotfishes, damsels, gobies and blennies. During breeding period many species exhibit colour variation between two sexes. The males are always brightly coloured. Sex reversal is the common phenomenon in many wrasses, parrotfishes, and groupers. They commence their adult life as females and are able to alter their sex to male along with the colour pattern if necessary. Most of the reef inhabitant fishes lay their eggs freely in open waters. Some fish like damsels, triggers, gobies etc. lay their eggs on the bottom in rock crevices, empty molluscan shells, sand pits, or on sea fans, sponges, corals and sea weeds. In damsels, one or both partners clean the nest site on the hard bottom and engage in courtship. The eggs are attached to the substratum by thin adhesive filaments. After laying the eggs, males guard them till hatches. Mouth brooding is common in cardinal fishes and some members of triplefins (Plesiopidae) and dotty backs (Pseudochromidae). During spawning period, the female cardinal fishes release large gelatinous egg masses. Then the egg mass is fertilized by the male. Later they engulf the eggs and brood them in mouth. The female seahorses and some pipefishes deposit the eggs in a pouch attached beneath the abdomen of the males. The male carries the eggs until hatching occurs.

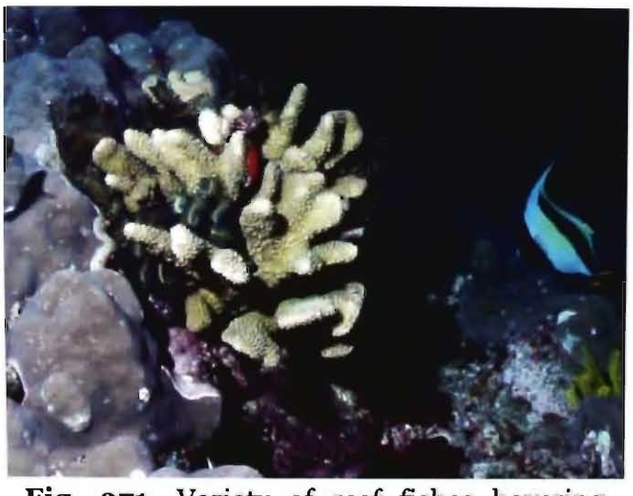

Fig. 371. Variety of reef fishes hovering around corals

Fig. 372. School of blue chromis, *Chromis viridis*

Fig. 373. A school of grunts

Fig. 374. A school of sweetlips, *Diagramma pictum*

Fig. 375. A school of damsels, *Dascyllus reticulatus* on coral colony

Fig. 376. School of snappers, *Lutjanus kasmira*

Fig. 377. Longfin bannerfishes, *Heniochus acuminatus*

Fig. 378. Threadfin buterflyfish, *Chaetodon auriga*

Fig. 379. Black-back buterflyfish, *Chaetodon melannotus*

Fig. 380. Cheveroned butterflyfish, *Chaetodon trifascialis*

Fig. 381. Vagabond butterflyfish, *Chaetodon vagabundus*

Fig. 382. Lined butterflyfish, *Chaetodon lineolatus*

Fig. 383. Blue-spot butterflyfish, *Chaetodon plebeius*

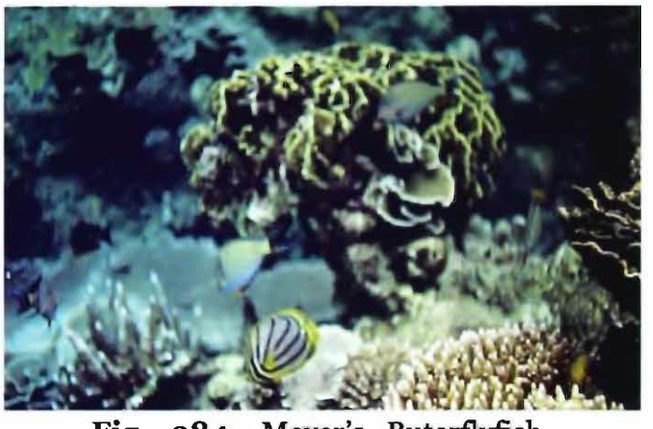

Fig. 384. Meyer's Buterflyfish, *Chaetodon meyeri*

Fig. 385. Melon Butterflyfish, *Chaetodon trifasciatus*

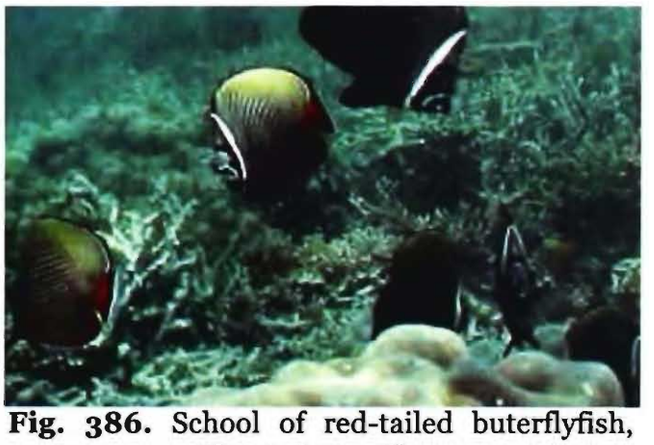

Fig. 386. School of red-tailed buterflyfish, *Chaetodon collare*

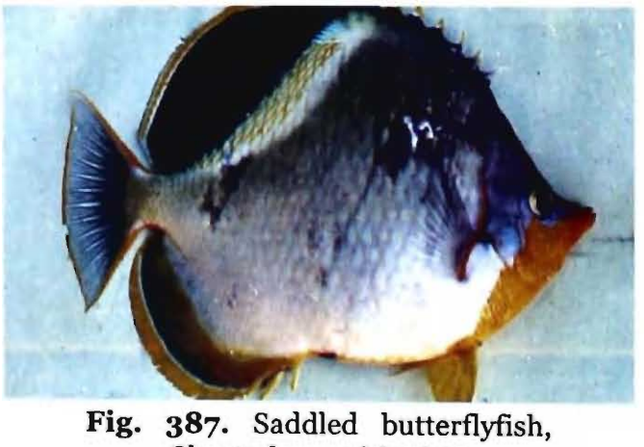

Fig. 387. Saddled butterflyfish, *Chaetodon ephippium*

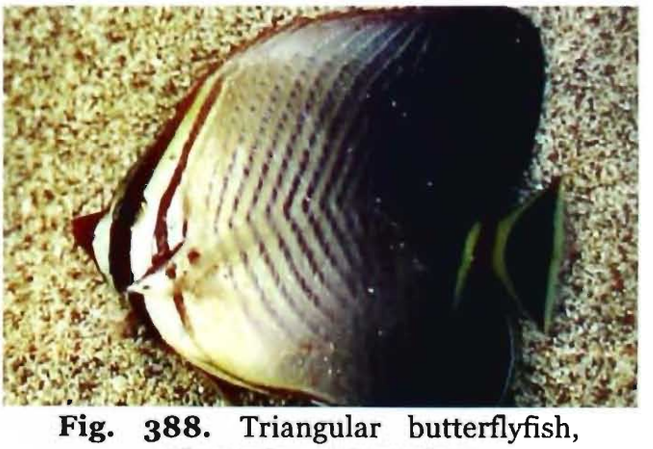

Fig. 388. Triangular butterflyfish, *Chaetodon triangulum*

Fig. 389. Vagabond butterflyfish, *Chaetodon vagabundus*

Fig. 390. Sickle butterflyfish, *Chaetodon falcula*

Fig. 391. Humphead bannerfish, *Heniochus varius* among corals

Fig. 392. Moorish idol, *Zanclus cornutus*

Fig. 393. School of anthid fishes

Fig. 394. Scalefin anthias, *Pseudanthias squamipinnis*

Fig. 395. Humbug damsel, *Dascyllus aruanus*

Fig. 396. Black sot sergeant, *Abudefduf sordidus*

Fig. 397. Yellow backed sergeant, *Abudefduf vaigensis*

Fig. 400. Spine-cheeked anemonefish, *Premanas biaculeatus*

Fig. 398. Pink anemonefish, *Amphiprion peridarian*

Fig. 399. Bridled clown, *Amphiprion frenatus*

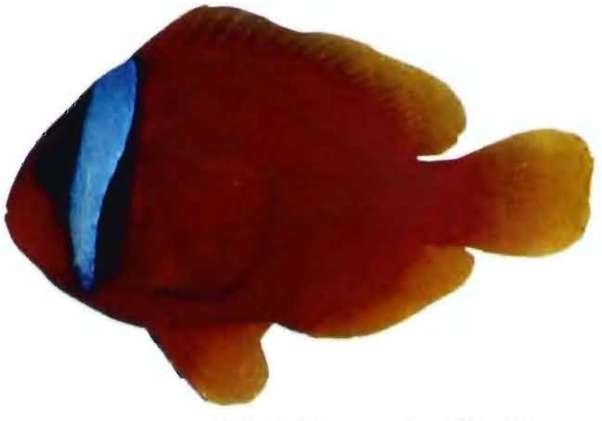

Fig. 401. Bridled clown, *Amphiprion frenatus*

Fig. 402. Young of black damsel, *Neoglyphidodon melas*

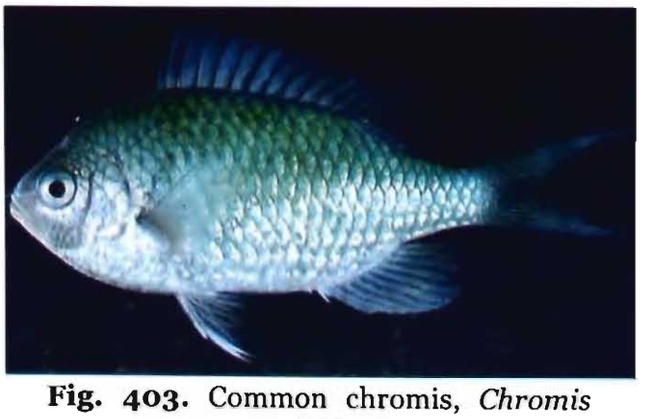

Fig. 403. Common chromis, *Chromis viridis*

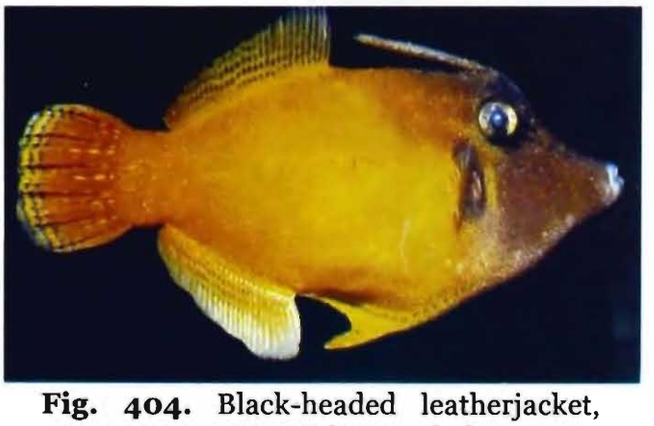

Fig. 404. Black-headed leatherjacket, *Pervagar melanocephalus*

Fig. 405. Yellowfin damsel, *Neoglyphidodon nigroris*

Fig. 406. Blue-ring angelfish, *Pomacanthus annularis*

Fig. 407. Semicircular angel, *Pomacanhus semicirculatus* (Adult)

Fig. 408. Juvenile of *P. semicirculatus*

Fig. 409. Regal angelfish, *Pygoplites diacanthus*

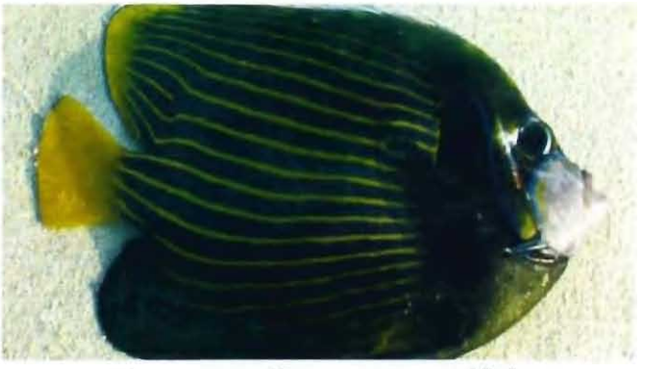

Fig. 410. Emperor angelfish, *Pomacanhus imperator*

Fig. 411. Hunp-head bannerfish, *Heniochus varius*

Fig. 412. Checkered wrasse, *Halichoeres hortulanus*

Fig. 413. Black-axil hogfish, *Bodianus axillaries*

Fig. 414. Sling-jaw wrasse, *Epibulus insidiator* (Black phase)

Fig. 415. Dusky wrasse, *Halichoeres marginatus*

Fig. 416. Pinkbelly wrasse, *Halichoeres margaritaceous*

Fig. 417. Red-breasted wrasse, *Cheilinus fasciatus*

Fig. 418. Bird wrasse, *Gomphosus caeruleus* (Dark phase)

Fig. 419. Bird wrasse, *Gomphosus caeruleus* (Green phase)

Fig. 420. Red spotted wrasse, *Halichoeres argus*

Fig. 421. Thick-lipped wrasse, *Hemigymnus melapterus*

Fig. 422. Three-ribbon wrasse, *Stethojulis trilineata*

Fig. 423. Jansen's wrasse, *Thalassoma jansenii*

Fig. 426. Oriental sweetlip, *Plectorhichus orientalis*

Fig. 424. Young of batfish, *Platax orbicularis*

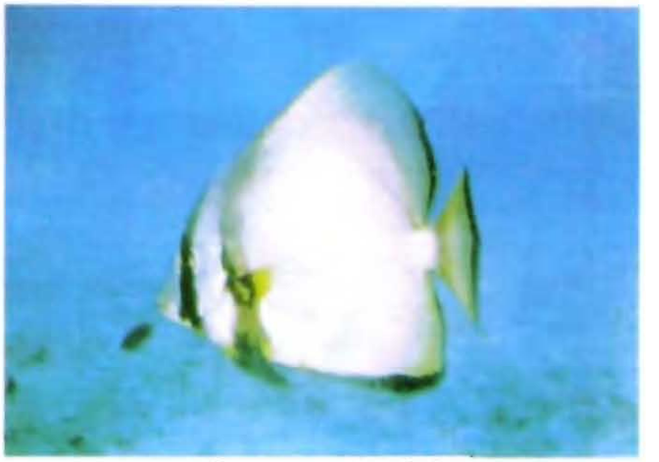

Fig. 425. Batfisf, *Platax pinnatus*

Fig. 427. Spotted sweetlip, *Plectorhinchus chaetodonaides* (Adult)

Fig. 428. Floral wrasse, *Cheilinus chlorourus*

Fig. 429. Yellowfin surgeon, *Acanthurus xanthopterus*

Fig. 430. Yellowfin surgeon, *Acanthurus xanthopterus*

Fig. 431. Convict surgeon, *Acanthurus triostegus*

Fig. 432. Eye-stripe surgeon, *Acanthurus dussumieria*

Fig. 433. Black-streak surgeon, *Acanthurus nigricauda*

Fig. 434. Blue-lined surgeons, *Acanthurus lineatus*

Fig. 436. Sailfin tang, *Zebrasoma veliferum* (Adult)

Fig. 437. Brush-tail tang, *Zebrasoma scopas*

Fig. 435. Powder-blue surgeon, *Acanthurus leucosternon*

Fig. 438. Blotch-eye soldierfish, *Myripristes murdjan*

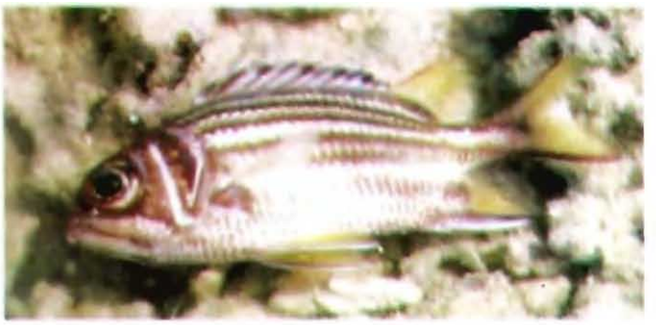

Fig. 439. Dark-striped squirrelfish, *Sargocentron praslin*

Fig. 440. Crown squirrelfish, *Sargocentron diadema*

Fig. 441. Dash-dot goatfish, *Parupeneus barberinus*

Fig. 442. Gold-saddle goatfish, *Parupeneus cyclostomus*

Fig. 443. Zebra Moray eel, *Gymnomuraena zebra*

Fig. 444. Peppered Moray eel, *Gymnothorax sp.*

Fig. 445. Ringed snake-eel, *Myrichthys colubrinus*

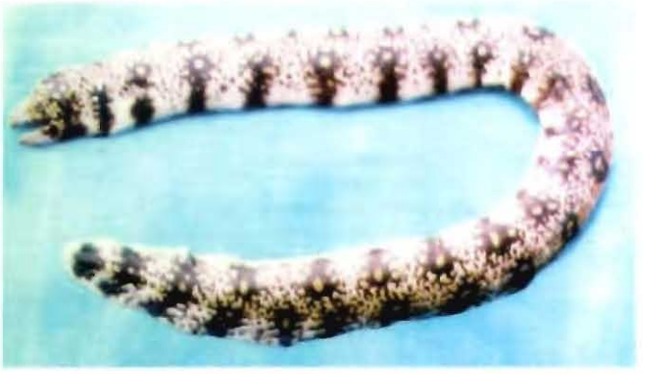

Fig. 446. Starry Moray eel, *Echidna nebulosa*

Fig. 447. Giant moray eel, *Gymnothorax javanicus*

Fig. 448. Adult of bicolour parrotfish, *Cetoscarus bicolor*

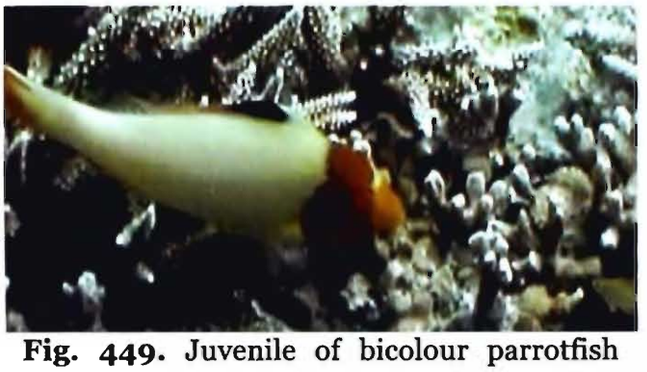

Fig. 449. Juvenile of bicolour parrotfish

Fig. 450. Parrotfish, *Scarus* sp. among corals

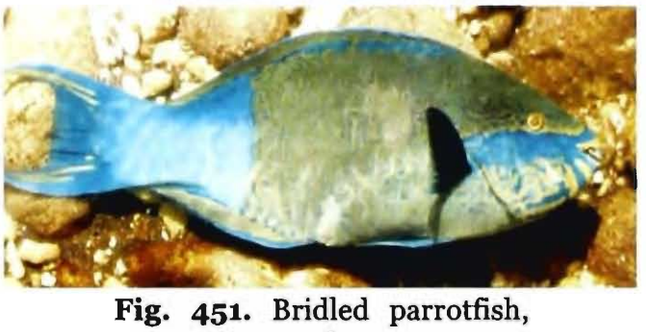

Fig. 451. Bridled parrotfish, *Scarus frenatus*

Fig. 452. Dusky-parrotfish, *Scarus niger*

Fig. 453. Ember-parrotfish, *Scarus rubroviolaceous*

Fig. 454. Saddled-parrotfish, *Scarus scaber*

Fig. 455. Thorny seahorse, *Hippocampus histrix*

Fig. 456. Spotted seahorse, *Hippocampus kuda*

Fig. 457. Alligator-pipefish, *Syngnathoides biaculeatus*

Fig. 458. Blue-striped pipefish, *Doryramphus excicus*

Fig. 459. Ringed pipefish, *Doryramphus dactylophorus*

Fig. 460. Pipe fish, *Choeroichthys sculptus*

Fig. 461. Sargassum fish, *Histro histrio*

Fig. 462. Razorfish, *Aeoliscus strigatus*

Fig. 463. Marbled hawkfish, *Cirrhitus pinnulatus*

Fig. 464. Black-sided hawkfish, *Paracirrhites forsteri*

Fig. 465. Falco hawkfish, *Cirrhitichthys falco*

Fig. 466. Hawk fish, *Paracirrhites forsteri*, colour variant

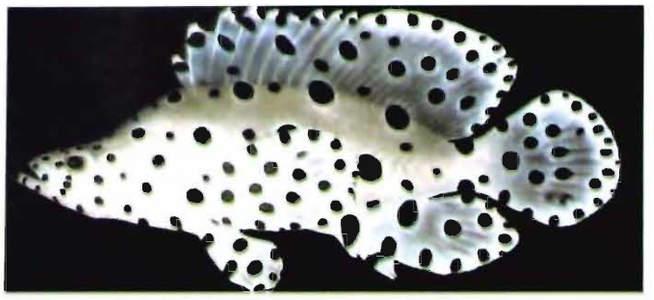

Fig. 467. Pantherfish,
Chromileptis altivelis

Fig. 468. Black-tip fin grouper,
Epinephelus fasciatus

Fig. 469. White-spotted rockcod,
Epinephelus caeruleopunctatus

Fig. 470. Brown-marbled grouper,
Epinephelus fuscoguttatus

Fig. 471. Coral hind,
Cephalopholis miniata

Fig. 472. Blue and Yellow grouper,
Epinephelus flavocaeruleus

Fig. 473. Soapfish,
Grammistes sexlineatus

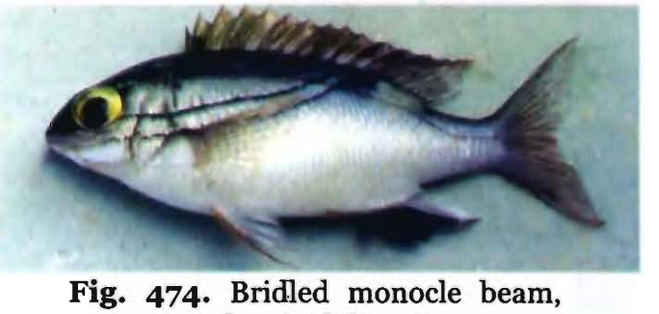

Fig. 474. Bridled monocle beam,
Scolopsis bilineatus

Fig. 475. Humpback scorpionfish,
Scorpaenopsis gibbosa (Young)

Fig. 476. Stonefish,
Synanceia verrucosa

Fig. 477. Radiant firefish, *Pterois radiata*

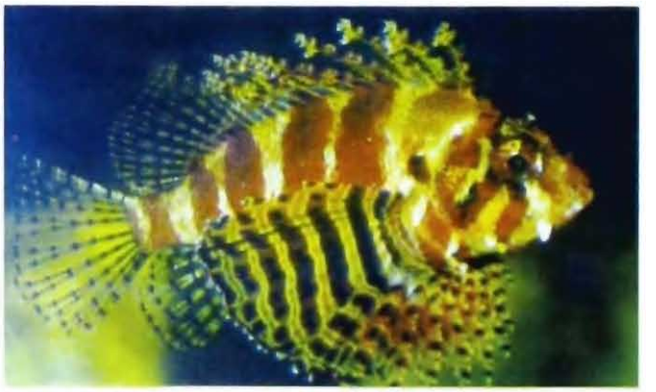

Fig. 478. Shortfin turkyfish, *Dendrochirus brachypterus*

Fig. 479. Red firefish, *Pterois volitans*

Fig. 480. Yellow-spotted rabbitfish, *Siganus guttatus*

Fig. 481. Barred rabbitfish, *Siganus virgatus*

Fig. 482. Dark-banded fusilier, *Pterocaesio tile*

Fig. 483. One-stripe Fusiliers, *Pterocaesio tessellata*

Fig. 484. Black-banded cardinalfish, *Apogon cookii*

Fig. 485. Iridescent cardinalfish, *Apogon kallopterus*

Fig. 486. Coral cardinalfish, *Sphaeramia orbicularis*

Fig. 487. Tenlined cardinalfish, *Cheilodipterus macrodon*

Fig. 488. Bengal snapper, *Lutjanus bengalensis*

Fig. 489. Checkered snapper, *Lutjanus decussatus*

Fig. 490. Hump-back redsnapper, *Lutjanus gibbus*

Fig. 491. Blubber-lip snapper, *Lutjanus rivulatus*

Fig. 492. Emperor redsnapper, *Lutjanus sebae*

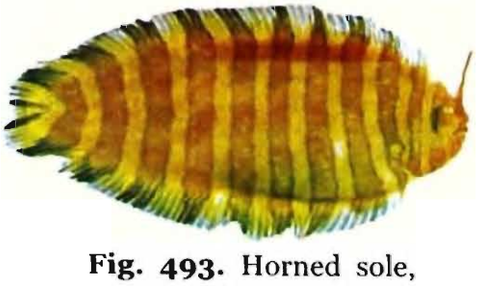

Fig. 493. Horned sole, *Aesopia cornuta*

Fig. 494. Speckled sole, *Pardachirus marmoratus*

Fig. 495. Threadfin dart fish, *Ptereleotris hanae*

Fig. 496. Lizardfish, *Synodus* sp.

Fig. 497. Coral goby, *Gobiodon citrinus*

Fig. 498. Midas bleny, *Escenius midas*

Fig. 499. Spotted Eagleray, *Aetobatos narinari*

Fig. 500. Feather-tail stingray, *Hypolophus sephen*

Fig. 501. Brown-banded bambooshark, *Chiloscyllium punctatum*

Fig. 502. Zebrashark, *Stegostoma fasciatum*

Fig. 503. Grey-reef shark, *Carcharhinus amblyrhynchos*

Fig. 504. Black-tip reefshark, *Carcharhinus melanopterus*

Fig. 505. Scalloped hammerhead shark, *Carchahinus longimanus*

Fig. 506. Oceanic White tip shark, *Carchahinus longimanus*

Fig. 507. Hammerheaded shark, *Sphyrna zygaena*

Fig. 508. Giant trevalley, *Caranx ignobilis*

Fig. 509. Golden trevalley, *Gnathanodon speciosus*

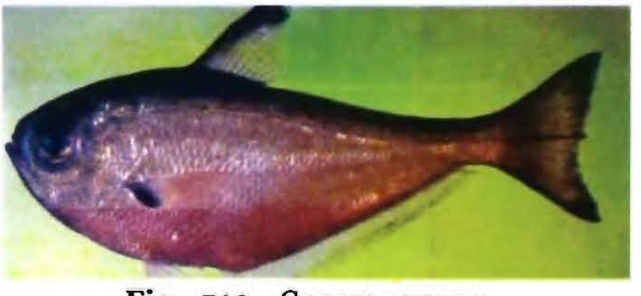

Fig. 510. Copper sweeper, *Pempheris oualensis*

Fig. 511. Long nose leatherjacket, *Oxymonacanthus longirostris*

Fig. 512. Yellow spotted trigger, *Psudobalistes fuscus*

Fig. 513. Clown-triggerfish, *Balistoides conspicillum*

Fig. 514. Titan triggerfish, *Balistoides viridescens*

Fig. 515. Red-tooth triggerfish, *Odonus niger*

Fig. 516. Wedge-tailed triggerfish, *Rhinecanthus rectangulus*

Fig. 517. Blackpatch trigger, *Rhinecanthus verrucosus*

Fig. 518. Black-bar trigger, *Rhinecanthus aculeatus*

Fig. 519. Black-spotted puffer, *Arothron nigropunctatus*

Fig. 520. Scribbled-puffer, *Arothron mappa*

Fig. 521. Black-spotted puffer, *Arothron nigropunctatus*

Fig. 522. A pufferfish inflated with air, *Arothron* sp

Fig. 523. Bennett's Puffer, *Canthigaster bennetti*

Fig. 524. Yellow boxfish, *Ostracion cubicus* (Juvenile)

Fig. 525. Adult of *Ostracion cubicus*

Fig. 526. White-spotted boxfish, *Ostracion meleagris*

Fig. 527. Long-horn cowfish, *Lactoria cornuta*

Fig. 528. Brown phase of Puffer, *Arothron nigropunctatus*

Fig. 529. Baloon Porcupine fish, *Diodon holocanthus*

Fig. 530. Fox-face rabbitfish, *Siganus magnificus*

SEA TURTLES
(Friends of reefs)

The sea turtles are the oldest creatures associated with reefs. All species of turtles are well adapted for aquatic mode of life. Usually juvenile and young turtles always take shelter in reef areas. It is a wonderful experience of encountering these turtles on the reefs while snorkeling or diving. They move gracefully and swiftly from the resting places when disturbed. They possess streamlined carapace and flipper-like limbs for swimming. Male turtles spend their entire life in water and never come to beaches. But the females normally come out of water only for nesting during breeding periods. About six species of turtles are common in the Indo-Pacific waters. Of which Green Sea turtle (*Chelonia mydas*), Leatherback turtle (*Dermochelys coriacea*), Hawk's Bill turtle (*Eretmochelys imbricata*) and Olive Ridley (*Lepdochelys olivacea*) visit the beaches of A & N Island for nesting. Usually turtles are migrants; they travel long distances to reach their nesting places. Some turtles even visit the same breeding sites where they were hatched. Turtles are carnivorous in nature feed on fish, tunicates, jellyfishes, soft corals, crabs, sponges and molluscs. The hatchlings and juveniles of green turtles are carnivorous, but the adults are herbivorous feed on algae and sea grasses. Little or nothing is known about their role in grazing or in the reef food chains. During the breeding period female turtles reach the high beach platform above the spring high tide mark for laying the eggs. They dig a deep pit in the sand with the help of rear flippers. After laying eggs, carefully cover the egg mass with sand. During a nesting year they lay several clutches of 40 to 200 eggs at almost fortnightly intervals. Usually larger turtles lay more eggs in a clutch than smaller ones. The length of nesting season varies from species to species and in different parts of the world.

The turtle hatchlings and juveniles face heavy predation. The egg mortality is even more severe. The monitor lizards, snakes, wild dogs, pigs, rats, ghost crabs (*Ocypode* sp.), *etc.* dig the nests, feed on them and destroy the clutches. Many sea birds including sea eagles feed on the hatchlings when they come out from the nest to enter the sea. Further, sharks and other carnivorous fish heavily feed on hatchlings, juveniles and young turtles. Even the adult turtles become the victims in the hands of greedy man who hunt them for flesh. Exploitation of sea turtles over several centuries made them endangered. If effective conservation measures are not implemented they may even face local extinction at several places in future.

Fig. 531. Green Sea turtle, *Chelonia mydas*

Fig. 532. Eggs of Green Sea turtle

Fig. 533. Hatchlings of Green sea turtle

Fig. 535. Hatchling of leatherback turtle

Fig. 534. Leatherback turtle, *Dermochelys coriacea*

Fig. 536. Hawk's bill sea turtle, *Erytmochelys imbricata squamata*

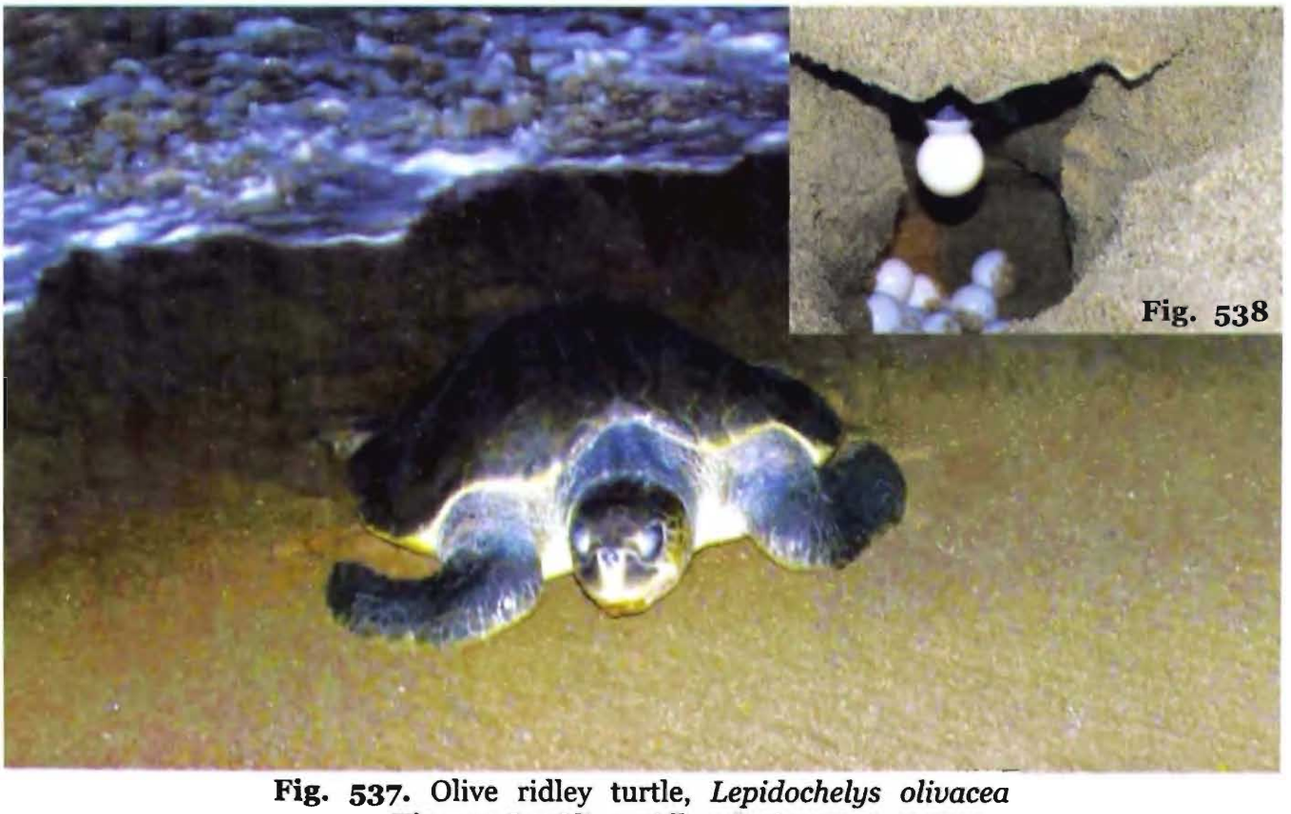

Fig. 537. Olive ridley turtle, *Lepidochelys olivacea*
Fig. 538. Olive ridley laying eggs

SEA SNAKES
(Treacherous creatures)

The sea snakes are highly venomous reptiles belonging to the family Hydrophidae. Over 50 species of sea snakes are found in marine environment. Some are known to have venom ten times as virulent as rattle snake venom. These reptiles look very much like their terrestrial counterparts but the tail is laterally compressed and rudder-like, making the snake an efficient underwater swimmer. Sea snakes are also air breathers; periodically they come to the surface of water to breath. Most of the sea snakes are silvery bluish, olive or golden colour but the sea kraits have attractive silver and black banding from the neck to tip of the tail. Sea snakes belongs to two subfamilies, snakes of laticaudinae are amphibious which lives on land and water and whereas hydrophiinae are totally aquatic and never leave the water. Majority of the sea snakes are found on continental region. Only two species of sea snakes belonging to the genus *Laticauda*, commonly known as Sea-Krait or amphibious sea snakes are encountered in shallow tropical reefs. The amphibious sea snakes spend their time at sea and come to shore during the breeding season for laying eggs. These snakes have specialized ventral scales for crawling on land.

The sea snakes crawl slowly along the coral heads, coral crevices and under debris, for foraging small fish. Sea kraits are ovoviviparous, lay their eggs on land but all other sea snakes are viviparous that bear their young in the water. All sea snakes are highly venomous and are capable of producing 10 to 15 mg of venom composed of powerful neurotoxins and myotoxins. The amphibious sea snakes are completely non-aggressive and when they are on land cannot inflict powerful bites. Usually fishermen are the victims of sea snake bites. During sorting the fish from nets, the trapped snakes may inflict severe bites. Swimmers, snorkelers and divers should avoid sea snakes.

Fig. 539. Amphibious sea snakes, *Laticauda clubrina*

Fig. 540. Sea snake among corals, *Laticauda laticauda*

Fig. 541. *Laticauda laticauda* on rocky shore for egg laying

REEF BIRDS
(Winged visitors of the Reef)

Birds of tropical seas are largely associate with coral reefs. The shallow waters of reef regions with a variety of habitats support many species of birds. One can often witness flocks of variety of birds along the beaches and reef flats. The sea birds enhance the beauty and aesthetic sense of reefs particularly during low tides. These winged visitors play a unique role in the reef ecosystem. They feed on the organisms of all trophic levels of reefs and make a significant contribution in nutrient cycles by transporting organic matter from the nutrient rich marine environment to nearby islands. Their role in seed dispersal is noteworthy and helps in development of plant communities and regeneration of forest in different islands.

The reef herons, little green herons, terns, sand pipers, stints, sanderlings, green shanks, whimbrel, curlews, plovers, *etc.* are the most common birds visit the coastal region and reef flats for breeding and foraging during low tides. They hover, swim and frequently dive in the shallow waters of reef areas of the A & N Islands. The plovers visit beaches in small groups and actively forage on reef dwelling forms. They lay eggs on sand banks. Reef herons are the most common birds found on reefs, coastal rocks and sandy shores. The reef heron has two colour phases. The white phase is more abundant than the gray phase. They wade in shallow waters for small molluscs, crustaceans and fishes. It nests in littoral and mangrove forest. The terns are common and found in large numbers throughout the islands. They move in flocks and congregate where food is available. The food consists of fish captured by plunging from the air. They usually breeds on rocky islands, huge cliffs, coral and rocky beds.

The kingfishers can be easily identified by presence of their strong beaks and brilliant plumage. About 10 species are represented in the islands. Many of them are common along coastal and mangrove belts. The white-bellied sea eagle is a heavy built bird which frequents sea shore. Usually they seen perched on tall trees near coasts and on coral rocks. Food consists of fish, other aquatic animals and snakes. On muddy areas of the reefs, long-legged and long-billed shanks, curlews, ringed plovers and sanderlings are common. They probe mud for small crustaceans, molluscs, worms etc.

Fig. 542. Reef heron, *Egretta sacra*

Fig. 543. Plovers, *Pluvialis* sp. on muddy shore

Fig. 544. Little egret, *Egretta grazetta*

Fig. 545. Median egret- *Mesophoxy intermedia*

Fig. 546. Pond heron, *Ardeola grayii* (Non-breeding phase)

Fig. 547. Indian Pond heron, *Ardeola grayii* (Breeding phase)

Fig. 548. White-collared kingfisher, *Todiramphus chloris*

Fig. 549. White breasted Kfisher, *Halcyon smyrnensis*

Fig. 550. Littleringed plover, *charadrius dubius* (Non-breeding phase)

Fig. 551. Black-napped tern, *Sterna sumatrana;* **Fig. 552.** Tern eggs, *Sterna sumatrana*

Fig. 553. White-bellied sea eagle, *Haliaetus leucogaster*

MARINE MAMMALS
(Pets of the Seas)

The dolphins and dugongs are the common shallow coastal marine mammals belong to Order Cetacia and Sirenia respectively. In fact they are not truly coral reef animals, but frequently found near reef areas. They are fish-like aquatic mammals suckle their young. Body is well adapted for marine life. The forelimbs are modified into a powerful flippers helps in rapid propulsion in water. Body fusiform and tail horizontally compressed. The eyes are very small, ear openings are minute and external ears absent. Of all the aquatic mammals, dolphins are the most powerful and fast swimmers. Like other mammals, cetaceans are air breathers and come to the surface regularly to breath.

The Dugong (*Dugong dugon* Muller) commonly known as Sea cow occurs in shallow seagrass beds. Dugong grows to a length of 2.5 to 3 meters and weighs 200 to 350 kg. Usually they move in pairs or in groups of 3-6 individuals. Due to hefty bodies they are very slugglish. Males possess tusk-like incisors. They feed on seagrases and algae of adjacent reefs. Its total life span is less than 20 years. Females usually gives birth two or three calves in their entire life period. The young ones reach maturity after a period of 10 to 12 years. They are widely distributed in Indian Ocean between East Africa and Australia. But in recent times their existences become so sparse at many places due to habitat destruction and ruthless killing for food and fat. Even though the animal is placed in endangered category of Red Data Book by IUCN, the population is declining throughout its range. In the past dugong enjoyed a wide range of distribution in the A & N Islands, but it is now restricted to a few pockets and their sighting becomes rare (Rao, 1990).

Fig. 554. Sea cow, *Dugong dugon* washed ashore

Fig. 555. Common Dolphin near reefs

Dolphins are one of the most beautiful and graceful marine mammals. More than 30 species of dolphins are recorded in tropical seas. But only few species encountered near reefs such as Bottlenose, Spinner and Common dolphins. The Common dolphin *Delphinus delphis* is found in coastal waters of A & N Islands. Dolphins usually move in small aggregations. They are the most intelligent and highly social animals. They have tremendous breath-holding capacity and can stay underwater for a long period. They swim faster than whales and sea cows and can keep pace with a ship or boat traveling at 30 knots or over. Their sense of vision is very poor but the sense of sound perception is remarkable. They possess a sophisticated 'biological sonar system' which receives sound echoes and interpret, evaluate and identify the eco. Their life span exceeds more than 25 to 30 years. Females attain sexual maturity after crossing 5-6 years of age. They produce single offspring at a time at intervals of every two years. Dolphins are carnivores feed on fish, molluscs and cephalopods.

THREATS TO THE REEFS OF A & N ISLANDS

The coral reefs occurr profusely all along these islands. As elsewhere, these reefs are also threatened from sedimentation, domestic sewage, oil pollution, tourism, large scale resource exploitation, etc and above all poaching by foreigners. Due to the extensive damage done to this fragile ecosystem many areas presently support only scattered patches of coral reefs. These degraded reefs could have possibly been regenerated at many of these areas, provided they are kept undisturbed for a long period. Unfortunately the degradation of natural environment at these sites continued to remain as such. The physical damage of coral reefs which protect the shore against the severe wave action, has shown detrimental consequences on the shore ecology at many places of the islands, can be seen in the form of extensive beach erosion and uprooting or destruction of littoral forests.

The dominant source of threats to the coral reefs of Andaman and Nicbar Islands may be either climatic or human induced (Anthropogenic). The sources for climatic alterations are sea level rise, CO_2 changes, temperature variations, visible light, currents and storms and where as anthropogenic alterations are nutrients, sedimentation, turbidity, toxic materials and resource use. Reef resource exploitation becomes a biggest and serious threat if not handled properly. The sedimentation is one of the serious threats to coral reef ecosystem in the islands. It is mainly due to dredging activities, erosion, faulty land use pattern such as deforestation, coastal development and agricultural practices. The sedimentation problem is more near shore waters of east coast side of the islands due to developmental activities. There are about 23 notified ports in the Islands. The construction of Jetties, their expansion and regular dredging activities definitely contribute to the deterioration of adjacent reef environment. Logging operations, poor land use practices, clearing of forests on near by hills for settlements and agriculture had caused extensive soil erosion increasing the sediment load in coastal waters. Every year during the rainy season over 90% of rainwater flow into sea carry with it heavy loads of suspended silt from the land. The excess sedimentation may have deleterious effects on the reef ecosystem such as choking of feeding mechanisms of animals, prolonged exposure to toxic components, increase the bacterial diseases, replacement of hard substrate with soft sediments thereby lessen the chances of larval settlement.

Sand mining in coastal areas will have harmful effects on marine life and ecology of the habitats. It causes heavy erosion of the coasts and increases sedimentation in shore waters, loss of natural nesting grounds for turtles and destruction of coastal habitats. As there are no major industries in the islands pollution due to industrial effluents is very negligible. Due to constant increase of plying the Inter-Island and Island-Mainland vessels, the habour waters are get polluted by the release of oil mixed waters from vessels. The domestic sewage, fertilisers and pesticides using in agriculture are reaching inshore waters through creeks and led to the increase of nutrient levels. Increased nutrient levels encourage the over growth of phytoplankton, algae, etc. and also encourage the growth of barnacles, bryozoans which prevent the recruitment of coral larvae.

The reefs of windward and open sea are always subjected to physical damage due to high waves during storms. The storms and cyclones often uproot the corals and break their branches. The crown-of-thorns starfish, *Acanthaster planci*, cause extensive coral mortality on the reefs. In the islands the starfish was reported from many localities, but there is no record of extensive damage caused by these starfish. Large scale bleaching of corals was reported during 1998 around the islands. The bleaching may be caused due to stress such as very low or high temperature, salinity variations, excess radiation etc. The temperature is considered to be the important parameter responsible for bleaching along with lower salinities.

The reefs in the islands are subjected to both legal and illegal fishing pressure. The indiscriminate exploitation of reef organisms poses a significant threat to reef ecosystem. During the last two decades the impact on the reefs of these islands is more than before. Corals have been widely collected for the purpose of decoration, making fancy articles, preparation of lime and cement, construction of roads, building blocks etc. The navigational and fishing activities are also affecting their growth. Now the commercial exploitation of corals was banned totally but still it goes on clandestinely in remote places of the islands. The organ-pipe coral (*Tubipora*) once is very common in the Nicobar group of Islands becomes scares due to over exploitation and now disappeared from many reef areas. Extensive damage of corals is being caused due to operation of synthetic gill nets in near shore areas. Some of the invertebrates like sea cucumbers, cones, turbo, tritons, cowries, sacred chanks and some targeted fish groups are fished so heavily that few species have become commercially extinct. Poaching of marine wealth is common in the islands. Since the important marine resources have been depleted in the territorial waters of the neighbouring countries like Myanmar, Thailand, Malaysia and Indonesia, large number of foreign poachers intrudes into the island waters and poaching large quantities of sea cucumbers, shells, corals, crocodiles and fish causing irreparable damage to the reef ecosystem.

IMPACT OF EARTHQUAKE AND TSUNAMI ON CORAL REEFS

The recent catastrophe, due to mega earthquake generated *tsunami* waves proved destructive and caused immense damage to the coral reefs and other marine habitats and their fauna around the Islands. In the early hours of the fateful day of 26th Dec. 2004 an earthquake epicentered at Indonesia generated the most devastating Tsunami waves in the history. The killer waves swooped all the fauna, flora, people and their dwellings and establishments all along the coastline of its way. The earthquake occurred along the plate boundary marked by subduction zone between Indian and Burmese plates. As a result of the movement of these tectonic plates, the Andaman and Nicobar Islands have experienced uplift and subsidence at different places (Jain *et al.*, 2005). Among the Andaman group of Islands, the North Andaman and Middle Andaman areas were uplifted more than two metres and tilted towards east and whereas the coastal regions of south of South Andaman to Nicobar Islands were submerged from one to three meters. This resulted in mass mortality of vast coral beds and their associated fauna. But, interestingly, there is no much destruction of habitats and fauna on the east coast side of the islands. The coastal

habitats in the southern group of Islands were covered with huge silt and sand led to the loss of enormous biodiversity. At many places the mangrove belts and their associated fauna have been damaged.

Due to uplifting, the exposed reefs became a barrier for the movement of sea turtles to the sandy shores. The corals on the deeper reef slopes have survived the impact. At many places the reefs are exposed extensively and the damage caused to the corals and their associated fauna was very high. All the associated fauna such as seastars, sealilies, feather stars, seaurchins, seacucumbers, large number of molluscs, crustaceans, sipunculids, worms, even many fish died and washed ashore in large quantities.

To bring back the lost glory of the reefs, the A & N Administration has taken up several measures like banning of collection of corals and seacucumbers, collection of sea shells and sand mining on permit basis, extensive afforestation programmes, strict implementation of forest laws and regulations. It is hoped that the untired efforts which are being made by the administration, policy makers, nature lovers, consrvationists and local populatin of the islands would restore and safeguard this unique and fragile reef ecosystem from permanent disappearance.

Fig. 556. Reef exposed due to 26th Dec. 2004 earthquake

Fig. 557. Extensive damage of corals at Interview Island after tsunami

Fig. 558. Massive death of corals at Anderson Island

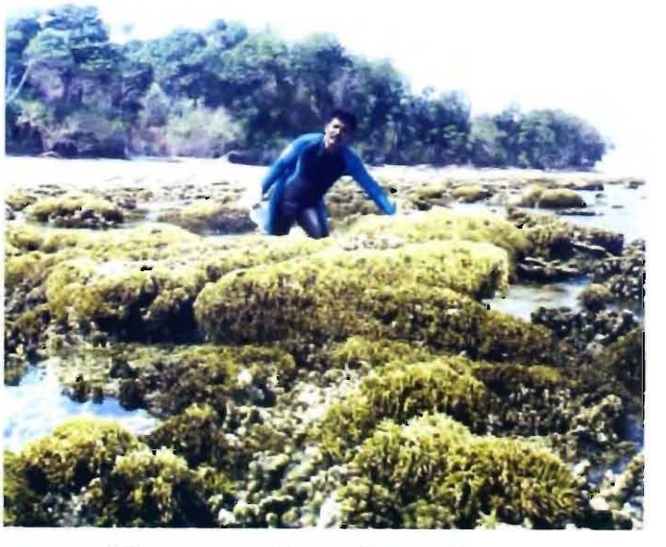

Fig. 559. Mass destruction of corals at North Reef Island

Fig. 560. Permanent exposure of reef around the islands

Fig. 561. Damaged littoral forest due to natural clamity

Fig. 562. Permanently exposed intertidal reef at East Island

Fig. 563. Partially submerged Island due to Earthquake & Tsunami

Fig. 564. Devastated north end coastal belt of Car Nicobar Island

Fig. 565. Huge coral blocks washed ashore due to Tsunami

Fig. 566. Large chunk of Red coral, *Tubipora mucica* on shore

Fig. 567. Huge *Porites* coral bock washed ashore during tsunami

Fig. 568. Sand mining on Island beach

Fig. 569. Reef flat damage due to Bleaching spray for collection of small fish

Fig. 570. Use of bleaching powder for collection of fish, crabs etc., an act of ignorance

Fig. 571. Destruction of corals due to fishing nets

A fervent appeal to all to save the corals and their associates

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ANNEXURE

List of corals and Coral Associate fauna of A & N Islands :

Phylum PORIFERA

Class Demospongia

Sub-Class Homoscleromorpha

Order Homosclerorphoridae

Family PLANKINIDAE

1. *Plankinastrella celylonensis* (Dendy)

Sub-Class Tetravtinomorpha

Order SPIROPHORIDA

Family TETILLIDAE

2. *Cinachyra arabica* (Carter)
3. *Cinachyra australiensis* (Carter)
4. *Paratettilla bacca* (Selenka)
5. *Tetilla cranium* (Muller)
6. *Tetilla dactyloidea* (Crater)

Family DESMACIDONIDAE

7 *Raspailia (Raspailia) viminalis* (Schmidt)

Family ANCHIONIDAE

8. *Ectyobatzella enigmatica* Burton
9. *Kirkpatrickia spiculaphila* Burton & Rao

Family MYXILLIDAE

10. *Damiriopsis brondstedi* Burton

Family DESMACELLIDAE

11. *Biemna lipsosigma* Burton
12. *Beimna tubulata* (Dendy)

Order HAPLOSCLERIDAE

Family CHALINIDAE

13. *Gellius flagellifer* Ridle & Dendy

Family NIPHATIDAE

14. *Gelliodes fibulatus* (Carter)
15. *Phakellia donnani* (Bwrbank)

Family PHLAOEODICTYIDAE

16. *Calyx clavata* Burton

Family PETROSIIDAE

17 *Xestospongia exigua* (Kirkpatrick)

18. *Xestospongia testudinaria* Lamarck

Order SPIROPHORIDAE

Family TETILLIDAE

19. *Cinachyra arabica* (Carter)

20. *Cinachyra australiensis* (Carter)

21. *Paratetilla bacca* (Selenka)

22. *Tetilla cranium* (Muller)

23. *Tetilla dactyloidea* (Carter)

Order ASTROPHORIDA

Family ANCORINIDAE

24. *Ecionemia acervus* Bowerbank

25. *Myriastra clavosa* (Ridley)

26. *Myriastra purpurea* (Ridely)

27. *Rhabdastrella globostellata* (Carter)

28. *Stelletta cavernosa* (Demdy)

29. *Stellatta haeckeli* (Sollas)

30. *Stelletta orientalis* Thiele

31. *Stelletta validissima* Thiele

Family GEODIIDAE

32. *Erylus lendenfeldi* Sollas

Family PACHASTRELLIDAE

33. *Dercitus simplex* (Carter)

34. *Halina plicata* (Schmidt)

35. *Poecillastra eccentrica* Dendy and Burton

36. *Poecillastra tenuillaminaris* Sollas

Family THENEIDAE

37. *Thenea andamanensis* Dendy and Burton

Order HALICHONDRIDA

Family AXINELLIDA

38. *Auletta andamanensis* Pattanayak

39. *Bubaris columnata* Burton

Family HALICHONDRIIDAE

40. *Petromica massalis* Dendy
41. *Spongosorites andamanensis* Pattanayak

Order DICTYOCERATIDA

Family SPONGIIDAE

42. *Phyllospongia foliascens* (Pllas)

Order HADROMERIDA

Family CLIONIDAE

43. *Cliona carpentaria* Hancock
44. *Cliona kempi* Annandale
45. *Cliona lobata* Hancock
46. *Cliona mucronata* Sollas
47. *Cliona quadrata* Hancock
48. *Cliona vastifica* Hancock
49. *Donatia repens* (Schmidst)
50. *Thoosa (Cliothosa) hancocki* (Topsent)

Family SPIRASTRELLIDAE

51. *Spirastrella andamanensis* Pattanayak
52. *Spirastrella inconstans* (Dendy)

Family SUBERITIDAE

53. *Suberites suericeus* Thiele

Family TETHYIDAEORDER

54. *Tethya diploderma* Schmidt
55. *Tethya andamanensis* (Dendy & Burton)
56. *Tethya repens* (Schmidt)
57. *Tethya robusta* Bowerbank

Order LITHISTIDAE

Family THEONELLIDAE

58. *Discodermia papillata* Carter
59. *Discodermia gorgonoides* Burton
60. *Theonella swinhoei* Gray

Family DESMANTHIDAE

61. *Leiodermatium pfefferae* Burton

Class HEXACTINELLIDAE

Subclass Amphidiscophora

Order AMPHIDISCOSIDA

Family HYALONEMATIDAE

62. *Hyalonema aculeatum* Schulze
63. *Hyalonema affine* Marshall
64. *Hyalonema indicum* Schluze
65. *Hyalonema nicobaricum* Schluze

Family PHERONEMATIDAE

66. *Pheronema raphanus* Schluze
67. *Semperella cucumis* Schluze

Order HEXACTINOSIDA

Family APHROCALLISTIDAE

68. *Aphrocallistes beatrix* Gray
69. *Aphrocallistes bocagei* Wright

Family FARREIDAE

70. *Farrea occa* Bowerbank

Family TRETODICTYIDAE

71 *Hexactinella minor* Dendy & Burton

Order LYSSACINOSIDA

Family EUPLECTELLIDAE

72. *Euplectella aspergillum* Owen
73. *Euplectella regalis* Schulze

Family LANGUINELLINAE

74. *Lophocalyx spinosa* Schulze

Phylum CNIDARIA

Class HYDROZOA

1. *Antenella secondaria* (Gmelin)
2. *Anthohydra psammobianta* Salvin-Plawen and Rao
3. *Clytia noliformis* (Mc Vrady)
4. *Halamohydra andamanensis* Rao
5. *Halamohydra chauhani* Rao
6. *Hebella crateroides* Ritchie
7 *Laomedea (Obelia) bristriata*
8. *Macrorhynchia philippina* (Kirchenpaure)

9. *Macrorhynchia phoenacea* (Busk)
10. *Monoserius pennarius* Linnaeus
11. *Nigellastrum mutulatum* (Busk)
12. *Sertularella polyzonias* var. *cornuta* Ritchie
13. Serularella guardridens var. cornuta Ritchie

Order MILLEPORINA

Family MILLEPORIDAE

1. *Millepora* sp.

Family CARYOPHYLLIDAE

1. *Caryopyllia cklavus* Scacchi
2. *Caryopyllia arcuata* Edwards and Haime
3. *Caryopyllia acnanthocyathus grayi* Edwards and Haime
4. *Deltocyathus andamanensis* Alcock
5. *Paracyathus indicus* Duncan
6. *Paracyathus stokesi* Edwards and Haime
7 *Polycyathus verrilli* Duncan
8. *Polycyathus andamanensis* Alcock
9. *Heterocyathus aequicostatus* Edwards and Haime

Family FLABELLIDAE

10. *Placotrochus laevis* Edwards and Haime

Family RHIZANGIIDAE

11. *Culicia rubeola* (Quoy & Gaimard)

Family DENDROPHYLLIDAE

12. *Balanophyllia imperialis* Kent
13. *Balanophyllia scabra* Alcock
14. *Endopsammaia philippinensis* Edwards and Haime
15. *Hetropsammia michelini* Edwards and Haime
16. *Tubastrea aurea* (Quoy& Gaimard)
17 *Dendrophyllia. arbuscula* Horst
18. *Ellanopsammia amphelioides* (Alcock)
19. Ellanopsammia marenzelleri Zibrowius

Class ANTHOZOA

Sub-Class HEXACORALLIA

Family ACROPORIDAE

1. *Acropora anthocercis* (Brook)

2. *Acropora aspera* (Dana)
3. *Acropora austera* (Dana)
4. *Acropora brueggemanni* (Brook)
5. *Acropora carduus* (Dana)
6. *Acropora caroliniana* Nomemzo
7 *Acropora clathrata* (Brook)
8. *Acropora cytherea* (Dana)
9. *Acropora digitifera* (Dana)
10. *Acropora divaricata* (Dana)
11. *Acropora echinata* (Dana)
12. *Acropora florida* (Dana)
13. *Acropora gemmifera* (Brook)
14. *Acropora glauca* (Brrok)
15. *Acropora grandis* (Brook)
16. *Acropora granulosa* (Edwards & Haime)
17 *Acropora humilis* (Dana)
18. *Acropora hyacinthus* (Dana)
19. *Acropora intermedia* (Dana)
20. *Acropora latistella* (Brook)
21. *Acropora longicyanthus* (Edwards and Haime)
22. *Acropora loripes* (Brroke)
23. *Acropora lutkeni* Crossland
24. *Acropora microclados* (Ehrenbergi)
25. *Acropora millepora* (Ehrenberg)
26. *Acropora monticulosa* (Bruggemann
27. *Acropora multiacuta* Nemenzo
28. *Acropora muricata* (Linnaeus)
29. *Acropora nasuta* (Dana)
30. *Acropora palifera* (Lamarck)
31. *Acropora palmerae* Wells
32. *Acropora paplillare* Latypov
33. *Acropora polystoma* (Brook)
34. *Acropora pulchra* (Brook)
35. *Acropora robusta* Dana
36. *Acropora samoensis* (Brook)

37. *Acropora secale* (Studer)
38. *Acropora solitaryensis* Veron & Wallace
39. *Acropora spicifera* (Dana)
40. *Acropora subglabra* (Brook)
41. *Acropora tenuis* (Dana)
42. *Acropora valida* (Dana)
43. *Astreopora cucullata* Lamberts
44. *Astreopora listeri* Bernard
45. *Montipora aequituberculata* Bernard
46. *Montipora angulata* (Lamarck)
47. *Montipora digitata* (Dana)
48. *Montipora foliosa* (Pallas)
49. *Montipora hispida* (Dana)
50. *Montipora informis* Bernard
51. *Montipora peltiformis* Bernard
52. *Montipora turgescens* (Bernard)
53. *Montipora venosa* (Ehrenberg)
54. *Montipora verrucosa* (Lamark)
55. *Montipora* angulata (Lamarck)

Family ASTROCOENIIDAE

56. *Madracis kirbyi* Veron & Pichon
57. *Stylocoeniella guentheri* Bassett Smith

Family POCILLOPORIDAE

58. *Pocillopora ankeli* Scheer & Pillai
59. *Pocillopora damicornis* (Linnaeus)
60. *Pocillopora eydouxi* Edwards & Haime
61. *Pocillopora verrucosa* (Eellis and Solander)
62. *Seriatopora crassa* Quelch
63. *Seriatopora hystrix* (Dana)
64. *Seriatopora stellata* Quelch
65. *Stylophora pistillata* (Esper)

Family EUPHYLLIDAE

66. *Euphyllia glabrescens* (Chamisso and Eysenhardt)
67. *Physogyra lichtensteini* Edwards and Haime
68. *Pleurogyra sinuosa* (Dana)

Family OCULINIDAE

69. *Galaxia astreata* (Lamarck)
70. *Galaxia fascicularis* (Linnaeus)

Family SIDERASTERIDAE

71. *Psammaocora contigua* (Esper)
72. *Psammaocora digitata* (Dana)
73. *Psammaocora profundacella* Gardiner
74. *Pseudosiderastrea tayami* Yabe and Sugiyama

Family AGARICIIDAE

75. *Coeloseris mayeri* Vaughan
76. *Gardineroseris planulata* (Dana)
77 *Leptosecris. papyracea* (Dana)
78. *Leptoseris hawaiensis* Vaughan
79. *Pachyseris gemmae* Nemenzo
80. *Pachyseris rugosa* (Lamarck)
81. *Pachyseris speciosa* (Dana)
82. *Pavona clavus* (Dana)
83. *Pavona decussata* (Dana)
84. *Pavona duerdeni* Vaughan
85. *Pavona explanulata* (Lamarck)
86. *Pavona maldivensis* Gardiner
87. *Pavona minuta* Wells
88. *Pavona varians* Verrill
89. *Pavona venosa* (Ehrenberg)
90. *Pavono* cactus (Forsskal)
91. *Pavono explanulata* (Lamarck)

Family FUNGIIDAE

92. *Ctenactis crassa* (Dana)
93. *Ctenactis echinata* (Pallas)
94. *Cycloseris costulata* (Ortmann)
95. *Cycloseris cyclolites* (Lamarck)
96. *Cycloseris hexagonalis* Edwards and Haime
97. *Cycloseris patelliformis* (Boschma)
98. *Cycloseris sinensis* Edwards and Haime
99. *Cycloseris somervillei* (Gardiner)

100. *Diaseris distorta* (Michelin)
101. *Fungia fungites* (Linnaeus)
102. *Fungia corona* Doderlein
103. *Fungia danai* Edwards and Haime
104. *Fungia horrida* Dana
105. *Fungia paumotensis* Stutchbury
106. *Fungia repanda* (Dana)
107. *Fungia scutaria* (Lamarck)
108. *Halomitra pileus* (Linnaeus)
109. *Herpolitha limax* (Esper)
110. *Lithophyllon undulatum* Rehberg
111. *Podabacia crustacea* (Pallas)
112. *Polyphyllia talpina* Lamarck
113. *Sandalolitha robusta* Quelch

Family PECTINIIDAE

114. *Echinophyllia aspera* (Ellis and Solander)
115. *Mycedium elephantotus* (Pallas)
116. *Oxypora lacera* (Verrill)
117. *Pectinia lactuca* (Pallas)
118. *Pectinia paenia* (Dana)

Family MERULINIDAE

119. *Hydnophora excesa* (Pallas)
120. *Hydnophora microconos* (Lamarck)
121. *Hydnophora rigida* (Dana)
122. *Merulina ampliata* (Ellis and Solander)
123. *Scapophyllia cylindrica* (Edwards and Haime)

Family DENDROPHYLLIIDAE

124. *Turbinaria mesenterina* (Lamarck)
125. *Turbinaria peltata* (Esper)
126. *Turbinaria reniformis* Bernard

Family MUSSIDAE

127. *Cynarina lacrymalis* (Edwards and Haime)
128. *Lobophyllia corymbosa* (Forsskal)
129. *Lobopyllia hemprichii* (Ehrengerg)
130. *Symphyllia argaricea* Edwards and Haime

131. *Symphyllia radians* Edwards and Haime
132. *Symphyllia recta* (Dana)

Family FAVIIDAE

133. *Cyphastrea microphthalma* (Lamarck)
134. *Cyphastrea seralia* (Forsskal)
135. *Diploastrea heliopora* (Lamarck)
136. *Echinopora gemmacea* Lamarck
137. *Echinopora horrida* (Dana)
138. *Echinopora lamellosa* (Esper)
139. *Favia matthaii* Vaughan-
140. *Favia favus* (Forsskal)-
141. *Favia pallida* Dana-
142. *Favia rotumana* (Gardiner)-
143. *Favia speciosa* (Dana)-
144. *Favia stelligera* (Dana)-
145. *Favites abdita* (Ellis and Solander)
146. *Favites complanata* (Ehrenberg)
147. *Favites flexuosa* Dana
148. *Favites halicora* (Ehrenberg)
149. *Goniastrea aspera* Verriil
150. *Goniastrea australensis* (Edward and Haime)
151. *Goniastrea edwardsi* Chevalier
152. *Goniastrea pectinata* (Ehrenberg)
153. *Goniastrea retiformis* (Lamarck)
154. *Leptastrea bottai* (Edwards and Haine)
155. *Leptastrea purpurea* (Dana)
156. *Leptastrea transverasa* Kluzinger
157. *Leptoria phrygia* (Ellis and Solander)
158. *Montastrea annuligera* Edwards and Haime
159. *Montastrea valenciennesi* Edwards and Haime
160. *Oulastrea crispata* (Lamarck)
161. *Oulophyllia crispa* (Lamarck)
162. *Platygyra daedalea* (Ellis & Solander)
163. *Platygyra lamellina* (Ehrenberg)
164. *Platygyra pini* Chevalier

165. *Platygyra sinensis* Edwards and Haine
166. *Plesiastrea versipora* (Lamarck)

Family TRACHYPHYLLIDAE

167. *Trachyphyllia geoffroyi* (Audouin)

Family PORITIDAE

168. *Alveopora verriliana* Dana
169. *Goniopora minor* Crossland
170. *Goniopora columna* Dana
171. *Goniopora planulata* (Edinbarg)
172. *Goniopora stokesi* Edwards and Haime
173. *Goniopora tenuidens* (Quelch)
174. *Porites lichen* Dana
175. *Porites lobata* Dana
176. *Porites lutea* Edwards and Haime
177 *Porites murrayensis* Vaughan
178. *Porites nigrescens* Dana
179. *Porites solida* (Forsskal)

Order ACTINIARIA

Family EDWARDSIIDAE

1. Edwardsia jonesii Seshaiya and Cuttress
2. *Edwardsia pudica* (Klunzinger)
3. *Edwardsia tinctris* Annandale

Family HALOCLAVIDAE

4. *Metapeachia tropica* (Panikkar)

Family HALCAMPIDAE

5. *Mena chikaea* (Annandale)
6. *Mena limnicola* (Annandale)

Family HALIACTIDAE

7 *Pelosetes exul* Annandale
8. *Pelosetes minima* Panikkar
9. *Phytocoetes gangeticus* Annandale
10. *Phytocoetopsis ramunni* Panikkar
11. *Stephensonactis ornata* Panikkar

Family BOLOCEROIDIDAE

12. *Boloceractis gopalayi* Panikkar

Family NEVADNEIDAE

13. *Nevadne glauca* (Annandale)

Family ACTINIIDAE

14. *Actinogeton sultana* (Carlgren)
15. *Anemonia indicus* Parulekar
16. *Anthopleura asiatica* Uchida
17 *Anthopleura midori* Uchida
18. *Anthopleura pacifica* Uchida
19. *Anthopleura panikkarii* Parulekar
20. *Bunodosoma granulifera* (Lesseur)
21. *Cribrinopsis robertii* Parulekar
22. *Paracondylactis indicus* Dave

Family STOICHACTIIDAE

23. *Stoichactis giganteum* (Forskal)

Family PHYMANTHIDAE

24. *Phymanthus loligo* (Ehrenberg)

Family ACONTOPHORIDAE

25. *Acontophorum bambayensis* Parulekar

Family METRIDIIDAE

26. *Metridium senile* var. *fimbriatum* (Verrill)

Family AIPTASIIDAE

27. *Neoaiptasia commensali* Parulekar

Family AIPTASIOMORPHIDAE

28. *Aiptasiomorpha luciae* (Verrill)

Family DIADUMENIDAE

29. *Diadumene schilleriana* (Stoliczk)

Family CERIANTHIDAE

30. *Cerianthus andamanensis* Alcock

Family ZOANTHIDAE

31. *Epizoanthus stellae*

Subclass OCTOCORALLIA

Order CAENOTHECALIA

Family HELIOPORIDAE

1. *Heliopora caerulea* Pallas

Order STOLINEFERA

Family CORNULARIIDAE

2. *Sympodium decipiens* Thomson & Henderson
3. *Sympodium incrustans* Thomson & Henderson
4. *Sympodium indicum* Thomson & Henderson
5. *Sympodium decipiens* Thomson & Henderson

Family CLAVULARIIDAE

6. *Telsto arborea* Wright
7 *Telsto rubra* Hickson

Family TUBIPORIDAE

8. *Tubipora musica* Linnaeus

Order ALCYONACEA

Family ALCYONIIDAE

9. *Anthomastis aberranus* Thomson & Henderson
10. *Alcyonium klunzinger* Thomson and Simpson
11. *Cladiella australis* (Macfadyen)
12. *Cladiella krempfi* (Hickson)
13. *Cladiella laciniosa* (Tixier-Durivault)
14. *Cladiella pachyclados* Klunzinger
15. *Lobophytum altum* Tixier-Durivault
16. *Lobophytum bataram* Moser
17 *Lobophytum catalai* Texier-Durivault
18. *Lobophytum crassum* Von Marenzeller
19. *Lobophytum crebriplicatum* Von Marenzeller
20. *Lobophytum hirsutum* Tixier-Durivault
21. *Lobophytum pauciflorum* (Ehrenberg)
22. *Lobophytum planum* Tixier-Durivault
23. *Lobophytum pusillum* Tixier-Durivault
24. *Lobophytum sarcophytoides* Moser
25. *Lobophytum strictum* Tixier-Durivault
26. *Lobophytum tecticum* Alderslade & Shirwaiker
27. *Lobophytum variatum* Tixier-Durivault
28. *Sarcophyton andamanensis* Jaya Sree, Bhatt & Parulekar
29. *Sarcophyton buitendijki* Verseveldt
30. *Sarcophyton boettgeri* Schenk

31. *Sarcophyton cherbonnieri Tixier*-Durivault
32. *Sarcophyton crassocaula* Moser
33. *Sarcophyton crassum* Tixier-Durivault
34. *Sarcophyton digitatum* Moser
35. *Sarcophyton ehrenbergi* Von Merenzeller
36. *Sarcophyton elegans* Moser
37. *Sarcophyton glaucum* (Quoy& Gaimard)
38. *Sarcophyton infundibuliforme* Tixier-Durivault
39. *Sarcophyton roseum* Pratt
40. *Sarcophyton stellatum* Kukenthal
41. *Sarcophyton tortuosum* Tixier-Durivault
42. *Sarcophyton trocheliophorum* Von Merenzeller
43. *Sinularia abrupta* Tixier-Durivault
44. *Sinularia andamanensis* Thomson and Simpson
45. *Sinularia brassica* May
46. *Sinularia capitalis* Pratt
47. *Sinularia conferta* (Dana)
48. *Sinularia cristata* Tixier-Durivault
49. *Sinularia densa* (Whitelegge)
50. *Sinularia depressa* Tixier-Durivault
51. *Sinularia flexibilis* Quoy & Gaimard
52. *Sinularia gibberosa* Tixier-Durivault
53. *Sinularia granosa* Tixier-Durivallt
54. *Sinularia hirta* (Pratt)
55. *Sinularia inelegans* Tixier-Durivault
56. *Sinularia leptoclados* (Ehrenberg)
57 *Sinularia lochmodes* Kolonko
58. *Sinularia mannarensis* Verseveldt
59. *Sinularia maxima* Verseveldt
60. *Sinularia microclavata* Tixier-Durivault
61. *Sinularia muralis* May
62. *Sinularia ornata* Tixier- Durivault
63. *Sinularia ovispiculata* Tixier-Duri vault
64. *Sinularia peculiaris* Tixier-Durivault
65. *Sinularia polydactyla* (Ehrenberg)

66. *Sinularia querciformis* (Pratt)
67. *Sinularia sandensis* Verseveldt
68. *Sinularia vrijmoethi* Verseveldt

Family VIGUIERIOTIDAE

69. *Studeriotes mirabili* (Thomson)

Family NEPHTHEIDAE

70 *Capnella parva* Light
71. *Dendronephthya andamanensis* Henderson
72. *Dendronephthya albogilva* Henderson
73. *Dendronephthya arbuscula* Henderson
74. *Dendronephthya booleyi* Henderson
75. *Dendronephthya brachycaulos* Henderson
76. *Dendronephthya brevirama* var. *andamanensis* Henderson
77 *Dendronephthya cervicornis* Henderson
78. *Dendronephthya conica* Henderson
79. *Dendronephthya costatorubra* Henderson
80. *Dendronephthya delicatissima* Henderson
81. *Dendronephthya divaricata* Henderson
82. *Dendronephthya elegans* Henderson
83. *Dendronephthya foliata* Henderson
84. *Dendronephthya gilva* Henderson
85. *Dendronephthya harrisoni* Henderson
86. *Dendronephthya* irregularis Henderson
87. *Dendronephthya kollikeri* var. *andamanensis* Henderson
88. *Dendronephthya lanxifera* Holm
89. *Dendronephthya lanxifera* var. *andamanensis* Henderson
90. *Dendronephthya longispina* Henderson
91. *Dendronephthya macrocaulis* Henderson
92. *Dendronephthya masoni* Henderson
93. *Dendronephthya microspiculata* var. *andamanensis* Henderson
94. *Dendronephthya mirabilis* Henderson
95. *Dendronephthya multispinosa* Henderson
96. *Dendronephthya nicobarensis* Henderson
97. *Dendronephthya ochracea* Henderson
98. *Dendronephthya orientalis* Henderson

99. *Dendronephthya pallida* Henderson
100. *Dendronephthya pellucida* Henderson
101. *Dendronephthya pentagona* Henderson
102. *Dendronephthya purpurea* Henderson
103. *Dendronephthya quadrata* Henderson
104. *Dendronephthya rubescens* Henderson
105. *Dendronephthya rubeola* Henderson
106. *Dendronephthya variata* Henderson
107. *Dendronephthya varicolor* Henderson
108. *Nephthea tenuispina* Thomson & Simpson
109. *Spongodes uliginosa* Thomson & Henderson

Family NIDALIDAE

110. *Chironephthya asperula*
111. *Chironephthya variabilis* Hickson
112. *Nidalia alciformes* (Simpson)
113. *Nidalia celosioides* (Simpson)
114. *Siphonogorgia media* Thomson, Simpson & Henderson
115. *Siphonogorgia mirabilis* Klunzinger
116. *Siphonogorgia palmata* Thomson *et al.*
117. *Siphonogorgia rotunda Harrison*
118. *Siphonogorgia variabilis* (Hickson)
119. *Stereacanthia armata* Thomson, Simpson & Henderson
120. *Stereacanthia indica* Thomson & Henderson

Order GORGONACEA

Suborder SCLERAXONIA

Family ANTHOTHELIDAE

121. *Solenocaulon sterrokoloneum* Germanos
122. *Solenocaulon tortuosum* (Gray)

Family SUBERGORGIIDAE

123. *Keroeides gracilis* Whitelegge
124. *Keroeides koreni* wright & Studer
125. *Subergorgia kolliker* var. ceylonensis Thomson
126. *Subergorgia ornata* Whitelegge

Family MELITHAEIDAE

127. *Melitodes ornata* Thomson, Simson & Henderson

128. *Melitodes phlippinensis* Wright & Studer
129. *Melitodes variabiles* (Hickson)

Family PARISIDIDAE

130. *Parisis fruticosa* Verrill & Henderson
131. *Parisis indica* Thomson

Suborder HOLAXANIA

Family PARAMURICEIDAE

132. *Acamptogorgia ceylonensis* Thomson & Henderson
133. *Acamptogorgia rubra* Thomson
134. *Acamptogorgia tenuis* Thomson, Simpson & Henderson
135. *Acis ceylonensis* Thomson & Henderson
136. *Acis indica* Thomson & Henderson
137. *Acis pustulata* Wright & Studer
138. *Acis rigida* Thomson, Simpson & Henderson
139. *Acis spinosa* Thomson & Henderson
140. *Acis ulex* Thomson, Simpson & Henderson
141. *Bebryce mollis* Phillipi
142. *Calicogorgia tenuis* Thomson Simpson & Henderson
143. *Echinogorgia flabellum* Esper
144. *Echinogorgia intermedia* Studer
145. *Echinogorgia macrospiculata* Thomson, Simpson & Henderson
146. *Echinogorgia multispinosa* Thomson & Henderson
147. *Echinogorgia ramulosa* Gray
148. *Echinogorgia reticulata* (Esper)
149. *Echinomuricea andamansis* Thomson, Simpson & Henderson
150. *Echinogorgia ochracea* Thomson, Simpson & Henderson
151. *Echinogorgia reticulata* Thomson, Simpson & Henderson
152. *Echinogorgia splendens* Thomson, & Henderson
153. *Elasmogorgia flexilis* Hickson
154. *Eumuricea ramosa* Thomson, Simpson & Henderson
155. *Menacella gracilis* Thomson, Simpson & Henderson
156. *Muricella bengalensis* Thomson & Henderson
157. *Muricella complanata* Wright & Studer
158. *Muricella ramosa* Thomson & Henderson
159. *Muricella robusta* Thomson, Simpson & Henderson

160. *Muricella rubra* Thomson
161. *Paramuricea indica* Thomson & Henderson
162. *Placogorgia indica* Thomson & Henderson
163. *Muricella orientalis* Thomson & Henderson

Family PLEXAURIDAE

164. *Plexaura indica* Ridley
165. *Plexauroides praelonga* (Ridley)
166. *Psammogorgia ridleyi* Thomson & Simpson

Family ACANTHOGORGIIDAE

167. *Acanthogorgia glomerata* Thomson, Simpson & Henderson
168. *Acanthogorgia muricata* Thomson & Henderson
169. *Acanthogorgia murrilli* Thomson & Henderson
170. *Acanthogorgia racemosa* Thomson, Simpson & Henderson
171. *Anthogorgia glomerata* Thomson, Simpson & Henderson
172. *Acanthogorgia racemosa* Thomson & Simpson
173. *Acanthogorgia verrili* Thomson & Henderson

Family ELLISELLIDAE

174. *Ellisella andamanensis* (Simpson)
175. *Gargonella flexuosa* Klunzinger
176. *Gargonella granulata* Esper
177 *Gargonella umbrachulum* (Ell. & Sol.)
178. *Juncella racemosa* Valencennes
179. *Juncella trilineata* (Young)
180. *Nicelia flabellata* Thomson & Henderson
181. *Nicelia pustulosa* Thomson, Simpson & Henderson
182. *Scirpearia filiformis* Toeplitz
183. *Scirpearia hicksoni*
184. *Scirpearia verrucosa*

Family GORGONIDAE

185. *Callistephanus koreni* Wright & Studer
186. *Lophogorgia lutkeni* Wright & Studer

Family CHRYSOGORGIIDAE

187. *Chrysogorgia dichotoma* Thomson & Henderson
188. *Chrysogorgia flexilis* Wright & Studer
189. *Lepidogorgia verrilli* Wright & Studer

Family PRIMNOIDAE

Subfamily PRIMNOINAE

190. *Caligorgia flexilis* Hickson
191. *Caligorgia indica* Thomson & Henderson
192. *Stenella horrida* Thomson & Henderson

Family ISIDIDAE

Subfamily ISIDINAE

193. *Isis hippuris* Linnaeus

Subfamily KERATOISIDINAE

194. *Acanella robusta* Thomson & Henderson
195. *Keratoisis gracilis* Thomson & Henderson

Order PENNATULACEA

Family KOPHOBELEMNIDAE

196. *Bathyptlum indicum* Thomson & Henderson

Family UMBELLULIDAE

197. *Umbellula dura* Thomson & Henderson
198. *Umbellula indica* Thomson & Henderson
199. *Umbellula pendula* Thomson & Henderson
200. *Umbellula purpurea* Thomson & Henderson
201. *Umbellula radiata* Thomson & Henderson

Family VIRGULARIIDAE

202. *Pavonaria willemoesii* Kolliker
203. *Scytalium martensii* var. *magniflora* Thomson, Simpson & Henderson
204. *Virgularia fusca* Simpson & Henderson
205. *Virgularia juncea* Pallas
206. *Vornata* Thomson, Simpson & Henderson

Family PENNATULIDAE

207. *Pennatula pendula* Thomson & Henderson
208. *Pennatula splendens* Thomson & Henderson

Family PTEROEIDIDAE

209. *Pteroeides andamanensis* Thomson, Simpson & Henderson
210. *Pteroeides chinense* Thompson
211. *Pteroeides crassum* Kolliker
212. *Pteroeides esperi* var. *armatum* Thomson, Simpson & Henderson
213. *Pteroeides hymenocaulon* Bleeker

214. *Pteroeides intermedium* Thomson, Simpson & Henderson
215. *Pteroeides lacazii* var. *spinosum* Kolliker
216. *Pteroeides macandrewi* Kolliker
217. *Pteroeides robustum* Thomson, Simpson & Henderson

Family VERTELLIDAE

Subfamily CAVERNULARINAE

218. *Cavernularia andamanensis* Thomson, Simpson & Henderson
219. *Cavernularia obesa* Valenciennes

Subfamily LITUARINAE

220. *Lituaria phalloides* (Pallas)
221. *Policella australis* Gray

Phylum ARTHROPODA

Class Crustacea

Sub-Class Cirripedia

Order THORACICA

Family LITHOTRYIDAE

1. *Lithotrya nicobarica* Reinhardt

Family IBLIDAE

2. *Ibla cumingi* Darwin

Family CHTHAMALIDAE

3. *Chthamalus malayensis* Pilsbry

Family BALANIDAE

4. *Balanus amphitrite variegates* Darwin
5. *Balanus madrasensis* Daniel
6. *Balanus perforatus* Bruguiere
7 *Balanus tintinnabulum occator* Darwin
8. *Balanus tintinnabulum tintinnabulum* Linnaeus
9. *Balanus tintinnabulum validus* Daewin
10. *Balanus tintinnabulum volcano* Pilsbry

Family CREUSIDAE

11. *Creusia spinulosus euspinosus* Brock

Family PYROGOMIDAE

12. *Pyrgoma grande* (Sowerby)

Family TETRACLITIDAE

13. *Tetraclita squamosa patellaris* Darwin

14. *Tetraclita squamosa viridis* Darwin

Order DECAPODA

Family PENAEIDAE

15. *Aristeomorpha woodmasoni* Calman
16. *Aristeus alcocki* Ramanadas
17 *Aristeus coruscans* Wood-Mason
18. *Aristeus crassipes* Wood-Mason
19. *Aristeus edwardsianus* Johnson
20. *Aristeus rostridentatus* Spence Bate
21. *Aristeus semidentatus* (Bate)
22. *Aristeus virilis* (S. Bate)
23. *Benthesicymus investigatoris* Anderson
24. *Gennadas alcocki* Kemp
25. *Haliporus microps* (S.I.Smith)
26. *Hymenopenaeus* aequalis (S.Bate)
27. *Metapenaeopsis andamanensis* (Woodmason & Alcock)
28. *Metapenaeopsis coniger* (Wood-Mason)
29. *Metapenaeopsis hilarula* (de Man)
30. *Metapenaeopsis mogiensis* (Rathbun)
31. *Metapenaeopsis palmensis* (Haswell)
32. *Metapenaeopsis phillippii* (Bate)
33. *Metapenaeopsis stridulans* Alcock
34. *Metapenaeus affinis* (H.M. Edwards)
35. *Metapenaeus brevicornis* (H.M. Edwards)
36. *Metapenaeus elegans* (de Man)
37. *Metapenaeus ensis* (de Haan)
38. *Metapenaeus krishnatrii* Silas & Muthu
39. *Metapenaeus lysianassa* (de Man)
40. *Metapenaeus moyebi* (Kishinouye)
41. *Parapenaeopsis stylifera* (H.M. Edwards)
42. *Parapenaeopsis tenella* (Kishinouye)
43. *Parapenaeopsis uncta* Alcock
44. *Parapenaeus fissures* (Bate)
45. *Parapenaeus investigatoris* Alcock & Anderson
46. *Penaeopsis rectacuta* (Bate)

47. *Penaeus canaliculatus* Olivier
48. *Penaeus indicus* Milne Edwards
49. *Penaeus merguiensis* de Man
50. *Penaeus monodon* Fabicius
51. *Penaeus semisulcatus* de Hann
52. *Sicyonia lancifer* (Oliver)
53. *Solenocera annectens* Wood-Mason
54. *Solenocera choprai* Nataraj
55. *Trachypenaeus* asper Alcock
56. *Trachypenaeus curvirostris* (Stimpson)

Family SERGESTIDAE

57. *Sergestes bisulcatus* Wood-Mason
58. *Sergestes rubroguttatus* Wood-Mason

Family ALPHEIDAE

59. *Alpheus disintiguendus*
60. *Alpheus frontalis* H.M. Edards
61. *Alpheus macrosceles* Alcock & Anderson
62. *Alpheus strenuous* Dana
63. *Athanas dorsalis* (Stimpson)
64. *Athanas indicus* (Coutiere)
65. *Synalpheus stimpsonii* (de Man)

Family ANCHISTIOIDAE

66. *Anchistioides compressus* Paulson

Family ATYIDAE

67. *Caridina brachydactyla brachydactyla* de Man
68. *Caridina gracilivostris gracilivostris* de Man
69. *Caridina prashadi* Tiwari & Pillai
70. *Caridina servatirostris* de Man
71 *Caridina typus* H.M. Edwards

Family CRANAGONIDAE

72. *Aegeon andamanensis* (Wood-Mason)
73. *Aegeon medium* (Alcock & Anderson)
74. *Aegeon orientalis* Henderson
75. *Aegeon propensalata* (Bate)
76. *Pontophilus angustirastris* de Han

77 *Pontophilus candidus* Kemp
78. *Pontophilus gracilis* S.I. Smith
79. *Pontophilus incisus* Kemp
80. *Pontophilus lowisi* Kemp
81. *Pontophilus plebs* Kemp
82. *Pontophilus sabsechota* Kemp
83. *Prionocrangon ommastosteres* Wood-Mason

Family DISCIADIDAE

84. *Discias exul* Kemp

Family GLYPHOCRANGONIDAE

85. *Glyphocrangon caeca* Wood-Mason
86. *Glyphocrangon gilesii* Wood-Mason
87. *Glyphocrangon investigatoris* Wood-Mason
88. *Glyphocrangon smithii* Wood-Mason

Family GNATHOPHYLLIDAE

89. *Bnathophyllum fasciolatum* Stimpson
90. *Hymenocera elegans* Heller
91. *Phyllognathia ceratophthalma* (Balss)

Family HIPPIOLYTIDAE

92. *Angasia armata* (Paulson)
93. *Gelastocaria paronae* (Nobili)
94. *Hippolysmata prima* (Borradaile)
95. *Hippolysmata vittata* Stimpson
96. *Hippolyte ventricosa* H.M. Edwards
97. *Latreutes mucronatus* Stimpson
98. *Latreutes porcinus* Kemp
99. *Latreutes pygmaeus* Nobili
100. *Paralatreutes bicornis* Kemp
101. *Phycocaris simulans* Kemp
102. *Saron marmoratus* (Olivier)
103. *Saron neglectus* de Haan
104. *Thor amboinensis* Borradaile
105. *Thor maldivensis* Borradaile
106. *Thor paschalis* (Heller)

Family HOPLOPHORIDA

107. *Azanthephyra armata* A.M. Edwards

108. *Azanthephyra curtirostris* Wood-Mason
109. *Azanthephyra eximea* S.I. Smith
110. *Azanthephyra sanguinea* Wood-Mason

Family NEMATOCARCINIDAE

111. *Nematocarcinius tenuirostris* Bate
112. *Nematocarcinius undulatipes* Bate

Family PALAEMONIDAE

113. *Anchistus custos* (Forskal)
114. *Anchistus demani* Kemp
115. *Anchistus miersi* de Man
116. *Anchistus pectinis* Kemp
117. *Conchodytes biunguiculatus* (Paulson)
118. *Conchodytes tridacnae* Peters
119. *Coralliocaris gramines* (Dana)
120. *Coralliocaris superba* (Dana)
121. *Harpioliopsis beaupresi* (Audouin)
122. *Harpioliopsis depressus* var. gracilis Kemp
123. *Jocaste lucina* (Nobili)
124. *Leander tenuicrnis* (Say)
125. *Leptocarpus potamuscus* (Kemp)
126. *Macrobrachium australe* (Guerin Meneville)
127. *Macrobrachium equidens* (Dana)
128. *Macrobrachium hendersoni* hendersoni (de Man)
129. *Macrobrachium lar* (Fabricius)
130. *Macrobrachium latidactylus* (Thallwitz)
131. *Macrobrachium placidulum* (de Man)
132. *Macrobrachium scabriculum* (Heller)
133. *Palaemon* (*Palaeander*) *semmelinki* (de Man)
134. *Palaemon* (*Palaemon*) *debilis* Dana
135. *Palaemonella lata* Kemp
136. *Palaemonella vestigialis* Kemp
137. *Periclimenes* (*Harpilius*) *agag* Kemp
138. *Periclimenes* (*Harpilius*) *andamanensis* Kemp
139. *Periclimenes* (*Harpilius*) *anymone* de Man
140. *Periclimenes* (*Harpilius*) *brevicarpalis* (Schenkel)

141. *Periclimenes* (*Harpilius*) *digitalis* Kemp
142. *Periclimenes* (*Harpilius*) *diversipes* Kemp
143. *Periclimenes* (*Harpilius*) *elegans* (Paulson)
144. *Periclimenes* (*Harpilius*) *inornatus* Kemp
145. *Periclimenes* (*Harpilius*) *leptopus* Kemp
146. *Periclimenes* (*Harpilius*) *proximus* Kemp
147. *Periclimenes* (*Harpilius*) *seychellensis* Borradaile
148. *Periclimenes* (*Harpilius*) *spiniferus* de Man
149. *Periclimenes* (*Harpilius*) *tenuipes* Boradaile
150. *Periclimenes* (*Periclimenes*) *impar* Kemp
151. *Periclimenes* (*Periclimenes*) *signatus* Kemp
152. *Periclimenes* (*Periclimenes*) *ver* Kemp
153. *Urocaridella gracilis* Borradaile

Family PANDALIDAE

154. *Chlorocurtis miser* Kemp
155. *Chlorotocella gracilis* Balss
156. *Chlorotocoides crassicornis* var. *andamanensis* Anderson
157. *Chlorotocoides spinicauda* (de Man)
158. *Heterocarpus alphonsi* Spence Bate
159. *Heterocarpus ensifer* A.M. Edwards
160. *Heterocarpus gibbosus* Bate
161. *Heterocarpus woodmasoni* Alcock
162. *Plesionika alcocki* (A.R.Y. Anderson)
163. *Plesionika bifurca* (Alcock & Anderson)
164. *Plesionika ensis* (A.M. Edwards)
165. *Plesionika martia* (A.M. Edwards)
166. *Plesionika ocellus* Spence Bate
167. *Plesionika unidens* Spence Bate
168. *Thalassocaris crinita* (Dana)

Family PASIPHAEIDAE

169. *Leptochela aculeocaudata* Paulson
170. *Leptochela pugnex* de Man
171. *Lepitochela robusta* Simpson
172. *Parapasiphaea* gilesii Wood-Mason
173. *Pasiphaea sivado* (Risso)

174. *Pasiphaea unispinosa* Wood-Mason
175. *Psathyrocaris infirma* Wood-Mason

Family PSALIDOPODIDAE

176. *Psalidopus huxleyi* Wood-Mason
177 *Psalidopus spiniventris* Wood-Mason

Family STYLODACTYLIDAE

178. *Stylodactylus anarynyjis* de Man

Family STENOPIDAE

179. *Richardina spongicola* Alcock & Anderson
180. *Spongicola andamanica* Alcock

Sub Order Reptantia

Section Macrura

Family ERYONIDAE

181. *Pentacheles hextii* Alcock
182. *Pentacheles qibbus* Alcock
183. *Polycheles ceratus* Alcock
184. *Polycheles phosphorus* Alcock

Family NEPHROPSIDAE

185. *Nephrops thomsoni* var. *andamanica* Wood-Mason
186. *Nephropsis ensirostris* Alcock
187. *Nephropsis stewarti* Wood-Mason

Family AXIIDAE

188. *Iconaxiopsis andamanensis* Alcock

Family CALLIANASSIDAE

189. *Callianassa lignicola* Alcock & Anderson
190. *Callianidea typa* Milne Edwards
191. *Gebicula exigua* Alcock

Family THALASSINIDAE

192. *Thalassina anomala* (Herbst)

Section ANOMURA

Family GALATHEIDAE

193. *Calcinus herbstii* De Man
194. *Calcinus latens* (Randall)
195. *Calicinus gaimardi* Milne Edwards
196. *Elasmonotus cylindrophthalmus* Alcock

197. *Galathea elegans* White
198. *Minidopsis unguifera* Alcock & Anderson
199. *Munida andamanica* Alcock
200. *Munida microps* Alcock
201. *Munida microps* var. *lasiocheles* Alcock
202. *Munida squamosa* var. *prolixa*
203. *Munida tricarinata* Alcock
204. *Munida vigiliarum* Alcock
205. *Munidopsis* (*Bathyankyristes*) *tenax* Alcock
206. *Munidopsis* (*Galathodes*) *reqia* Alcock & Anderson
207. *Munidopsis* (*Galathodes*) *triaena* Alcock & Anderson
208. *Munidopsis* (*Galathodes*) *trifida* Henderson
209. *Munidopsis* (*Orphorhynchus*) *ceratophthalmus* Alcock
210. *Munidopsis dasypus* Alcock
211. *Munidopsis wardeni* Anderson

Family UROPTYCHIDAE

212. *Ptychogaster investigatoris* Alcock & Anderson
213. *Uroptychus nigricapillis* Alcock

Family COENOBITIDAE

214. *Coenobita cavipes* Stimpson
215. *Coenobita clypeata* (Herbert)
216. *Coenobita olivieri* Owen
217. *Coenobita perlata* (H.M. Edwards)
218. *Coenobita rugosa* H.M. Edwards

Family PAGURIDAE

219. *Aniculus aniculus* (Herbst)
220. *Aniculus strigatus* (Herbst)
221. *Clibanarius arethusa* de Man
222. *Clibanarius corallinus* (H.M. Edwards)
223. *Clibanarius humilis* Dana
224. *Clibanarius longitarsus* (de Haan)
225. *Clibanarius merguiensis* de Haan
226. *Clibanarius olivaceus* Henderson
227. *Clibanarius striolatus* Dana
228. *Dardanus deformis* (H.M. Edwards)

229. *Dardanus euopsis* (Dana)
230. *Dardanus guttatus* (Olivier)
231. *Dardanus megistos* (Herbst)
232. *Dardanus varipes* (Heller)
233. *Dardanus vulnerans* (Thallwitz)
234. *Dardanus woodmasoni* (alcock)
235. *Diogenes avarus* Heller
236. *Diogenes custos* (Fabricius)
237. *Diogenes merguiensis* de Man
238. *Nematopagurus squamichelis* Alcock
239. *Pagurus megistos* Herbst
240. *Pagurus pergranualatus* (Henderson)
241. *Pagurs setifer* Milne Edwards
242. *Pagurus zebra* Herbst
243. *Paguristes balanophilus* Alcock
244. *Paguristes ciliatus* (Heller)
245. *Paguristes incomitatus* Alcock
246. *Paguristes longirostris* Dana
247. *Paguristes mundus* Alcock
248. *Paguristes puniceus* Henderson
249. *Spiropagurus profundorum* Alcock
250. *Spiropagurus* spiriger var. *lophomeris* Alcock
251. *Spiropagurus spiriger* var. *spinosicarpis* Alcock
252. *Sympagurus bicristatus* var. *indicus* Alcock
253. *Sympagurus monstrosus* (Alcock)

Family PYLOCHELIDAE

254. *Parapylocheles scorpio* Alcock
255. *Pylocheles miersii* Alcock & Anderson

Family ALBUNIDAE

256. *Albunea symnista* (Linnaeus)

Family PANULIRIDAE

257. *Panulirus homarus* (Linnaeus)
258. *Panulirus longipus* (A.M. Edwards)
259. *Panulirus ornatus* (Fabricius)
260. *Panulirus penicillatus* (Olivier)

261. *Panulirus polyphagus* (Herbst)
262. *Panulirus versicolor* (Latrelle)

Section BRACHYURA

Family PORTUNIDAE

263. *Benthochascon hemingi* Alcock & Anderson
264. *Carupa laeviusula* Heller
265. *Charybdis (Goniohellenus) truncata* (Fabricius)
266. *Charybdis affinis* (Edwards)
267. *Charybdis cruciata* (Hernst)
268. *Charybdis merguensis* de Man
269. *Charybdis miles* (de Man)
270. *Charybdis natator* (Herbst)
271. *Charybdis orientalis* (Dana)
272. *Charybdis rostrata* Edwrads
273. *Charybdis truncata* (de Haan)
274. *Lissocarcinus laevis* Miers
275. *Lissocarcinus polybioides* Adams & White
276. *Lupocyclus philippinensis* Dana
277. *Lupocyclus rotundatus* Adams & White
278. *Lupocyclus strigiosus* Alcock
279. *Lybestes edwardsi* Alcock
280. *Parathranites orientalis* Miers
281. *Podophthalmus nacreus* Alcock
282. *Portunus (Monomia) argentatus* (White)
283. *Portunus (Monomia) broocki* (de Maan)
284. *Portunus (Monomia) tenuipes* de haan
285. *Portunus (Xiphonectes) longispinosus* (Dana)
286. *Portunus andersoni* de Man
287. *Portunus argentatus* (White)
288. *Portunus brockii* de Man
289. *Portunus glareosus* Alcock
290. *Portunus gracilimanus* (Stimpson)
291. *Portunus grannulatus* (Edwards)
292. *Portunus hastatoides* (Fabricius)
293. *Portunus longispinosus* (Dana)

294. *Portunus marginatus* Stephenson & Campbell
295. *Portunus minutus* (Shen)
296. *Portunus orbicularis* Richters
297. *Portunus pelagicus* (Linnaeus)
298. *Portunus sanguinolentus* (Herbst)
299. *Portunus spinipes* Miers
300. *Portunus tenuipes* de Haan
301. *Portunus tuberculosus* Edwards
302. *Portunus whitie* (Edwards)
303. *Scylla serrata* (Forskal)
304. *Thalamita admete* (Herbst)
305. *Thalamita chaptalii* Audouin & Savigny
306. *Thalamita crenata* (Edwards)
307. *Thalamita danae* Stimpson
308. *Thalamita integra* Dana
309. *Thalamita oculea* Alcock
310. *Thalamita picta* Stimpson
311. *Thalamita prymna* Herbst
312. *Thalamita quadrilobata* Miers
313. *Thalamita sexlobata* Miers
314. *Thalamita spinimana*
315. *Thalamita stimpsoni* Edwards
316. *Thalamita woodmasoni* Alcock
317. *Thalamitoides tridents* (Edwards)
318. *Thalamonyx gracilipes* A.M. Edwards

Family GRAPSIDAE

319. *Brachunotus harpax* Hilgendorf
320. *Cardiosoma carnifex* (Herbst)
321. *Cardiosoma hirtipes* Dana
322. *Clistocoelome balansae* Edwards
323. *Clistocoelome mrguiense* de Man
324. *Epigrapsus politus* Heller
325. *Gecarcoidea lalandii* (H.M. Edwards)
326. *Geograpsus crinipes* (Dana)
327. *Geograpsus greyi* (Edwards)

328. *Grapsodes notatus* Heller
329. *Grapsus alboloneatus* Lamarck
330. *Grapsus strigosus* (Herbst)
331. *Grapsus grapsus* (Linnaeus)
332. *Liolophus planissimus* (Herbst)
333. *Metaplax crenulate* Gerstaecker
334. *Metaplax distincta* Edwards
335. *Metaplax elegans* de Man
336. *Metasesarma qubryi* Edwards
337. *Metasesarma rousseauxii* Edwards
338. *Metopograpsus frontalis* Miers
339. *Metopograpsus maculatus* Edwards
340. *Metopograpsus messor* (Forskal)
341. *Pachygrapsus minutus* A.M. Edwards
342. *Pachygrapsus planifrons* de Man
343. *Pachygrapsus plicatus* Edwards
344. *Pelocarcinus humei* (Woodmason)
345. *Perenon planissimum* (Herbst)
346. *Plagusia depressa squamosa* (Herbst)
347. *Plagusia depressa* var. *immaculate* Lamarck
348. *Ptychognathus andamanica* Alcock
349. *Ptychognathus barbatus* Edwards
350. *Ptychognathus dentata* de Man
351. *Ptychognathus pusilla* Heller
352. *Pyxidognathus deianira* de Man
353. *Sarmatium crassum* Dana
354. *Sesarma (Chiromantes) bidens* (de Haan)
355. *Sesarma andersoni* de Man
356. *Sesarma brockii* de Man
357. *Sesarma edwardsi* de Man
358. *Sesarma finni* Alcock
359. *Sesarma gracilipes* Edwards
360. *Sesarma indica* Edwards
361. *Sesarma intermedium* (de Haan)
362. *Sesarma kraussi* de Man

363. *Sesarma latifermur* Alcock
364. *Sesarma longipes* Krauas
365. *Sesarma meinerti* de Man
366. *Sesarma oceanicum* de Man
367. *Sesarma quadratum* (Fabricius)
368. *Sesarma strigosus* (Herbst)
369. *Sesarma taeniolatum* White
370. *Sesarma tetragonum* (Fabricius)
371. *Sesarma thelxinoe* Heller
372. *Varuna litterata* Edwards

Family OCYPODIDAE

373. *Dotilla myctiroides* (Edwards)
374. *Dotilla wiehmanni* de Man
375. *Leipocten sordidulum* Kemp
376. *Macrophthalmus convexus* Stimpson
377. *Macrophthalmus depressus* Ruppell
378. *Macrophthalmus sulcatus* Edwards
379. *Macrophthalmus telescopicus* (Dwen)
380. *Macrophthalmus telescopicus* (Owen)
381. *Macrophthalmus verreauxi* Edwards
382. *Ocypode ceratopthalma* (Pallas)
383. *Ocypode cordimana* Desmarest
384. *Ocypode kuhli* de Man
385. *Ocypode platytarsis* Edwards
386. *Ocypode stimpsoni* Ortmann
387. *Tympanomerus orientalis* de Man
388. *Uca acutus* Stimpson
389. *Uca annulipes* (Latreille)
390. *Uca dubius* Stimpson
391. *Uca dussumieri* Edwards
392. *Uca inversus* Hoffman
393. *Uca lacteous* (de Haam)
394. *Uca marionis* Desmarest
395. *Uca marionis* excisa Mobili
396. *Uca marionis* nitidus Dana

397. *Uca tetragonum* (Herbst)
398. *Uca triangularis* Edwards
399. *Uca urvillei* Edwards
400. *Uca vocans* (Linnaeus)

Family MYCTYRIDAE

401. *Mictyris longicarpus* Latreille

Family XANTHIDAE

402. *Actaea amoyensis* de Man
403. *Actaea areolata* Dana
404. *Actaea bullifera* Alcock
405. *Actaea calculosa* A.M. Edwards
406. *Actaea cavipes* (Dana)
407. *Actaea depressa* (white)
408. *Actaea fossulata* Edwards
409. *Actaea granulata* (Audouin)
410. *Actaea hirsutissima* (Ruppell)
411. *Actaea lata* Borradaile
412. *Actaea michaelsani* Odhner
413. *Actaea nodulosa bullifera* Alcock
414. *Actaea nodulosa* White
415. *Actaea orientalis* Odhner
416. *Actaea peronii* (Edwards)
417. *Actaea pulchella* A.M. Edwards
418. *Actaea purvula* (de Haan)
419. *Actaea rufopunctata* (Edwards)
420. *Actaea ruppellii* (Krauss)
421. *Actaea ruppellii orientalis* Odhner
422. *Actaea savignyi* (Edwards)
423. *Actaea speciosa* (Dana)
424. *Actaea tomentosa* (M. Edwards)
425. *Actaea tuberculosa* Miers
426. *Actaea tumulosa* Odhner
427. *Actaea variolosa* Borradaile
428. *Actumnus asper* (Ruppel)
429. *Actumnus dorsipes* Stimpson

430. *Actumnus fissifrons* Alcock
431. *Actumnus obesus* Dana
432. *Actumnus setifer* (de Man)
433. *Actumnus squamosus* (de Haan)
434. *Actumnus tomentosus* Dana
435. *Atergatis dilatatus* de Haan
436. *Atergatis floridus* (Rumph)
437. *Atergatis integerrimus* (Lamarck)
438. *Atergatopsis signata* (Adams & White)
439. *Banareia armata* (Edwards)
440. *Banareia bengalensis* Deb
441. *Baptozius vinosus* (Edwards)
442. *Bathupilumnus sinensis* Gordon
443. *Camatopsis rubida* (Alcock & Anderson)
444. *Carcinoplax lomgimana* (de Haan)
445. *Carcinoplax longipes* (Woodmason)
446. *Carpilodes cariosus* Alcock
447. *Carpilodes monticulosus* Edwards
448. *Carpilodes pediger* Alcock
449. *Carpilodes rugutus* (Latreille)
450. *Carpilodes tristis* Dana
451. *Carpilodes vaillanatianus* Edwards
452. *Carpilus convexus* (Forskal)
453. *Carpilus maculates* (Linnaeus)
454. *Ceratoplax ciliata* (Stimpson)
455. *Chlorodius espinosus* (Borradaile)
456. *Chlorodius laevissima* (Dana)
457. *Chlorodius niger* (Forsskal)
458. *Chlorodopsis areolata* (M.Edwards)
459. *Chlorodopsis melanochira* (Edwards)
460. *Chlorodopsis nigrocrinita* (Stimpson)
461. *Chlorodopsis ornate* Dana
462. *Chlorodopsis pilunmoides* (White)
463. *Chlorodopsis pugil* Dana
464. *Chlorodopsis spinipes* (Heller)

465. *Chlorodopsis venusta* Rathbun
466. *Chlorodopsis woodmasoni* Alcock
467. *Cymo andereossyi* (Audouin)
468. *Cymo melanodactylus* de Haan
469. *Cymo quadrilobatus* Miers
470. *Dacryopilumnus rathbuane* Balss
471. *Demania intermedia* (Guinot)
472. *Domecia glabra* (Alcock)
473. *Domecia hispida* Eydoux & Souleyet
474. *Epixanthus dentatus* (White)
475. *Epixanthus frontalis* (M. Edwards)
476. *Epixanthus rugosus* Miers
477. *Eriphia laevimana* Latreille
478. *Eriphia scabricula* Dana
479. *Eriphia smithii* Macleay
480. *Etisus anaglyptus* (Edwards)
481. *Etisus andamanicus* Deb
482. *Etisus dentatus* Herbst
483. *Etisus electra* (Herbst)
484. *Etisus laevimanus* Randall
485. *Etisus utilis* Lucas
486. *Eucrocte crenata* (de Haan)
487. *Eucrocte sulcatiforns* (Stimpson)
488. *Eurycarcinus grandidieri* M. Edwards
489. *Eurycarcinus maculatus* (M. Edwards)
490. *Eurycarcinus orientalis* Edwards
491. *Euxanthus exsculptus* (Herbst)
492. *Euxanthus melissa* (Herbst)
493. *Euxanthus rugosus* Miers
494. *Euxanthus sculptilis* Dana
495. *Glabropilumnus granulimanus* Miers
496. *Heteropanope laevis* (Dana)
497. *Heteropilumnus beaumontii* Alcock
498. *Heteropilumnus ciliatus* (Stimson)
499. *Heteropilumnus integra* (Miers)

500. *Heteropilumnus quadrispinosa* Zehntner
501. *Heteropilumnus setosa* (A.M. Edwards)
502. *Jonesius minuta* Sankarankutty
503. *Lachnopodus rodgersii* Stimpson
504. *Lachnopodus subacutus* (Stimpson)
505. *Leptodius cavipes* (Dana)
506. *Leptodius crassimanus* Edwards
507. *Leptodius exaratus* (Edwards)
508. *Leptodius gracilis* Dana
509. *Leptodius nudipes* (Dana)
510. *Leptodius quinquedentatus* (Krauss)
511. *Leptodius sanguineus* (Edwards)
512. *Liomera bella* (Dana)
513. *Liomera cinctimana* (White)
514. *Liomera laevis* (Edwards)
515. *Liomera monticulosa* (Edwards)
516. *Liomera pediger* Alcock
517. *Liomera rugata* (Edwards)
518. *Liomera stimsoni* (Edwards)
519. *Liomera tristis* (Dana)
520. *Liomera venosa* (Edwards)
521. *Lophozoymus dodone* (Herbst)
522. *Lydia annulipes* Gistel
523. *Lydia tesselata* (Latrelle)
524. *Maldivia triunquiculata* (Borradaile)
525. *Medacops neglectus* Balss
526. *Mictyris longicarpus* (Latreille)
527. *Myomenippe hardwickii* (Gray)
528. *Myopilumnus andamanicus* Deb
529. *Nanopilumnus bazbatus* (Edwards)
530. *Nanopilumnus heterodon* (Sakai)
531. *Neiliomera striata* Buitendijk
532. *Ozius perlatus* Stimpson
533. *Ozius rugulosus* Stimpson
534. *Ozius tuberculosus* Edwards

535. *Paractaea garretti* (Rathbun)
536. *Paractaea indica* Deb
537. *Paractaea rufopunctata* (Edwards)
538. *Paractaea speciosa* (Dana)
539. *Paractaea sulcata* Stimpson
540. *Paractaea typica* Deb
541. *Parapanope hextii* (Alcock)
542. *Parapilumnus indicus* Deb
543. *Parapilumnus littoralis* Deb
544. *Piarapilumnus minimus* Deb
545. *Parapilumnus quinotae* Deb
546. *Paraxanthias notatus* (Dana)
547. *Phymodius darchi* Guinot
548. *Phymodius monticulosus* Dana
549. *Phymodius nitidus* (Dana)
550. *Phymodius ornatus* (Dana)
551. *Phymodius sculptus* (Edwards)
552. *Phymodius ungulatus* (Edwards)
553. *Pilodius nigrocrinitus* (Stimpson)
554. *Pilodius pugil* (Dana)
555. *Pilumnopeus indicus* (de Man)
556. *Pilumnus caeruleseens* Edwards
557. *Pilumnus cursor* Edwards
558. *Pilumnus dorsipes* Stimpson
559. *Pilumnus heterodon* Sakai
560. *Pilumnus hirsutus* Stimpson
561. *Pilumnus investigatoris* Deb
562. *Pilumnus kempi* Deb
563. *Pilumnus longicornis* Hilgendorf
564. *Pilumnus minutus* Stimpson
565. *Pilumnus rotundus* Borradaile
566. *Pilumnus scabrius Iculus* Adams & White
567. *Pilumnus vespert IiIllio* (Fabricinus)
568. *Platypilumnus gracilipes* Wood-Mson
569. *Platypodia alcocki* Buitendijk

570. *Platypodia anaglypta* (Heller)
571. *Platypodia andamanica* Deb
572. *Platypodia granulose* (Ruppell)
573. *Platypodia semigranosa* (Ruppell)
574. *Pseudoliomera granosimana* (Edwards)
575. *Pseudoliomera hellerii* Edwards
576. *Pseudozius caystrus* (Adams & White)
577 *Psopheticus stridulans* (Wood-Mason)
578. *Quadrella coronata* Alcock
579. *Quadrella maculosa* Alcock
580. *Quadrella reticulata* Alcock
581. *Serenius andamanicus* Deb
582. *Sphenomerus trapezioides* Wood-Mason
583. *Tetralia glaberrima* (Herbst)
584. *Tetrias fischeri* (A.M. Edwards)
585. *Trapezia cymodoce* (Herbst)
586. *Trapezia digitalis* Latreille
587. *Trapezia ferruginea* Latreille
588. *Trapezia ferruginea* var. *areolata* Dana
589. *Trapezia ferruginea* var. *intermedia* Miers
590. *Trapezia guttata* Ruppell
591. *Trapezia maculata* (Macleay)
592. *Trapezia rufopunctata* (Herbst)
593. *Xanthasia murigera* (White)
594. *Xanthia bidentatus* (Edwards)
595. *Xanthia impressus* (Lamarck)
596. *Xanthia lamarckii* (Edwards)
597. *Xanthia notatus* (Dana)
598. *Xanthodes lamarckii* (Edwards)
599. *Zozymodes cavipes* (Dana)
600. *Zozymodes pumilus* (Jacquinot)
601. *Zozymus aeneus* (Linnaeus)
602. *Zozymus piylosus* Edwards

Family CALAPPIDAE

603. *Calappa calappa* (Linnaeus)

604. *Calappa fornicata* Fabricius
605. *Calappa gallus* (Herbst)
606. *Calappa hepatica* (Linnaeus)
607. *Calappa lophos* (Herbst)
608. *Calappa philargius* (Linnaeus)
609. *Calappa spinosissima* Edwards
610. *Cryptosoma* granulosum (de Haan)
611. *Cycloes granulose* (de Haan)
612. *Matuta banksii* Leach
613. *Matuta lunaris* (Forsskal)
614. *Matuta planipes* Fabricius
615. *Matuta victor* Fabricies
616. *Mursia bicristimana* Alcock & Anderson

Family LEUCOSIIDAE

617. *Arcania gracilipes* Bell
618. *Arcania novemspinosa* Adams & White
619. *Arcania septemspinosa* (Fabricies)
620. *Arcania tuberculata* Bell
621. *Arcania undecimspinosa* de Haan
622. *Ebalia erosa* (Edwards)
623. *Ebalia woodmasoni* Alcock
624. *Heterillihadia fallax* (Henderson)
625. *Iphiculus spongiosus* Adams & White
626. *Ixa cylindrus* (Fabricius)
627. *Leucosia cumingii* Bell
628. *Leucosia haswelli* Miers
629. *Leucosia longifrons* de Haan
630. *Leucosia margaritata* Edwards
631. *Leucosia marmorea* Bell
632. *Leucosia pallida* Bell
633. *Leucosia pubescens* Miers
634. *Leucosia rhomboidalis* de Haan
635. *Leucosia unidentata* de Haan
636. *Leucosia urania* Herbs
637. *Leucosia vittata* Stimpson

638. *Leucosia whitie* Bell
639. *Leucosia whitmaei* Miers
640. *Myra affinis* Bell
641. *Myra brevimana* Alcock
642. *Myra darnleynsis* Haswell
643. *Myra fugax* (Fabricius)
644. *Myra pentacantha* Alcock
645. *Myrodes eudactylus* Bell
646. *Nursila dentate* Bell
647. *Nursila tonsor* Alcock
648. *Nursilia hardwickii* Edwards
649. *Philyra globulosa* Edwards
650. *Philyra platychira* de Haan
651. *Pseudophilyra pusilla* Henderson
652. *Pseudophilyra tridentate* Miers
653. *Pseudophilyra woodmasoni* Alcock
654. *Randallia glans* Alcock
655. *Randallia lamellidentata* Wood-Mason
656. *Randallia lanata* Alcock
657. *Randallia pustulosa* Wood-Mason
658. *Tlos latus* Borradaile
659. *Tlos patella* Alcock
660. *Tlos petraeus* Edwards

Family PARTHENOPIDAE

661. *Aulacolambrus hoplonotus* Adam & White
662. *Caratocarcinus longomanus* Adams & White
663. *Cryptopodia fornicata* Fabricius
664. *Dethra scruposa* Linnaeus
665. *Echinoecus pentagonus* (Milne-Edwards)
666. *Harrovia alboloneata* Adam & White
667. *Harrovia elegans* de Haan
668. *Lambrus* (*Aulacolambrus*) *curvispinis* Miers
669. *Lambrus* (*Aulacolambrus*) *hoplonotus* Adams & White
670. *Lambrus* (*Aulacolambrus*) *sculptus* A.M. Edwards
671. *Lambrus* (*Aulacolambrus*) *whitei* A.M. Edwards

672. *Lambrus* (*Parthenolambrus*) *beaumontii* Alcock
673. *Lambrus* (*Parthenolambrus*) *calappoides* Adams & White
674. *Lambrus* (*Parthenolambrus*) *harpax* Adams & White
675. *Lambrus* (*Parthenolambrus*) *tarpeius* Adams & White
676. *Lambrus* (*Rhinolambrus*) *cybelis* Alcock
677 *Lambrus* (*Rhinolambrus*) *gracilis* Dana
678. *Lambrus* (*Rhinolambrus*) *pelagicus* Ruppell
679. *Lambrus* (*Rhinolambrus*) *turriger* Adams & White
680. *Lambrus contrarius* Herbst
681. *Lambrus longimanus* Leach
682. *Parthenope* (*Parthenope*) *longimanus* (Linnaeus)
683. *Parthenope efflorescens* Alcock
684. *Parthenope horrida* Fabriciuos

Family MAJIDAE

685. *Achaeus cadelli* Alcock
686. *Achaeus lacertosus* Stimpson
687. *Achaeus tenuicollis* Miers
688. *Apocremnus indicus* Alcock
689. *Camposcia retusa* Latreille
690. *Cariocarcinus superciliosus* Herbst
691. *Chlorilibinia andamanica* Alcock
692. *Cyclax suborbicularis* (Stimpson)
693. *Cyphocarcinus minutes* A.M. Adwards
694. *Doclea gracilipes* Stimpson
695. *Doclea tetraptera* Walker
696. *Echinoplax pungens* Wood-Mason
697. *Echinoplax rubida* Alcock
698. *Egeria arachnoids* (Rumph)
699. *Egeria investigatoris* Henderson
700. *Egerla arachnoids* (Rumph)
701. *Entomonyx spinosus* Miers
702. *Huenia proteus* de Haan
703. *Hyastenus aris* (Latreille)
704. *Hyastenus calvarius* Alcock
705. *Hyastenus diacanthus* de Haan

706. *Hyastenus hilgendorfi* de Maan
707. *Hyastenus oryx* Edwards
708. *Hyastenus pleione* (Herbst)
709. *Lambrachaeus ramifer* Alcock
710. *Macrocoeloma nummifer* Alcock
711. *Maia gibba* Alcock
712. *Menaethius monoceros* Latreille
713. *Micippa maragaritifera* Henderson
714. *Micippa philyra* (Herbst)
715. *Micippa thalia* (Herbst)
716. *Naxia cerastes* Ortmann
717. *Naxia hirta* Edwards
718. *Naxia hystrix* Miers
719. *Naxia investrigatoris* Alcock
720. *Naxia taurus* (Pocock)
721. *Oncinopus aranea* de Haan
722. *Paramithrax aculeatus* Edwards
723. *Paramithrax longispinus* (de Haan)
724. *Paratymolus hastatus* Alcock
725. *Phalangipus hystrix* Miers
726. *Physachaeus ctenurus* Alcock
727. *Physachaeus tonsor* Alcock
728. *Platymaia wyville-thomosoni* Miers
729. *Pleistacantha oryx* Ortmann
730. *Pseudomicippa tenuipes* Edwards
731. *Psudomicippa tenuipes* M. Edwards
732. *Schizophrys aspera* (Edwards)
733. *Schizophrys dama* (Herbst)
734. *Scyramathia globulifera* Wood-Mason
735. *Scyramathia pulchra* Miers
736. *Simocarcinus pyramidatus* (Heller)
737 *Tiarinia carnigera* (Latreille)
738. *Tylocarcinus styx* (Herbst)
739. *Xenocarcinus tuberculatus* White

Family GECARCINIDAE

740. *Cardisoma carnifex* (Herbst)
741. *Cardisoma hirtipes* Dana
742. *Epigrpsus politus* Heller
743. *Grapsodes notatus* Heller
744. *Pelocarcinus humei* (Wood-Mason)

Family RANINIDAE

745. *Lyreidus channeri* Wood-Mason
746. *Notopus dorsipes* (Fabricius)
747. *Raninoides personatus* White

Family DORIPPIDAE

748. *Cymonomops glaucomma* Alcock
749. *Dorippe astuta* Fabricius
750. *Dorippe dorsipes* (Linnaeus)
751. *Dorippe fascchino* (Herbst)
752. *Ehtusa* (*Ethusina*) *desciscens* Alcock
753. *Ethsua pyqmaea* Alcock
754. *Ethusa andamanica* Alcock
755. *Ethusa indica* Alcock
756. *Ethusa sexdentata* (Stimpson)

Family CANCRIDAE

757 *Kraussia integra* (de Haan)
758. *Kraussia nitida* Stimson

Family HOMOLODROMIDAE

759. *Arachnodromia margarita* Alcock

Family DROMIIDAE

760. *Conchoecates andamanicus* Alcock
761. *Conchoecates artificiosus* (Fabricius)
762. *Cryptodromia bullifera* Alcock
763. *Cryptodromia canaliculate* Stimpson
764. *Cryptodromia tuberculata pileifera* Stimpson
765. *Dromia* (*Cryptodromia*) *bullifera* Alcock
766. *Dromia* (*Petalomera*) *granulata* Stimpson
767 *Dromia cranioides* de Haan
768. *Dromia rumphii* Fabricius

769. *Dromia unidentata* Ruppell
770. *Petalamera granulata* indica Alcock
771 *Saphaesodromia nux* Alcock

Family HOMOLIDAE

772. *Homola andamanica* Alcock
773. *Homola megalops* Alcock
774. *Hpmola orientalis* (Henderson)
775. *Paramalopsis boasi* Wood-Mason

Family LATREILLIDAE

776. *Latreillia pennifera* Alcock
777 *Latreillopsis bispinosa* Henderson
778. *Notopus dorsipes* (Fabricius)

Family GONOPLACIDAE

779. *Camatopsis rubida* Alcock & Anderson
780. *Carcinoplax longimanus* de Haan
781. *Carcinoplax longipes* (Wood-Mason)
782. *Ceratoplax ciliata* Stimpson
783. *Eucrate crenata* de Haan
784. *Eucrate sexdentata* Haswell
785. *Hephtogelta lugubris* Alcock
786. *Libystes alphonsi* Alcock
787. *Libystes edwardsi* Alcock
788. *Litochira beaumontii* Alcock
789. *Litochira quadrispinosa* Zehntuer
790. *Litochira setosa* (Edwards)
791. *Notonyx vitreus* Alcock
792. *Platypilumnus gracilipes* Wood-Mason
793. *Pseudorhombila spinipes* Alcock
794. *Psopheticus insignis* Alcock
795. *Psopheticus stridulans* Wood-Mason
796. *Scalopidia spinosipes* Stimpson
797. *Typhlocarcinus nudus* Stimpson
798. *Xenophthalmodes moebii* Richters

Family PALICIDAE

799. *Palicus investigatoris* Alcock

800. *Palicus jukessii* (white)
801. *Palicus whitei* (Miers)
802. *Palicus woodmasoni* Alcock

Family HOMOLODROMIDAE

803. *Archnodromia baffini* Alcock & Anderson

Family DYNOMENIDAE

804. *Acanthodromia margirita* Alcock

Family PINNOTHERIDAE

805. *Pinnotheres puroureus* Alcock
806. *Tetrias fischeri* (A.M. Edwards)
807. *Xanthasia murigera* White
808. *Xenophthalmus obscurus* Henderson

Family HYMENOSOMIDAE

809. *Elamena sindensis* Alcock
810. *Elamena truncata* (Stimpson)
811. *Hymenicus woodmasoni* Alcock
812. *Trigonoplax unguiformis* de Haan

Order STOMATOPODA

Family LYSOSQUILLIDAE

813. *Acanthosquilla acanthocarpus* (Miers)
814. *Heterosquilla insignis* (Kemp)
815. *Heterosquilla spinosa* (Wood-Mason)
816. *Lysiosquilla maculata* (Fabricius)
817. *Lysiosquilla sulcirostris* Kemp

Family SQUILLIDAE

818. *Anchisquilla fasciata* (de Haan)
819. *Clorida decorata* Wood-Mason
820. *Harpiosquilla annandalei* (Kemp)
821. *Harpiosquilla harpax* (de Haan)
822. *Harpiosquilla indica* Manning
823. *Harpiosquilla raphidea* (Fabricius)
824. *Leptosquilla schemeltzii* (A.M. Edwards)
825. *Oratosquilla gonypetes* (Kemp)
826. *Oratosquilla indica* (Hansen)
827. *Oratosquilla interrupta* (Kemp)

828. *Oratosquilla oratoria* (de Haan)
829. *Oratosquilla perpensa* (Kemp)
830. *Squilloides leptosquilla* (brooks)
831. *Squilloides tenuispinis* (Wood-Mason)

Family EURYSQUILLIDAE

832. *Manningia andamanensis* Ghosh

Family PSEUDOSQUILLIDAE

833. *Pseudosquilla ciliata* (Fabricius)
834. *Pseudosquilla stulifera* (M. Milne-Edwards)

Family GONODACTYLIDAE

835. *Chorisquilla andamanica* Manning
836. *Chorisquilla gyrosa* (Odhner)
837. *Chorisquilla spinosissima* (Pfeffer)
838. *Gonodactylus chiraga* (Fabricius)
839. *Gonodactylus excavatus* Miers
840. *Gonodactylus falcatus* (Forskal)
841. *Gonodactylus glaber* (Lenz)
842. *Gonodactylus glabrous* Brooks
843. *Gonodactylus nefandus* (Kemp)
844. *Gonodactylus platysoma* Wood-Mason
845. *Haptosquilla glyptocercus* Wood-Mason
846. *Haptosquilla lenzi* (Holthuis)
847. *Haptosquilla nefanda* (Kemp)
848. *Haptosquilla pulchella* (Miers)
849. *Odontodactylus southwelli* Kemp

Family AXIIDAE

850. *Iconaxiopsis andamanensis* Alcock

PYCNOGONIDS

Family NYMPHONIDAE

851. *Nymphon andamanensis* Calman

Family PALLENIDAE

852. *Pallenopsis alcocki* Calman
853. *Pallenopsis ovalis* Loman

Family PHOXICHILIDIIDAE

854. *Anoplodactylus cribellatus* Calman

Family AMMOTHEIDAE

855. *Endeis mollis* (Carpenter)

Family COLOSSENDEIDAE

856. *Colossendeis colossea* Wilson

857. *Colossendeis macerrima* Wilson

858. Rhopalorhyncus kroyeri Wood-Mason

Phylum MOLLUSCA

Class Polyplcophora

Order Lepidopleurida

Family LEPIDOPLEURIDAE

1. *Lepidopleurus andamanicus* Smith

Family ACANTHOCHITONIDAE

2. *Acanthochitona mahensis* Winckworth

3. *Acanthochitona penetrans* Winckworth

Family CRYPTOPLACIDAE

4. *Cryptoplax larvaeformis* Burow

Family ISCHNOCHITONIDAE

5. *Callistochiton pulchellus* (Gray)

6. *Ischnochiton alatus* (Sowerby)

7 *Ischnochiton bouryi* Dupuis

8. *Ischnochiton winckworthi* Leloup

Family CHITONIDAE

9. *Acanthopleura spinger* (Sowerby)

10. *Chiton granoradiatus* Leloup

11. *Chiton huluensis* (Smith)

12. *Chiton pulcherimus* (Sowerby)

13. *Squamopleura imitator* Nierstraz

Class GASTROPODA

Order ARCHAEGASTROPODA

Family HALIOTIDAE

14. *Haliotis* (*Haliotis*) *asinine* Linnaeus

15. *Haliotis* (*Haliotis*) *diversicolor* Reeve

16. *Haliotis* (*Haliotis*) *jacnensis* Reeve

17 *Haliotis* (*Ovinotis*) *ovina* Gmelin

18. *Haliotis* (*Sanhaliotis*) *varia* Linnaeus

19. *Haliotis rugosa* Reeve

Family FISSURELLIDAE

20. *Diodora funiculate* (Reeve)
21. *Diodora granifera* (Reeve)
22. *Diodora lentiginosa* (Reeve)
23. *Diodora pileopsoides* (Reeve)
24. *Diodora singaporensis* (Reeve)
25. *Diodora subquadrata* (Nevill)
26. *Diodora ticaonica* (Reeve)
27. *Emarginula clypea* A. Adams
28. *Emarginula eximia* A. Adams
29. *Emarginula fuliginea* A. Adams
30. *Emarginula scabriuscula* A. Adams
31. *Fissurella cyathulum* Reeve
32. *Fissurella gibberula* Reeva
33. *Lucapinella canalifera* (G. & H. Nevill)
34. *Lucapinella gaylodrae* Preston
35. *Macroschisma elegans* Preston

Family ACMAEIDAE

36. *Acmaea achates* (Reeve)
37. *Acmaea inconspicuous* (Gray)
38. *Acmaea puncturata* (Lamarck)
39. *Acmaea semicornea* Preston

Family PATTELLIDAE

40. *Cellana radiata enneagona* (Reeve)
41. *Cellana radiata radiata* (Born)
42. *Cellana testudinaria* (Linnaeus)
43. *Patelloida flammea* (Quoy & Gaimard)
44. *Patelloida saccharrina* (Linnaeus)
45. *Scutellastra flexuosa* (Quoy & Gaimard)

Family LEPETELLIDAE

46. *Cocculinella minutissima* (Smith)
47. *Saptadonta nasika* Prashad & Rao

Family TROCHIDAE

48. *Chrysostoma paradoxum* (Born)

49. *Clanculus clanguloides* (Wood)
50. *Clanculus margaritarius* (Philippi)
51. *Clanculus microdon* A. Adams
52. *Euchelus asper* (Gmelin)
53. *Euchelus atratus* (Gmelin)
54. Euchelus *fossulatus* Sowerby
55. *Gibbula coeni* Preston
56. *Gibbula declivis* Forsskal
57. *Gibbula pulcherrima* (A. Adams)
58. *Minolia subplicata* Nevill
59. *Mondonta* (*Mondonta*) *australis* Lamarck
60. *Mondonta* (*Mondonta*) *labio* (Linnaeus)
61. *Monilea callifera* (Lamarck)
62. *Monilea masoni* Nevill
63. *Monilea warnefordi* (Nevill)
64. *Solariella dulcissima* Preston
65. *Tectus fenestratus* (Gmelin)
66. *Tectus mauritianus* (Gmelin)
67. *Tectus pyramis* (Born)
68. *Trochus* (*Infundibulum*) *ochroleucus* Gmlen
69. *Trochus* (*Infundibulum*) *radiatus* Gmelin
70. *Trochus* (*Infundibulum*) *stellatus* Gmelin
71 *Trochus* (*Trochus*) *erythreus* Brocchi
72. *Trochus* (*Trochus*) *maculates* Linnaeus
73. *Trochus* (*Trochus*) *niloticus* Linnaeus

Family STOMATELLIDAE

74. *Broderipia rosea* (Broderip)
75. *Pseudostomatella papyracea* (Gmelin)
76. *Stomatella asperulata* A. Adams
77 *Stomatella crenulata* Preston
78. *Stomatella haliotidae* Sowerby
79. *Stomatella sulcifera* Lamarck
80. *Stomatia phymotis* Helbling

Family SKENEIDAE

81. *Tubiola subdisjuncta* (H. Adams)

Family CYCLOSTREMATIDAE

82. *Cyclostrema micans* A. Adams

Family TURBINIDAE

83. *Angaria delphinus* (Linnaeus)
84. *Astralium calcar* (Linnaeus)
85. *Astralium rhodostoma* (Lamarck)
86. *Astralium semicostata* (Kiener)
87. *Bolma girgyllus* Reeve
88. *Leptothyra delecta* Smith
89. *Liota varicose* (Reve)
90. *Liotia cidaris* (Reeve)
91. *Turbo* (*Lunella*) *cinereus* Born
92. *Turbo* (*Lunella*) *granulata* melin
93. *Turbo* (*Marmorostoma*) *argyrostoma* Linnaeus
94. *Turbo* (*Turbo*) *brunneus* (Roeding)
95. *Turbo* (*Turbo*) *chrysostomus* Linnaeus
96. *Turbo* (*Turbo*) *cochleus* Linnaeus
97. *Turbo* (*Turbo*) *marmoratus* Linnaeus
98. *Turbo* (*Turbo*) *petholatus* Linnaeus
99. *Turbo* (*Turbo*) *spinosus* Gmelin

Family NERITIDAE

100. *Dostia violacea* (Gmelin)
101. *Nerita* (*Amphinerita*) *articulata* Gould
102. *Nerita* (*Amphinerita*) *insculpta* Recluz
103. *Nerita* (*Amphinerita*) *polita* Linnaeus
104. *Nerita* (*Ritena*) *grayana* (Recluz)
105. *Nerita* (*Ritena*) *maxima* Gmelin
106. *Nerita* (*Ritena*) *plicata* Linnaeus
107. *Nerita* (*Theliostyla*) *albicilla* Linnaeus
108. *Nerita* (*Theliostyla*) *chamaeleon* Linnaeus
109. *Nerita* (*Theliostyla*) *costata* Gmelin
110. *Nerita* (*Theliostyla*) *patula* Recluz
111. *Nerita* (*Theliostyla*) *planospira* Anton
112. *Nerita* (*Theliostyla*) *squamulata* Le Guillou
113. *Neritina* (*Vittina*) *turrita* (Gmelin)

114. *Neritina* (*Vittina*) *variegata* Lesson
115. *Pseudonerita amoena* (Gould)

Order MESOGASTROPODA

Family LITTORINIDA

116. *Littorina* (*Littorina*) *undulata* (Gray)
117. *Littorina* (*Littorinopsis*) *scabra scabra* (Linnaeus)
118. *Nodilittorina* (*Granulittorina*) millegrana (Philippi)
119. *Nodilittorina* (*Nodilittorina*) *pyramidalis pyramidalis* (Quoy & Gaimard)
120. *Peasiella balteatum* (Preston)
121. *Peasiella roepstorfii* Nevill
122. *Peasiella templiana* (Nevill)

Family RISSOIDEA

123. *Alvania stigmatica* Frauenfeld
124. *Rissoina* (*Moerchiella*) *artensis* Montrouzier
125. *Rissoina* (*Moerchiella*) *d'orbigny* A. Adams
126. *Rissoina* (*Moerchiella*) *gigantean* Deshayes
127. *Rissoina andamanica* Weinkauff
128. *Rissoina angusta* Preston
129. *Rissoina evanida* Nevill
130. *Rissoina mohrensterni* Deshayes
131. *Rissoina oryza* Garrett
132. *Rissoina pupiniformis* Preston
133. *Rissoina sculpturata* Preston
134. *Rissoina subnodicincta* Nevill
135. *Rissoina sulzeriana* Risso
136. *Rissoina tridentata* Michaud
137. *Rissoina warnefordiae* Preston
138. *Rissoina woodmasoniana* Nevill
139. *Schwartziella* (*Pandalosia*) *minuta* (G. & H. Nevill)

Family ASSIMINIDAE

140. *Acmella andamanica* Nevill
141. *Acmella roepstorfiana* Nevill
142. *Assiminea brevicula* (Pfeiffer)
143. *Assiminea templeana* Nevill

Family PLANAXIDAE

144. *Planaxis ineptus* Gould

145. *Planaxis nicobaricus* Frauenfeld
146. *Planaxis niger* Quoy & Gaimard
147. *Planaxis sulcatus* (Born)
148. *Planaxis suturalis* Smith

Family MODULIDAE

149. *Modulus candidus*

Family CERITHIIDAE

150. *Cerethium balteatum* Philippi
151. *Cerethium citrinum* Sowerby
152. *Cerethium columna* Sowerby
153. *Cerethium coralium* Kiener
154. *Cerethium diaeleucum* Philippi
155. *Cerethium lifuense* Melvill & Standen
156. *Cerethium nodulosum* Bruguiere
157. *Cerethium punctatum* Bruguiere
158. *Cerethium traillii* Sowerby
159. *Cerethium zonatum* (Wood)
160. *Clypeomorus batillariaeformis* Habe & Kosuge
161. *Clypeomorus bifasciata bifasciata* (Sowerby)
162. *Clypeomorus petrosa gennesi* (Fischer & Vignal)
163. *Clypeomorus purpurastoma* Houbrick
164. *Rhinoclavis* (*Proclava*) *kochi* (Philippi)
165. *Rhinoclavis* (*Proclava*) *sordidula* (Gould)
166. *Rhinoclavis* (*Rhinoclavis*) *aspera* (Linnaeus)
167. *Rhinoclavis* (*Rhinoclavis*) *sinensis* (Gmelin)
168. *Rhinoclavis* (*Rhinoclavis*) *vertagus* (Linnaeus)

Family LITIOPIDAE

169. *Alaba warnefordiana* Preston

Family POTAMIDIDAE

170. *Cerithidea* (*Cerithidea*) *quadrata* Sowerby
171. *Cerithidea* (*Cerithideopsill*) *cingulata* (Gmelin)
172. *Telescopium telescopium* (Linnaeus)
173. *Terebralis palustris* (Linnaeus)

Family TURRITELLIDAE

174. *Turritella duplicata* (Linnaeus)

175. *Turritella fastigiata* Adams & Reeve
176. *Turritella infraconstricta* Smith
177. *Turritella monilifera* Adams & Reeve

Famly SILIQUARIIDAE

178. *Siliquaria* (*Tenagodus*) muricata Lamarck

Family VERMIETIDAE

179. *Dendropoma andamanicus* (Prashad & Rao)
180. *Dendropoma maximus* Moerch

Family STROMBIDAE

181. *Lambis* (*Harpago*) *chiragra* chiragra (Linnaeus)
182. *Lambis* (*Lambis*) *crocata* crocata (Link)
183. *Lambis* (*Lambis*) *lambis* Linnaeus
184. *Lambis* (*Millepes*) *scorpius* indomaris Abbott
185. *Strombus* (*Canarium*) *fragilis* (Roeding)
186. *Strombus* (*Canarium*) *erythrinus erythrinus* Dillwyn
187. *Strombus* (*Canarium*) *labiatus* labiatus (Roeding)
188. *Strombus* (*Canarium*) *labiatus* olydius (Duclos)
189. *Strombus* (*Canarium*) *mutabilis* Swainson
190. *Strombus* (*Canarium*) *terebellatus* teirebellatus Sowerby
191. *Strombus* (*Dolomena*) *dilatus dilatus* Swainson
192. *Strombus* (*Dolomena*) *marginatus marginatus* Linnaeus
193. *Strombus* (*Dolomena*) *marginatus succinctus* Linnaeus
194. *Strombus* (*Dolomena*) *plicatus pulchellus* Reeve
195. *Strombus* (*Dolomena*) *variabilis variables* Swainson
196. *Strombus* (*Euprotomus*) *aurisdianae aurisdianae* Linnaeus
197. *Strombus* (*Gibberulus*) *gibberulus gibberulus* Linnaeus
198. *Strombus* (*Laevistrombus*) *canarium* Linnaeus
199. *Strombus* (*Lentigo*) *lentiginosus* Linnaeus
200. *Terebellum* (*Terebellum*) *terebellum* Linnaeus
201. *Tibia fuscus* Linnaeus
202. *Tibia powisii* (Petit)
203. *Tibiia unicornis* (Dillwayn)
204. *Varicospira cancellatus* (Lamarck)

Family VANIKORIDAE

205. *Vanikoro cancellata* (Lamarck)

206. *Vanicoro plicata* (Recluz)

Family CREPIDULIDAE

207. *Calyptraea dormitoria* Reeve
208. *Calyptraea extinctorium* Lamarck
209. *Crepidula walshi* Heremannson

Family CAPULIDAE

210. *Capulus lamellose* Chemnitz

Family XENOPHORIDAE

211. *Xenophora* (*Onustus*) *exuta* (Reeve)
212. *Xenophora* (*Onustus*) *indica* (gmelin)
213. *Xenophora* (*Stellaria*) *solaris* (Linnaeus)
214. *Xenophora chinensis chinensis* (Philippi)
215. *Xenophora pallidula* (Reeve)
216. *Xenophora solarioides* (Reeve)

Family CYPRAEIDAE

217. *Cypraea annulus* Linnaeus
218. *Cypraea arabica* Linnaeus
219. *Cypraea argus* Linnaeus
220. *Cypraea asellus* Linnaeus
221. *Cypraea caputserpentis* Linnaeus
222. *Cypraea carneola* Linnaeus
223. *Cypraea caurica* Linnaeus
224. *Cypraea chinensis* Gmelin
225. *Cypraea cicercula* Linnaeus
226. *Cypraea clandestine* Linnaeus
227. *Cypraea cribraria* Linnaeus
228. *Cypraea erosa* Linnaeus
229. *Cypraea errones* Linnaeus
230. *Cypraea gangranosa* Dillwyn
231. *Cypraea globules* Linnaeus
232. *Cypraea gracilis* Gaskoin
233. *Cypraea hirundo* Linnaeus
234. *Cypraea histrio* Meuschen
235. *Cypraea Isabella* Linnaeus
236. *Cypraea kieneri* Hidalgo

237. Cyipraea *lanarckii* Gray
238. Cyipraea *lynx* Linnaeus
239. *Cypraea mappa* Linnaeus
240. *Cypraea mauritiana* Linnaeus
241. *Cypraea microdon* Gray
242. *Cypraea moneta* Linnaeus
243. *Cypraea nucleus* Linnaeus
244. *Cypraea ocellata* Linnaeus
245. *Cypraea onyx* Linnaeus
246. *Cypraea piallida* Gray
247. *Cypraea pioraria* Linnaeus
248. Cyipraea *punctata* Linnaeus
249. Cyipraea *staphylaea* Linnaeus
250. Cyipraea *stolida* Linnaeus
251. *Cypraea talpa* Linnaeus
252. *Cypraea testudinaria* Linnaeus
253. *Cypraea tigris* Linnaeus
254. *Cypraea vitellus* Linnaeus
255. *Cypraea* walkeri Sowerby
256. *Cypraea ziczac* Linnaeus

Family OVULIDAE

257. *Pseudosimnia* (*Diminovula*) *punctata* (Duclos)
258. *Calpurnus* (*Calpurnus*) *verrucosus* (Linnaeus)
259. *Ovula ovum*

Family TRIVIIDAE

260. *Trivirostra oryza* (Lamarck)

Family NATICIDAE

261. *Eunaticina* (*Eunaticina*) *coarctata* (Reeve)
262. *Natica* (*Naticarius*) *alapapilionis* (Roeding)
263. *Natica* (*Naticarius*) *onca* (Roeding)
264. *Natica* (*Testonatica*) *violacea* Sowerby
265. *Natica adamsoni* Blainville
266. *Natica gracilis* Recluz
267. *Natica gualteriana* Recluz
268. *Natica kempi* Preston

269. *Natica lineata* (Roeding)
270. *Natica manceli* Jousseaume
271. *Natica orientalis* (Gmelin)
272. *Natica sulcata* (Born)
273. *Natica vitellus* (Linnaeus)
274. *Polinices* (Mammilla) *maurus* (Lamarck)
275. *Polinices* (*Mammilla*) *zanzibarica* (Recluz)
276. *Polinices* (*Nevertia*) *albumen* (Linnaeus)
277. *Polinices* (*Polinices*) *flemingiana* (Recluz)
278. *Polinices* (*Polinices*) *tumidus* (Swainson)
279. *Sinum delesserti* (Recluz)
280. *Sinum laevigatum* (Lamarck)
281. *Sinum planulatum* (Recluz)
282. *Tanea euzona* Recluz

Family TONNIDAE

283. *Malea pomum* (Linnaeus)
284. *Tonna cepa* (Roeding)
285. *Tonna dolium* (Linnaeus)
286. *Tonna perdix* (Linnaeus)
287. *Tonna sulcosa* (Born)
288. *Tonna tessellata* (Lamarck)

Family FICIDAE

289. *Ficus gracilis* (Sowerby)
290. *Ficus investigatoris* (Smith)
291. *Ficus subintermedia* (Orbigny)

Family CASSIDIDAE

292. *Casmaria erinaceus erinaceus* (Linnaeus)
293. *Casmaria ponderosa ponderosa* (Gmelin)
294. *Cassis cornuta* (Linnaeus)
295. *Cypraecassis rufa* (Linnaeus)
296. *Phalium* (*Phalium*) *areola* Linnaeus
297. *Phalium* (*Phalium*) *glaucum* (Linnaeus)
298. *Phalium* (*Semicassis*) *bisulcatum bisulcatum* (Shubert & Wanger)

Family RANELLIDAE

299. *Biplex perca* (Perry)

300. *Charonia obscura* (Reeve)
301. *Charonia tritonis* Linnaeus
302. *Cymatium* (*Guttarnium*) *muricinum* Roeding
303. *Cymatium* (*Monoplex*) *nicobaricum* (Roeding)
304. *Cymatium* (*Monoplex*) *pileare* (Linnaeus)
305. *Cymatium* (*Monoplex*) *thersites* (Reeve)
306. *Cymatium* (*Reticutriton*) *pfeifferianum* (Reeve)
307. *Cymatium* (*Septa*) *rubeculum* (Linnaeus)
308. *Cymatium amictus* Reeve
309. *Cymatium gracilis* (Reeve)
310. *Cymatium loebbeckii* Lischke
311. *Cymatium retusum* Lamarck
312. *Distorsio* (*Distorsio*) *reticularis* (Linnaeus)
313. *Gyrineum gyrinum* (Linnaeus)
314. *Gyrineum natator* (Roeding)
315. *Gyrineum wilmerianum* Preston
316. *Linatella* (*Gelagna*) *succincta* (Linnaeus)

Family BURSIDAE

317. *Bufonaria* rana (Linnaeus)
318. *Cerithopsis pulvis* (Issel)
319. *Colubellina granularis* (Roeding)

Family CERITHIOPSIDAE

320. *Tutufa* (*Tutufa*) *bubo* (Linnaeus)
321. *Tutufa* (*Tutufa*) *bufo* (Roeding)
322. *Tutufa* (*Tutufa*) *bufonia* (Gmelin)
323. *Tutufa* (*Tutufella*) *rubeta* (Linnaeus)

Family TRIPHORIDAE

324. *Triphora alveolatus* Adams & Reeve
325. *Triphora concinnus* Hinds
326. *Triphora corrugatus* Hinds
327. *Triphora formosus* Deshayes
328. *Triphora ornate* Deshayes
329. *Triphora vittatus* Hinds

Family EPITONIIDAE

330. *Epitonium multicostata* (Sowerby)

331. *Epitonium perplexum* (Pease)
332. *Epitonium varicose* (Lamarck)

Family JANTHINIDAE

333. *Janthina janthina* (Linnaeus)

Family EULIMIDAE

334. *Eulima acuformis* G. & H. Nevill
335. *Eulima balteata* Preston
336. *Eulima rossinsulae* Preston
337. *Melanella acuta* (Sowerby)
338. *Melanella axydata* (Watson)
339. *Melanella fulvescens* (A. Adams)
340. *Melanella recurva* Boettger
341. *Melanella solidula* (Adams & Reeve)

Order NEOGASTROPODA

Family MURICIDAE

342. *Attiliosa nodilifera* (Sowerby)
343. *Boreotrophon indicus* (Smith)
344. *Boreotrophon tenuirostratus* (Smith)
345. *Chicoreus* (*Naquetia*) *anniandalei* (Preston)
346. *Chicoreus* (*Naquetia*) *capucinus* (Roeding)
347. *Chicoreus* (*Naquetia*) *triqueter* (Born)
348. *Chicoreus axicornis* (Lamarck)
349. *Chicoreus banksii* (Sowerby)
350. *Chicoreus brunneus* (Lamarck)
351. *Chicoreus denudatus* (Perry)
352. *Chicoreus kilburni* Houart & Pain
353. *Chicoreus microphyllus* (Lamarck)
354. *Chicoreus ramosus* (Linnaeus)
355. *Coralliophila neritoidea* (Lamarck)
356. *Cornia amygdata* (Kiener)
357. *Cornia contracta* (Reeva)
358. *Cornia fiscella* (Gmelin)
359. *Cornia konkanensis* (Melvill)
360. *Cornia ochrostoma* (Blainville)
361. *Coirnia subnodulosa* (Melvill)

362. *Corniao* zenneana (Crosse)
363. *Drupa* (*Drupa*) *morum morum* Roeding
364. *Drupa* (*Drupa*) *ricinus ricinus* (Linnaeus)
365. *Drupa* (*Drupina*) *lobata* (Blainville)
366. *Drupa* (*Ricinella*) *rubusidaeus* Roeding
367. *Drupella concatenata* (Lamarck)
368. *Drupella cornus* (Roeding)
369. *Favartia tetragona* (Broderip)
370. *Haustellum haustellum* (Linnaeus)
371. *Homalocantha scorpio* (Linnaeus)
372. *Maculotriton serriale* Deshayes in Laborde & Linant
373. *Mancinella alouina* (Roeding)
374. *Mancinella bufo* (Lamarck)
375. *Morula anaxares* (kiener)
376. *Morula biconica* (Blainville)
377. *Morula granulata* (Duclos)
378. *Morula marginata* (Blainville)
379. *Morula nodicostata* (Pease)
380. *Morula uva* (Roeding)
381. *Murex occa* Sowerby
382. *Murex scolopax* Dillwyn
383. *Murex tenuirostrum tenuirostrum* Lamarck
384. *Murex ternispina* Lamarck
385. *Murex trapa* Roeding
386. *Murex tribulus* Linnaeus
387. *Murex troscheli* Lischke
388. *Murexilla andamanensis* Haurat & Surya Rao
389. *Nassa serta* (Bruguiere)
390. *Purpura buccinea* (Deshayes)
391. *Purpura panama* (Roeding)
392. *Purpura prsica* (Linnaeus)
393. *Quoyula madreporarum* (Sowerby)
394. *Rapa rapa* (linnaeus)
395. *Rapa tenuis* Martini
396. *Rapana rapiformis* (Born)

397. *Thais armigera* (Link)
398. *Thais blanfordi* (Melvill)
399. *Thais echinata* (Blainville)
400. *Thais hippocastanum* (Linnaeus)
401. *Thais intermedia* (Kiener)
402. *Thais* lacera (Born)
403. *Thais* rugosa (Born)
404. *Thais* tissoti (Petit)
405. *Thais tuberosa* (Roeding)
406. *Vitularia miliaris* (Gmelin)

Family BUCCINIDAE

407. *Babylonia spirata* (Linnaeus)
408. *Cantharus* (*Pollia*) *delicata* (Smith)
409. *Cantharus* (*Pollia*) *fumosus* (Dillwyn)
410. *Cantharus* (*Pollia*) *undosus* (Linnaeus)
411. *Engina alveolata* (Kiener)
412. *Engina mendicaria* (Linnaeus)
413. *Engina zonalis* (Lamarck)
414. *Nassaria acuminata* (Reeve)
415. *Nassaria laevier* Smith
416. *Phos senticosus* (Linnaeus)
417. *Phos textum* (Gmelin)

Family COLUMBELLIDAE

418. *Anachis terpsichore* Leith
419. *Columbela duclosiana* Sowerby
420. *Columbella scripta* Lamarck
421. *Pyrene faba* (Linnaeus)
422. *Pyrene flava* (Bruguiere)
423. *Pyrene lacteal* (kiener)
424. *Pyrene philippinarum* (Reeve)
425. *Pyrene turturina* (Lamarck)
426. *Pyrene versicolor* (Sowerby)

Family NASSARIIDAE

427. *Bulla vitta* (Linnaeus)
428. *Hebra horrida* Dunker

429. *Hebra subspinosa* (Lamarck)
430. *Nassarius (Aciculina) vittatus* (A. Adams)
431. *Nassarius (Gussonea) marguesa* (Gaskoin)
432. *Nassarius (Niotha) albescens* albescens (Duncker)
433. *Nassarius (Niotha) distortus* (A. Adams)
434. *Nassarius (Niotha) echinatus* (A. Adams)
435. *Nassarius (Niotha) livescens* (Philippi)
436. *Nassarius (Niotha) nodifera* (Powis)
437. *Nassarius (Plicarcularia) callospira* (A. Adams)
438. *Nassarius (Plicarcularia) globosus* (Quoy & Gaimard)
439. *Nassarius (Plicarcularia) pullus* (Linnaeus)
440. *Nassarius (Telasco) gaudiosus* (Hinds)
441. *Nassarius (Telasco) luridus* (Gould)
442. *Nassarius (Zeuxis) comptus* (A. Adams)
443. *Nassarius (Zeuxis) dorsatus* (Roeding)
444. *Nassarius (Zeuxis) margaritiferus* (Dunker)
445. *Nassarius (Zeuxis) olivaceous* (Bruguiere)
446. *Nassarius (Zeuxis) pictus* (Duncker)
447. *Nassarius (Zeuxis) vitiensis* (Hambron & Jaquinot)
448. *Nassarius arcularia arcularia* (Linnaeus)
449. *Nassarius arculariaphoenicensis* (Preston)
450. *Nassarius arcularius* plicartus (Roeding)
451. *Nassarius coronatus* (Bruguiere)
452. *Nassarius gerstenbrandti* (Preston)
453. *Nassarius jucundus* (Preston)
454. *Nassarius kempi* Preston
455. *Nassarius stigmaria* A. Adams
456. *Nassarius subconstrictus* (Sowerby)
457. *Nassarius tristis* (Preston)

Family MELONGENIDAE

458. *Pugilina cochlidium* (Linnaeus)

Family FASCIOLARIIDAE

459. *Fuscus captinus* Smith
460. *Latrius andamanicus* Smith
461. *Latrius craticulatus* Linnaeus

462. *Latrius nodatus* (Gmelin)
463. *Leucozonia* (*Latriolagene*) *smaragdulus* (Linnaeus)
464. *Peristernia nassatula* (Lamarck)
465. *Peristernia ustulata* (Reeve)
466. *Peristernia violacea* (Reeve)
467. *Pleuroploca filamentosa* (roeding)

Family VOLUTIDAE

468. *Lyria coronata* (Hinds)
469. *Lyria elegans* Reeve
470. *Lyria funebris* Reeve
471. *Lyria lyrica* (Reeve)
472. *Lyria marginelloides* Reeve
473. *Lyria trivittata* Adams & Reeve

Family VASIDAE

474. *Harpa amouretta* Roeding
475. *Harpa davidis* Roeding
476. *Harpa major* Roeding
477. *Vasum* (*Vasum*) *ceramicum* (liinaeus)
478. *Vasum* (*Vasum*) *turbinellus* (Linnaeus)

Family OLIVIDAE

479. *Agaronia nebulosa* (Lamarck)
480. *Ancilla ampula* (Gmelin)
481. *Ancilla glans* Smith
482. *Ancilla leucospira* Smith
483. *Ancilla nivea* (Gmelin)
484. *Oliva annulata* (Gmelin)
485. *Oliva guttata* Lamarck
486. *Oliva miniacea* (Roeding)
487. *Oliva mustellina* Lamarck
488. *Oliva oliva* (Linnaeus)
489. *Oliva sericea* (Roeding)
490. *Oliva sidelia* Duclos
491. *Oliva tricolor* Lamrack
492. *Oliva vidua* (Roeding)
493. *Oliva caerulea* (Roeding)

494. *Olivancillaria gibbosa* (Born)

Family MARGINELLIDAE

495. *Marginella latritia* Melvill & Sykes

496. *Marginella persica* Nevill

Family MITRIDAE

497. *Cancilla (Domiporta) praestantissima* (Roeding)

498. *Cancilla (Domiporta) rufilirata* (Adams & Reeve)

499. *Cancilla interlirata* (Reeve)

500. *Cancilla isobella* (Swainson)

501. *Cancilla philippinarum* (A. Adams)

502. *Imbricaria punctata* (Swainson)

503. *Mitra (Mitra) ambigua* Swainson

504. *Mitra (Mitra) cardinalis* (Gmelin)

505. *Mitra (Mitra) guttatus* Swainson

506. *Mitra (Mitra) imperialis* Roeding

507. *Mitra (Mitra) mitra* (Linnaeus)

508. *Mitra (Mitra) stictica* (Link)

509. *Mitra (Nebularia) aurantia aurantia* (Gmelin)

510. *Mitra (Nebularia) chrysalis* Reeve

511. *Mitra (Nebularia) cucumerina* Lamarck

512. *Mitra (Nebularia) doliolum* Kuester

513. *Mitra (Nebularia) luctuosa* A. Adams

514. *Mitra (Nebularia) maesta* Reeve

515. *Mitra (Nebularia) ruepellii* Reeve

516. *Mitra (Nebularia) tabanula* Lamarck

517. *Mitra (Nebularia) ticaonica* Reeve

518. *Mitra (Nebularia) turgida* Reeve

519. *Mitra (Strigatella) acuminata* Swainson

520. *Mitra (Strigatella) decurtata* Reeve

521. *Mitra (Strigatella) litterata* Lamarck

522. *Mitra (Strigatella) paupercula* (Linnaeus)

523. *Mitra (Strigatella) pellisserpentis* Reeve

524. *Mitra (Strigatella) retusa* Lamarck

525. *Mitra (Strigatella) scutulata* (Gmelin)

526. *Neocancilla antoniae* (H. Adams)

527. *Neocancilla circula* Cernohorsky
528. *Neocancilla clathrus* (Gmelin)
529. *Neocancilla granatina* (Lamarck)
530. *Neocancilla papilio* (Link)
531. *Pterygia crenulata* (Gmelin)
532. *Pterygia dactylus* (Linnaeus)
533. *Pterygia fenestrata* (Lamarck)
534. *Scabricola* (*Scabricola*) *coerulea* (Reeve)
535. *Scabricola* (*Scabricola*) *coriacea* (Reeve)
536. *Subcancilla flammea* (Quoy & Gaimard)

Family COSTELLARIIDAE

537. *Vexillum* (*Pusia*) *amabilis* (Reeve)
538. *Vexillum acuminatum* (Gmelin)
539. *Vexillum acupicta* (Reeve)
540. *Vexillum cadaverosum* (Reeve)
541. *Vexillum costellaris* (Lamarck)
542. *Vexillum crebrilirata* (Reeve)
543. *Vexillum cruentatum* (Gmelin)
544. *Vexillum daedalum* (Reeve)
545. *Vexillum deshayesi* (Reeve)
546. *Vexillum exasperatum* (Gmelin)
547. *Vexillum gruneri* (Reeve)
548. *Vexillum luculentum* (Reeve)
549. *Vexillum melongena* (Lamarck)
550. *Vexillum obeliscus* (Reeve)
551. *Vexillum plicarium* (Linnaeus)
552. *Vexillum rectilateralis* Sowerby
553. *Vexillum regina* (Sowerby)
554. *Vexillum sanguisugum* (Linnaeus)
555. *Vexillum sculptilis* (Reeve)
556. *Vexillum semifasciatum* (Lamarck)
557. *Vexillum taeniatum* (Lamarck)
558. *Zieliana woldemarii* (Kiener)

Family CANCELLARIIDAE

559. *Cancellaria asperella* Lamarck

560. *Scalptia scalarina* (Lamarck)
561. *Scalptia scalata* (Sowerby)
562. *Trigonostoma lamellose* (Hinds)

Family CONIDAE

563. *Conus adamsonii* Broderip
564. *Conus amadis* Gmelin
565. *Conus araneosus* var. *nicobaricus* Hwass
566. *Conus arenatus* Hawass
567. *Conus aulicus* Linnaeus
568. *Conus balteatus* Sowerby
569. *Conus biliosus* (Roeding)
570. *Conus canonicus* Hwass
571. *Conus capitaneus* Linnaeus
572. *Conus caracteristicus* Fischer
573. *Conus catus* Hwass
574. *Conus ceylanensis* Hwass
575. *Conus chaldaeus* (Roeding)
576. *Conus coronatus* Gmelin
577. *Conus distans* Hwass
578. *Conus ebraeus* Linnaeus
579. *Conus eburneus* Hwass
580. *Conus edwardi* Preston
581. *Conus emaciates* Reeve
582. *Conus ermineus* Born
583. *Conus figulinus* Linnaeus
584. *Conus flavidus* Lamarck
585. *Conus generalis* var. Maldives Hwass
586. *Conus geographus* Linnaeus
587. *Conus glans* Hwass
588. *Conus hyaena* Hwass
589. *Conus litteratus* Linnaeus
590. *Conus lividus* Hwass
591. *Conus marmoreus* Linnaeus
592. *Conus miles* Linnaeus
593. *Conus miliaris* Hwass

594. *Conus mitratus* Hwass
595. *Conus monile* Hwass
596. *Conus nobilis* Linnaeus
597. *Conus pennaceus* Born
598. *Conus straturatus* Sowerby
599. *Conus striatus* Linnaeus
600. *Conus sumatrensis* (Hwass)
601. *Conus terebra* Born
602. *Conus tessulatus* Born
603. *Conus textile* Linnaeus
604. *Conus tulipa* Linnaeus
605. *Conus virgo* Linnaeus
606. *Conus zonatus* Hwass

Family TURRIDAE

607. *Clavus unizonalis* (Lamarck)
608. *Conchlespira travancorica* (Smith)
609. *Lophiotoma* (*Xenuroturris*) *cingulifera* (Lamarck)
610. *Lophiotoma acuta* (Perry)
611. *Lophiotoma indica* (Roeding)
612. *Turridrupa bijubata* (Reeve)
613. *Turris annulata* (Reeve)

Family TEREBRIDAE

614. *Diplomerixa dulpicata* (Linnaeus)
615. *Diplomerixa straminea* (gray)
616. *Diplomerixa tricolor* (Sowerby)
617. *Hastula albula* (Menke)
618. *Hastula hastate* (Gmelin)
619. *Hastula matheroniana* (Deshayes)
620. *Hastula stylata* (Hinds)
621. *Impages hectica* (Linnaeus)
622. *Terebra affinis* gray
623. *Terebra alveolata* Hinds
624. *Terebra areolata* (Link)
625. *Terebra cingulifera* Lamarck
626. *Terebra commaculata* (Gmelin)

627. *Terebra crenulata* Linnaeus
628. *Terebra deshayesi* Reeve
629. *Terebra dimidiata* Linnaeus
630. *Terebra exigua* Deshayes
631. *Terebra guttata* (Roeding)
632. *Terebra laevigata* gray
633. *Terebra maculata* (Linnaeus)
634. *Terebra nebulosa* (Sowerby)
635. *Terebra pertusa* (Born)
636. *Terebra subulata* (Linnaeus)
637. *Terebra succincta* Boss
638. *Terebra undulata* Gray

Subclass HETEROBRANCHIA

Order ARCHITECTONIDAE

Family ARCHITECTONICIDAE

639. *Architectonica laevigata* (Lamarck)
640. *Architectonica perspectiva* (Linnaeus)
641. *Heliacus staminea* (Gmelin)
642. *Philippia radiata* (Roeding)

Family PYRAMIDELLIDAE

643. *Menestho acuminiata* Preston
644. *Odostomia andamanensis* (Preston)
645. *Odostomia canaliculata* C.B. Adams
646. *Odostomia decorata* Philippi
647. *Odostomia pfeifferi* Preston
648. *Otopleura auriscati* (Holten)
649. *Pyramidella sulcata* (A. Adams)
650. *Pyramidella ventricosa* Guerin
651. *Syrnola brummea* (A. Adams)
652. *Turbonillla rubrobrunnea* Preston

Family AMATHINIDAE

653. *Amathina carinata* (Rathike

Subclass Opisthobranchia

Order CPHALSPIDEA

Family SCAPHANDRIDAE

654. *Cylichna andamanica* Smith

655. *Cylichna grandi* (A. Adams)

656. *Cylichna syngenes* Preston

657. *Scaphander* andamanicus Smith

658. *Tornatina conspicua* Preston

Family PHILINIDAE

659. *Philina truncatissina* Sowerby

Family ALAJIDAE

660. *Alaja pilsbryi* Eliot

Family BULLIDAE

661. *Bulla ampulla* Linnaeus

Family HAMINEIDAE

662. *Atys* (*Aliculastrum*) *cylindricus* (Helbling)

663. *Atys* amygdala Sowerby

664. *Atys debilis* Pease

665. *Atys naucum* (Linnaeus)

666. *Atys neglecta* Preston

667. *Atys* pacei Preston

668. *Atys submalleata* Smith

669. *Atys nonscripta* (A. Adams)

Family RESTUSIDAE

670. *Volvulella perangusta* (A. Adams)

Order SACCOGLOSSA

Family CYLINDROBULLIDAE

671. *Cylindrobulla pusilla* Nevill

Order APLYSIOMORPHA

Family APLYSIIDAE

672. *Dolabella ecaudata* Rang

673. *Phyllaplysia plana* Eales

674. *Stylocheilus longicauda* (Quoy & Gaimard)

675. *Syphonota aeographica* (Adams & Reeve)

Order NUDIBRANCHIA

Family PSEUDOVERMETIDAE

676. *Pseudovermis solcatus* Salviniplawen

Subclass GYNOMORPHA

Order SYSTELLOMMATOPHORA

Family ONCHIDIIDAE

677. *Onchidium peronii* Cuvier

678. *Onchidium tigrinum* Stoliczka

679. *Onchidium verruculatum* Cuvier

Subclass GYNOMORPHA

Order SYSTELLOMMATOPHORA

Family ELLOBIIDAE

680. *Cassidula aurisfelis* Bruguiere

681. *Cassidula nucleus* Martyn

682. *Ellobium aurisjudae* (Linnaeus)

683. *Ellobium gangetica* (Pfeiffer)

684. *Melampus caffera* Kauester

685. *Melampus castaneus* (Muehlfeldt)

686. *Melampus ceylanicus* Tetit

687. *Melampus luteus* Quoy & Gaimard

688. *Pythia plicata* (Gray)

689. *Pythia scarabaeus* (Linnaeus)

Family SYPHONARIIDAE

690. *Siphonaria acuta* Quoy & aimard

691. *Siphonaria aspera* Krauss

692. *Siphonaria plana* Quoy & Gaimard

693. *Siphonaria sipho* var. *exigua* Sowerby

Class CEPHALOPODA

Order NAUTILIDA

Family NAUTILIDAE

694. *Nautilus pompilus* Linnaeus

Subclass Coleopidae

Order SEPIIDA

Family SEPIIDAE

695. *Euprymna berryi* Sasaki

Family SEPIOLIDAE

696. *Inioteuthis japonica* Verrill

697. *Inioteuthis maculosa* Goodrich

698. *Sepia aculeate* Ferussac & d'Orbigny
699. *Sepia pharaonis* Ehrenberg
700. *Sepiella inermis* (Ferussac & d'Orbigny)

Family SEPIADRIIDAE

701. *Sepiadarium kochii* (Steenstrup

Order TEUTHIDAE

Family LOLIGINIDAE

702. *Loligo duvauceli* d' Orbigny
703. *Sepioteuthis lessoniana* Lesson

Family ENDOPLOTEUTHIDAE

704. *Abralia andamanica* Goodrich
705. *Abraaliopsis liniata* (Goodrich)

Family HISTIOTEUTHIDAE

706. *Histioteuthis hoyle* (Goodrich)
707. *Histioteuthis reversa* Verrill

Order OCTOPODA

Family CIPROTEUTHIDAE

708. *Grimpoteuthis grimaldii* (Joubin)
709. *Grimpoteuthis pacifica* (Hoyle)

Family BOLITAENIDAE

710. *Eledonella diaphana* (Hoyle)

Family OCTOPODIDAE

711. *Octopus arborescens* (Hoyle)
712. *Benthoctopus profundorum* Robson
713. *Danoctopus hoylei* (Berry)
714. *Octopus* (*Callistoctopus*) *cyaneus* (Gray)
715. *Octopus globosus* Apelloef
716. *Octopus microphthalmus* Goodrich
717. *Octopus prashadi* Adam
718. *Octopus rugosus* (Bosc)
719. *Octopus vulgaris* Lamarck
720. *Octopus niveus* Lesson
721. *Teretoctopus alcocki* Robson

Family ARGONAUTIDAE

722. *Argonauta boettgeri* Maltzan

Class BIVALVIA

Order NUCULOIDA

Family NUCULIDAE

723. *Nucula (Leionucula) cumingii* Hinds

724. *Nucula (Leionucula) layardi* A. Adams

725. *Nucula (Nucula) marmoreal* Hinds)

726. *Nucula (Nucula) mitralis* Hinds

Family NUCULANIDAE

727. *Nuculana (Nuculana) retusa* (Hinds)

Family YOLDIIDAE

728. *Yoldia nicobarica* (Bruguiere)

729. *Yoldia tenella* Hinds

Family ARCIDAE

730. *Anadara granosa* (Linnaeus)

731. *Anadara holoserica* (Reeve)

732. *Anadara rhombea* (Born)

733. *Anadara scapha* (Linnaeus)

734. *Anadara uropygmellana* (Bary De st. Vincent)

735. *Arca (Arca) avellana* Lamarck

736. *Arca (Arca) ventricosa* Lamarck

737. *Barbatia (Barbatia) amygdalumtostum* (roeding)

738. *Barbatia (Barbatia) cancellata* Preston

739. *Barbatia (Barbatia) plicatum* (Dillwyn)

740. *Barbatia (Barbatia) tenella* (Reeve)

741. *Barbatia (Cucullacarca) helblingii* (Bruguiere)

742. *Barbatia (Cucullacarca) lacerata* (linnaeus)

743. *Scapharca clathrata* (Reeve)

744. *Scapharca inaequivalvis* (Bruguiere)

745. *Scapharca lischkei* (Dunker)

746. *Scapharca pilula* (Reeve)

747. *Trisidos tortuosa* (Linnaeus)

Family LIMOPSIDAE

748. *Limopsis compressa* G. & H. Nevill

Family GLYCYMERIDIDAE

749. *Glycymeris castaneus* (Lamarck)

750. *Glycymeris lividus* (Reeve)

Order MYTILOIDA

Family MYTILIDAE

751. *Adipicola indica* (Smith)
752. *Amygdalum watsoni* Smith
753. *Branchidontes variabilis* Krauss
754. *Gregariella coralliophaga* Gmelin
755. *Lithophaga canalifera* (Henley)
756. *Lithophaga gracilis* (Philippi)
757. *Lithophaga levigata* (quoy & Gaimard)
758. *Lithophaga nasuta* (Philippi)
759. *Lithophaga teres* (Philippi)
760. *Modiolus albicostata* Lamarck
761. *Modiolus aratus* (Dunker) Reeve
762. *Modiolus curvartus* Dunker
763. *Modiolus cymbula* Preston
764. *Modiolus philippinarum* Hanley
765. *Modiolus tulipa* (Lamarck)
766. *Modiolus undulates* (Dunker)
767. *Modiolus zebra* Preston
768. *Perna samoensis* Baird
769. *Perna viridis* (Linnaeus)
770. *Septifer bilocularis* (Linnaeus)

Family PINNIDAE

771. *Atrina* (*Atrina*) *vexillum* (Born)
772. *Atrina* (*Servatrina*) *pectinata* pectinata (Linnaeus)
773. *Pinna bicolor* Gmelin
774. *Pinna muricata* Linnaeus

Family PTERIIDAE

775. *Electroma ovata* (Quoy & Gaimard)
776. *Pinctada anomioides* (Reeve)
777. *Pinctada inquinata* (Reeve)
778. *Pinctada margaritifera*
779. *Pinctada sugillata* (Reeve)
780. *Pteria chinensis* (Leach)

781. *Pteria penguin* (Roeding)

Family ISOGNOMONIDAE

782. *Isognomon ephippium* (Linnaeus)
783. *Isognomon isognomon* (Linnaeus)
784. *Isognomon isognomon* var. *attenuata* (Reeve)
785. *Isognomon isognomon* var. *carina* (Lamarck)
786. *Isognomon legumen* (Gmelin)
787. *Isognomon nucleus* (Lamarck)
788. *Isognomon perna* (Linnaeus)

Family MALLEIDAE

789. *Malleus albus* Lamarck
790. *Malleus malleus* (Linnaeus)
791. *Malleus regula* (Forskal)
792. *Vulsella vulsella* (Linnaeus)

Family PROPEAMUSSIIDAE

793. *Parvamussium cristellum* (Dautzenberg & Bavay)
794. *Parvamussium scitulum* (Smith)
795. *Propeamussiium caducum* (Smith)

Family PECTINIDAE

796. *Amusium andamanicum* Smith
797. *Amusium japonicum* (Gmelin)
798. *Amusium pleuronectes* (Linnaeus)
799. *Argopecten tranquebaria* (Gmelin)
800. *Bratechlamys vexillum* Reeve)
801. *Chlamys andamanica* Preston
802. *Chlamys fricata* (Reeve)
803. *Chlamys irregularis* (Sowerby)
804. *Chlamys squamosa* (Gmelin)
805. *Chlamys testudines* (Reeve)
806. *Comptopallium radula* (Linnaeus)
807. *Coralichlamys madreporarum* (Sowerby)
808. *Cyclopectena* (*Hyalopectena*) fluctuates (Bavay)
809. *Decatopecten amiculum* (Philippi)
810. *Decatopecten plica* (Linnaeus)
811. *Delectopecten alcocki* (Smith)

812. *Excellichlamys histrionica* (Gmelin)
813. *Gloripalliun pallium* (Linnaeus)
814. *Haumea inaequivalvis* (Sowerby)
815. *Lyropecten corallinoides* (d'Ordigny)
816. *Mimachlamys albilineata* (Sowerby)
817. *Mimachlamys lentiginosa* (reeve)
818. *Mimachlamys senatoria* (Gmelin)
819. *Minnivola pyxidata* 9Born)
820. *Pedum spondyloideum* (Gmelin)
821. *Semipallium tigris* (Lamarck)
822. *Serratovola gardineri* (E.A. Smith)

Family PLICATULIDAE

823. *Plicatula plicata* (Linnaeus)
824. *Spondylus hystrix* Roeding
825. *Spondylus layardi* Reeve
826. *Spondylus microlepos* Lamarck
827. *Spondylus multisetosus* Reeve
828. *Spondylus zonalis* Chenu

Family ANOMIIDAE

829. *Anomia ephippium* Linnaeus
830. *Enigmonia aenigmatica* (Holten)
831. *Olacuna placenta* Linnaeus
832. *Placuna sella* Gmelin

Family OSTREIDAE

833. *Crassostrea cuttackensis* (Newton & Smith)
834. *Saccostrea cuculata* (Born)

Family GRYPHAEIDAE

835. *Hyotissa hyotis* (Linnaeus)

Family LIMIDAE

836. *Ctenoides annulata* (Lamarck)
837. *Lima vulgaris* (Link)
838. *Limaria basilanica* (Adams & Reeve)
839. *Limaria fragilis* (Gmelin)

Order VENEROIDA

Family LUCINIDAE

840. *Anodontia endentula* (Linnaeus)

841. *Codakia divergens* (Philippi)
842. *Codakia tigerina* (Linnaeus)
843. *Eamisiella philippinarum* (Hanley)
844. *Lucina macandrecae* A. Adams
845. *Lucina pisum* Reeve
846. *Lucina simplex* Reeve

Family FIMBRIIDAE

847. *Fimbria fimbriata* (Linnaeus)

Family UNGULINIDAE

848. *Diplodonta bullata* Dunker
849. *Diplodonta globosa* (Forskal)
850. *Diplodonta insulsa* preston

Family CHAMIDAE

851. *Chama brassica* Reeve
852. *Chama isotoma* Conard
853. *Chama japonica* Linnaeus
854. *Chama lazarus* Linnaeus
855. *Chama multisquamosa* Reeve

Family KELLIDAE

856. *Kellia mirabilis* Preston

Family GALEOMMATIDAE

857. *Scintilla citrina* Preston
858. *Scintilla elongata* Preston
859. *Scintilla faba* Deshayes
860. *Scintilla lacteal* Sowerby
861. *Scintilla perflexa* Preston

Family CARDITIDAE

862. *Beguima semiorbiculata* (Linnaeus)
863. *Beguina* pica Reeve
864. *Cardita antiquata* (Linnaeus)
865. *Cardita distorta* Reeve

Family CRASSATELLIDAE

866. *Bathytormus radiatus* Sowerby

Family CARDIIDAE

867. *Cardium virgo* Reeve

868. *Corculum* cardissa (Linnaeus)
869. *Ctenocardia hystrix* (Reeve)
870. *Fragum fornicatum* (Sowerby)
871. *Fragum fragum* (Linnaeus)
872. *Fragum unedo* (Linnaeus)
873. *Fulvia australis* (Sowerby)
874. *Fulvia papyracea* (Sowerby)
875. *Lunulicardia hemicardia* (Linnaeus)
876. *Lunulicardia retusa* (Linaeus)
877. *Lyrocardium aeolicum* (Born)
878. *Lyrocardium lyratum* (Sowerby)
879. *Nemocardium exasperatum* (Soweby)
880. *Trachycardium asiaticum* (Bruguiere)
881. *Trachycardium elongatum* Bruguiere
882. *Trachycardium flavum* (Linnaeus)
883. *Trachycardium unicolor* (Sowerby)

Family TRIDACNIDAE

884. *Hippopus hippopus* (Linnaeus)
885. *Tridacna crocea* Lamarck
886. *Tridacna maxima* Roeding
887. *Tridacna squamosa* Lamarck

Family MACTRIDAE

888. *Coelomactra antiquata* Spengler
889. *Mactra achatina* Holten
890. *Mactra andamanica* Smith
891. *Mactra apicina* Deshayes
892. *Mactra cuneata* Gmelin
893. *Mactra decora* Deshayes
894. *Mactra hepatica* Deshayes
895. *Mactra luzonica* Dunker
896. *Mactra maculata* Gmelin
897. *Mactra turgida* Gmelin
898. *Mactra violacea* Gmelin
899. *Meropesta nicobarica* (Gmelin)

Family MESODESMATIDAE

900. *Atactodea striata* (Gmelin)

901. *Davila crassula* Deshayes

Family SOLENIDAE

902. *Solen asperus* Dunker

903. *Solen brevis* Gray

Family CULTELLIDAE

904. *Cultellus cumingianus* Dunker

905. *Cultellus maximus* (Gmelin)

906. *Ensiculus cultellus* (Linnaeus)

907. *Ensiculus cultellus* var. lividus Dunker

908. *Silqua radiata* (Linnaeus)

Family TELLINIDAE

909. *Apolymetis papyracea* (Gmelin)

910. *Gastrana polygona* (Gmelin)

911. *Macalia* (*Macalia*) *bruguieri* (Hanley)

912. *Macoma* (*Psammacoma*) *candida* (Lamarck)

913. *Macoma* (*Psammacoma*) *truncata* (Jonas)

914. *Macoma* (*Scissulina*) *dispar* (Conrad)

915. *Macoma* (*Scissulina*) *reticulata* (Sowerby)

916. *Psammotreta mIicans* (Hanley)

917. *Strigilla* (*Aeretica*) *splendida* (Anton)

918. *Tellina* (*Angulus*) *corbuloides* Hanley

919. *Tellina* (*Angulus*) *incisa* Preston

920. *Tellina* (*Angulus*) *lanceolata* Gmelin

921. *Tellina* (*Arcopagia*) *angulata* Linnaeus

922. *Tellina* (*Arcopagia*) *carnicolor* Hanley

923. *Tellina* (*Arcopagia*) *casta* Hanley

924. *Tellina* (*Arcopagia*) *inflata* Gmelin

925. *Tellina* (*Arcopagia*) *pinguis* Hanley

926. *Tellina* (*Arcopagia*) *remies* Linnaeus

927. *Tellina* (*Arcopagia*) *robusta* Hanley

928. *Tellina* (*Cadella*) *semen* Henley

929. *Tellina* (*Moerella*) *ostracea* Lamarck

930. *Tellina* (*Moerella*) *philippinarum* Hanley

931. *Tellina* (*Moerella*) *subtruncata* Hanley

932. *Tellina* (*Pharaonella*) *perna* Spengler

933. *Tellina* (*Pharaonella*) *vulsella* Hanley
934. *Tellina* (*Phylloda*) *foliacea* Linnaeus
935. *Tellina* (*Quidnipagus*) *gargadia* Linnaeus
936. *Tellina* (*Quidnipagus*) *palatam* Iredale
937. *Tellina* (*Scutarcopagia*) *scobinata* Linnaeus
938. *Tellina* (*Serratina*) *capsoides* Lamarck
939. *Tellina* (*Tellinella*) *staurella* Lamarck
940. *Tellina* (*Tellinella*) *virgata* Linnaeus
941. *Tellina* (*Tellinides*) *opalina* Gmelin
942. *Tellina* (*Tellinides*) *ovalis* Sowerby
943. *Tellina* (*Tellinides*) *sinuate* Spengler

Family DONACIDAE

944. *Donax* (*Latona*) *cuneata* Linnaeus
945. *Donax* (*Latona*) *faba* Schroeter
946. *Donax* (*Latona*) *incarnatus* Gmelin
947. *Donax* (*Paradonax*) *nuxfagus* Preston
948. *Donax* (*Plebidonax*) *compressus* Lamarck

Family PSAMMOBIIDAE

949. *Asaphis violascens* (Forskal)
950. *Gari* (*Grammotomya*) *pulcherrima* (Deshayes)
951. *Gari* (*Grammotomya*) *squamosa* Lamarck
952. *Gari elongata* (Lamarck)
953. *Gari maculosa* (lamarck)
954. *Gari obtuse* Preston
955. *Gari pulchella* Lamarck
956. *Gari suffusa* (Reeve)
957. *Gari tenuis* (Deshayes)

Family SCORBICULARIIDAE

958. *Theora hindsiana* Preston

Family SEMELIDAE

959. *Abra maxima* (Sowerby)
960. *Cumingia rostrata* A. Adams
961. *Cumingia striata* Rueppelei

Family SOLECURTIDAE

962. *Azorinus coarctatus* (Gmelin)

963. *Novaculina andamanensis* Preston
964. *Solecurtis philippinarum* Dunker

Family TRAPEZIIDAE

965. *Coralliophaga coralliophaga* (Gmelin)
966. *Trapezium (Neotrapezium) sublaevigatum* (Lamarck)
967. *Trapezium (Trapezium) bicarinatum* (Schumacher)

Family GLOSSIDAE

968. *Meiocardia moltkiana* (Gmelin)

Family VESICOMYIDAE

969. *Vesicomya indica* E.A.smith

Family VENERIDAE

970. *Antigona lamellaris* Schumacher
971. *Bassina callophylla* (Philippi)
972. *Chione layardi* (Reeve)
973. *Circe scripta* (Linnaeus)
974. *Collista erycina* (Linnaeus)
975. *Dosinia fibula* (Reeve)
976. *Dosinia histrio* (Gmelin)
977. *Dosinia juvenilis* (Gmelin)
978. *Dosinia planatum* G. & H. Nevill)
979. *Dosinia pubescens* (Philippi)
980. *Gafrarium divaricatum* (Gmelin)
981. *Lioconcha (Sulciloconcha) philippinarum* (Hanle)
982. *Lioconcha castrensis* (Linnaeus)
983. *Lioconcha ornate* (Dillwyn)
984. *Lioconcha polita* (Roeding)
985. *Lioconcha* trimaculata (Lamarck)
986. *Marcia japonica* (Gemelin)
987. *Marcia pinguis* Schroeter
988. *Meretrix attenuata* var. *flava* Hornell
989. *Meretrix casta* (Gmelin)
990. *Paphia alapapiliones* Roeding
991. *Paphia amabilis* Philippi
992. *Paphia malabarica* (Schroeter)
993. *Paphia textrix* (Schroeter)

994. *Paphia undulata* (Born)
995. *Periglypta pectinatum* (Linnaeus)
996. *Periglypta puerpera* (Linnaeus)
997. *Periglypta reticulata* (Linnaeus)
998. *Periglypta tumidum* Rueding
999. *Pitar (Pitarina) citrina* (Lamarck)
1000. *Pitar (Pitarina) varina* (wood)
1001. *Pitar inflata* (Sowerby)
1002. *Ruditapes bruguieri* (Hanley)
1003. *Ruditapes philippinarum* (Adams & Reeve)
1004. *Ruditapes variegates* (Sowerby)
1005. *Sunetta scripta* (Linnaeus)
1006. *Tapes deshayesi* Hanley
1007. *Tapes literatus* (Linnaeus)
1008. *Timoclea (Glycydonta) marica* (Linnaeus)
1009. *Venerupis macrophylla* (Deshayes)
1010. *Ventricolaria toreuma* Gould

Family PETRICOLIDAE

1011. *Petricola divergens* (Gmelin)
1012. *Petricola lithophaga* (Retzius)
1013. *Petricola monstrosa* (Gmelin)

Order MYOIDA

Family CORBULIDAE

1014. *Corbula andamanica* E.A. Smith
1015. *Corbula crassa* Hinds
1016. *Corbula fortisulcata* E.A. Smith

Family GASTROCHAENIDAE

1017. *Gastrochaena cuneiformis* Spengler

Family PHOLADIDAE

1018. *Jouannetia cumingii* (Sowerby)
1019. *Jouannetia globosa* Quoy & Gaimard
1020. *Martesia multistriata* Sowerby
1021. *Martesia striata* (Linnaeus)
1022. *Parapholas quadrizonata* (Spengler)
1023. *Pholas orientalis* Gmelin

1024. *Xylophaga indica* Smith

Family TEREDININAE

1025. *Bactronophorus thoracites* (Gould)

1026. *Bankia bipalmulata* (Lamarck)

1027. *Bankia bipennata* (Turton)

1028. *Bankia campanellata* Moll & Roch

1029. *Bankia rochi* Moll

1030. *Dicyathifer mannii* (Wright)

1031. *Lyrodus pedicellatus* (Quatrefagus)

1032. *Nausitora dunlopei* Wright

1033. *Nausitora hedleyi* Schepman

1034. *Nototerodo edax* (hedley)

1035. *Terido furcifera* VonMartens

1036. *Uperotus clava* (Gmelin)

1037. *Uperotus rehderi* (Nair)

Subclass ANOMALODESMATA

Order PHOLADOMYOIDA

Family PANDORIDAE

1038. *Pandora* (*Frenamya*) *zeilanica* Sowerby

Family LYONSIIDAE

1039. *Lyonsia jucunda* E.A. Smith

Family MYOCHAMIDAE

1040. *Myadora quadrata* Smith

Family LATERNULIDAE

1041. *Laternula lanterna* (Lamarck)

Order POROMYOIDA

Family CUSPIDARIIDAE

1042. *Cardiomya andamanica* Preston

1043. *Cuspidaria approximata* Smith

1044. *Cuspidaria caduca* Smith

Family VORTICORDIIDAE

1045. *Euciroa* (*Euciroa*) *eburnean* Woodmason & Alcock

1046. *Vertcordia optima* Sowerby

Class SCAPHOPODA

Family DENTALIIDAE

1047. *Dentalium aprinum* Linnaeus

1048. *Dentalium insolitum* Smith
1049. *Dentalium serrulatum* Smith
1050. *Dentalium subfissura* Nevill
1051. *Dentalium subfolitum* Nevill
1052. *Dentalium subquadraqulere* Nevill
1053. *Dentalium variable* Deshayes

Phylum SIPUNCULA

Class SIPUNCULIDEA

Order SIPUNCULIFORMES

Family SIPUNCULIDAE

1. *Siphonosoma australe* (Keferstein)
2. *Siphonosoma cumanense* (Keferstein)
3. *Siphonosoma vastum* (Selenka and Bulow)
4. *Sipunculus indicus* Peters
5. *Sipunculus nudus* Linnaeus
6. *Sipunculus phalloides inclusus* (Sluiter)
7. *Sipunculus robustus* Keferstein

Family THEMISTIDAE

8. *Themiste hennahi* Gray
9. *Themiste lageniformis* Baird

Class PHASCOLOSOMATIDEA

Order PHASCOLOSOMATIFORMES

Family PHASCOLOSOMATIDAE

10. *Antillesoma antillarum* (Grube and Oersted)
11. *Apionsoma* sp. (cf. *capitatum* Gerould)
12. *Phascolosoma agassizii* Keferstein
13. *Phascolosoma albolineatum* Baird
14. *Phascolosoma arcuatum* (Gray)
15. *Phascolosoma granulatum* Leuckart
16. *Phascolosoma japonicum* Grube
17. *Phascolosoma nigrescens* Keferstein
18. *Phascolosoma pacificum* Keferstein
19. *Phascolosoma perlucens* Baird
20. *Phascolosoma scolops* (Selenka and de Man)
21. *Phascolosoma varians* Keferstein

Order ASPIDOSIPHONIFORMES

Family ASPIDOSIPHONIDAE

22. *Aspidosiphon gracilis* Baird
23. *Aspidosiphon laevis* de Quatrefages
24. *Aspidosiphon muelleri* Diesing
25. *Aspidosiphon pachydermatus* Wesenberg-Lund
26. *Aspidosiphon steenstrupii* Deising
27. *Aspidosiphon tenuis* Sluiter
28. *Cloeosiphon aspergillus* (de Quatrefages)
29. *Lithacrosiphon cristatus lakshadweepensis* Haldar

Phylum ECHINODERMATA

Class CRINOIDEA

Order COMMATULIDA

Family COMASTERIDAE

1. *Capillaster mariae* (A.H.Clark)
2. *Capillaster multiradiatus* (Linnaeus)
3. *Comanthus nobilis* (P.H. Carpenter)
4. *Comanthus parvicirrus* (Mueller)
5. *Comanthus samoanus* A.H. Clark
6. *Comanthus wahlbergi* (Mueller)
7. *Comaster gracilis* (Hartlaub)
8. *Comaster multibrachiatus* (P.H. Carpenter)
9. *Comaster multifidus* (J. Mueller)
10. *Comatella maculata* (P.H. Carpenter)
11. *Comatella nigra* (P.H. Carpenter)
12. *Comatella stelligera* (P.H. Carpenter)
13. *Comatula brevicirra* (Bell)
14. *Comatula pectinata* (Linnaeus)
15. Oxycomanthus bennetti (Mueller)

Family HIMEROMETRIDAE

16. *Amphimetra molleri* A.H. Clark
17. *Amphimetra mortenseni* Clark
18. *Amphimetra philiberti* (J.Mueller)
19. *Craspedometra acuticirra* (P.H. Carpenter)
20. *Heterometra bengalensis* (Hartlaub)

21. *Himerometra magnipinna* (A.H. Clark)
22. *Himerometra robustipinna* (P.H. Carpenter)

Family MARIAMETRIDAE

23. *Dichrometra protectus* (P.H. Carpenter)
24. *Lamprometra palmata* (J. Mueller)
25. *Stephanometra indica* (Smith)
26. *Stephanometra monacantha* (Hartlaub)

Family COLOBOMETRIDAE

27. *Colobometra discolor* (A.H. Clark)
28. *Cotylometra gracilicirra* (A.H. Clark)
29. *Iconometra intermedia* (A.H. Clark)
30. *Oligometra serripinna* (P.H. Carpenter)
31. *Pontiometra andersoni* (P.H. Carpenter)

Family ANTEDONIDAE

32. *Dorometra nana* (Hartlaub)

Class ASTEROIDEA

Order PAXILLOSIDA

Family LUIDIIDAE

33. *Luidia hardwicki* (Gray)
34. *Luidia maculata* Mueller and Troschel
35. *Luidia savignyi* (Audouin)

Family ASTROPECTINIDAE

36. *Astropecten monacanthus* Sladen
37. *Astropecten polyacanthus* Mueller and Troschel
38. *Astropecten zebra* Sladen

Order VALVATIDA

Family ARCHASTERIDAE

39. *Archaster typicus* Mueller and Troschel

Family GONIASTERIDAE

40. *Anthenea* sp.
41. *Anthenea pentagonula* (Lamarck)

Family OREASTERIDAE

42. *Choriaster granulatus* Luetken
43. *Culcita novaeguineae* Mueller and Troschel
44. *Culcita schmideliana* (Retzius)

45. *Pentaceraster indicus* (Koehler)
46. *Poraster superbus* (Mobius)
47. *Protoreaster lincki* (de Blainville)
48. *Protoreaster nodosus* (Linnaeus)

Family OPHIDIASTERIDAE

49. *Andora lemonnieri* (Koehler)
50. *Chaetaster vestitus* Koehler
51. *Dactylosaster cylindricus* (Lamarck)
52. *Fromia armata* Koehler
53. *Fromia indica* (Perrier)
54. *Fromia milleporella* (Lamarck)
55. *Fromia monilis* Perrier
56. *Gomophia egyptiaca* Gray
57. *Heteronardoa carinata* (Koehler)
58. *Leiaster glaber* Peters
59. *Linckia guildingi* Gray
60. *Linckia laevigata* (Linnaeus)
61. *Linckia multifora* (Lamarck)
62. *Nardoa frianti* (Koehler)
63. *Nardoa galathaea* (Luetken)
64. *Neoferdina offreti* (Koehler)
65. *Ophidiaster armatus* Koehler
66. *Ophidiaster hemprichi* Mueller and Troschel
67. *Paraferdina sohariae* Marsh and Price
68. *Tamaria dubiosa* (Koehler)
69. *Tamaria megaloplax* (Bell)

Family ASTEROPSEIDAE

70. *Asteropsis carinifera* (Lamarck)

Family ASTERINIDAE

71. *Asterina burtoni* Gray
72. *Asterina sarasini* (de Loriol)
73. *Disasterina spinosa* Koehler
74. *Disasterina spinulifera* H.L. Clark
75. *Patiriella pseudoexigua* Dartnall
76. *Tegulaster emburyi* Livingstone

Family ACANTHASTERIDAE

77. *Acanthaster planci* (Linnaeus)

Family VALVASTERIDAE

78. *Valvaster striatus* (Lamarck)

Order VELATIDA

Family PTERASTERIDAE

79. *Euretaster insignis* (Sladen)

Order SPINULOSIDA

Family ECHINASTERIDAE

80. *Echinaster callosus* Marenzeller

81. *Echinaster luzonicus* (Gray)

Family METRODIDIDAE

82. *Metrodera subulata* Gray

Class OPHIUROIDEA

Order PHRYNOPHIURIDA

Family GORGONOCEPHALIDAE

83. *Astrocladus exiguus* (Lamarck)

Family EURYALIDAE

84. *Trichaster acanthifer* Doederlein

85. *Asteromorpha flosculus* (Alcock)

Family ASTEROSCHEMATIDAE

86. *Asteroschema fastosum* Doederlein

87. *Asteroschema subfastosum* Doederlein

88. *Ophiocreas sibogae* (Doederlein)

Family OPHIOMYXIDAE

89. *Ophiomyxa australis* Luetken

Order OPHIURIDA

Family OPHIACANTHIDAE

90. *Ophicantha indica* Ljungman

Family AMPHIURIDAE

91. *Amphioplus* (*Amphioplus*) *personatus* (Koehler)

92. *Amphioplus* (*Lymnella*) *depressus* (Ljungman)

93. *Amphioplus* (*Lymnella*) *laevis* (Lyman)

94. *Amphipholis misera* (Koehler)

95. *Amphipholis squamata* (Delle Chiaje)

96. *Amphiura septemspinosa* H.L. Clark

Family OPHIACTIDAE

97. *Ophiactis modesta* Brock
98. *Ophiactis pictei* (de Loriol)
99. *Ophiactis savignyi* (Mueller and Troschel)

Family OPHIOTHRICIDAE

100. *Macrophiothrix aspidota* (Mueller and Troschel)
101. *Macrophiothrix demessa* (Lyman)
102. *Macrophiothrix galatea* (Koehler)
103. *Macrophiothrix koehleri* A.M. Clark
104. *Macrophiothrix longipeda* (Lamarck)
105. *Macrophiothrix propinqua* (Lyman)
106. *Macrophiothrix speciosa* (Koehler)
107. *Ophiocnemis marmorata* (Lamarck)
108. *Ophiolophus novarae* Marktanner- Turneretscher
109. *Ophiomaza cacaotica* Lyman
110. *Ophiopteron elegans* Ludwig
111. *Ophiothela danae* Verrill
112. *Ophiothrix (Acanthophiothrix) proteus* Koehler
113. *Ophiothrix (Acanthophiothrix) purpurea* von Martens
114. *Ophiothrix (Acanthophiothrix) vigelandi* A.M. Clark
115. *Ophiothrix (Keystonea) nereidina* (Lamarck)
116. *Ophiothrix (Ophiothrix) ciliaris* (Lamarck)
117. *Ophiothrix (Ophiothrix) exigua* Lyman
118. *Ophiothrix (Ophiothrix) foveolata* Marktanner–Turneretscher
119. *Ophiothrix (Ophiothrix) trilineata* Luetken

Family OPHIOCOMIDAE

120. *Ophiarthrum elegans* Peters
121. *Ophiarthrum pictum* Mueller and Troschel
122. *Ophiocoma brevipes* Peters
123. *Ophiocoma dentata* Mueller and Troschel
124. *Ophiocoma doderleini* Loriol
125. *Ophiocoma erinaceus* Mueller and Troschel
126. *Ophiocoma pica* Mueller and Troschel
127. *Ophiocoma pusilla* (Brock)

128. *Ophiocoma scolopendrina* (Lamarck)
129. *Ophiocomella sexradia* (Duncan)
130. *Ophiomastix aunulosa* (Lamarck)
131. *Ophiopsila pantherina* Koehler

Family OPHIONEREIDAE

132. *Ophionereis andamanensis* James
133. *Ophionereis dubia* (Mueller and Troschel)
134. *Ophionereis porrecta* Lyman

Family OPHIODERMATIDAE

135. *Gymnopelta indica* (Koehler)
136. *Ophiarachna incrassata* (Lamarck)
137. *Ophiarachnella gorgonia* (Mueller and Troschel)
138. *Ophiarachnella infernalis* (Muller and Trocschel)
139. *Ophiarachnella sphenesci* (Bell)
140. *Ophiopeza custos* Koehler
141. *Ophiopsammus yoldii* (Luetken)

Family OPHIURIDAE

142. *Ophioelegans cincta* (Mueller and Troschel)
143. *Ophiolepis superba* H.L. Clark
144. *Ophioplocus imbricatus* (Mueller and Troschel)

Class ECHINOIDEA

Order CIDAROIDA

Family CIDARIIDAE

145. *Eucidaris metularia* (Lamarck)
146. *Phyllacanthus imperialis* (Lamarck)
147. *Prionocidaris verticillata* (Lamarck)

Order DIADEMATOIDA

Family DIADEMATIDAE

148. *Astropyga radiata* (Leske)
149. *Chaetodiadema granulatum* Mortensen
150. *Diadema savignyi* Michelin
151. *Diadema setosum* (Leske)
152. *Echinothrix calamaris* (Pallas)
153. *Echinothrix diadema* (Linnaeus)

Order PHYMOSOMATOIDA

Family STOMECHINIDAE

154. *Stomopneustes variolaris* (Lamarck)

Order TEMNOPLEUROIDA

Family TEMNOPLEURIDAE

155. *Mespilia globulus* (Linnaeus)

156. *Microcyphus ceylanicus* Mortensen

157. *Paratrema doederleini* (Mortensen)

158. *Salmaciella dussmieri* (L. Agassiz)

159. *Salmacis bicolor* L. Agassiz

160. *Temnopleurus toreumaticus* (Leske)

161. *Temnotrema scillae* (Mazetti)

Family TOXOPNEUSTIDAE

162. *Gymnechinus robillardi* (de Loriol)

163. *Toxopneustes pilelous* (Lamarck)

164. *Tripneustes gratilla* (Linnaeus)

Order ECHINOIDA

Family ECHINOMETRIDAE

165. *Colobocentrotus atratus* (Linnaeus)

166. *Echinometra mathaei* (de Blainville)

167. *Echinostrephus molaris* (de Blainville)

168. *Heterocentrotus trigonarius* (Lamarck)

Order HOLECTYPOIDA

Family ECHINONEIDAE

169. *Echinoneus cyclostomus* Leske

Order CLYPEASTEROIDA

Family ARACHNOIDIDAE

170. *Arachnoides placenta* (Linnaeus)

Family LAGANIDAE

171. *Laganum depressum* Lesson

172. *Laganum laganum* Klein

173. *Peronella lessueuri* (Valenciennes)

174. *Peronella macroproctes* Koehler

175. *Peronella rubra* Doederlein

Family ASTRICLYPEIDAE

176. *Echinodiscus auritus* Laske

177. *Echinodiscus bisperforatus* Leske

Order SPATANGOIDA

Family BRISSIDAE

178. *Metalia spatagus* (Linnaeus)

179. *Metalia sternalis* (Lamarck)

Family BRISSIDAE

180. *Metalia spatagus* (Linnaeus)

Family SPATANGIDAE

181. *Maretia planulata* Gray

182. *Nacospatangus* (*Pseudomaretia*) *alta* A. Agassiz

Family LOVENIIDAE

183. *Breynia vredenburgi* Anderson

184. *Lovenia elongata* (Gray)

185. *Lovenia subcarinata* (Gray)

Class HOLOTHUROIDEA

Order ASPIDOCHIROTIDA

Family HOLOTHURIIDAE

186. *Actinopyga echinites* (Jaeger)

187. *Actinopyga lacanora* (Jaeger)

188. *Actinopyga mauritiana* (Quoy and Gaimard)

189. *Actinopyga miliaris* (Quoy and Gaimard)

190. *Bohadschia argus* Jaeger

191. *Bohadschia bivittata* (Mitsukuri)

192. *Bohadschia marmorata* Jaeger

193. *Bohadschia vitiensis* (Semper)

194. *Holothuria (Acanthotrapeza) pyxis* Selenka

195. *Holothuria (Cystipus) rigida* (Selenka)

196. *Holothuria (Halodeima) atra* Jaeger

197. *Holothuria (Halodeima) edulis* Lesson

198. *Holothuria (Halodeima) pulla* Selenka

199. *Holothuria (Lessonothuria) pardalis* Selenka

200. *Holothuria (Mertensiothuria) fuscocinerea* Jaeger

201. *Holothuria (Mertensiothuria) leucospilota* Brandt

202. *Holothuria (Mertensiothuria) pervicax* Selenka
203. *Holothuria (Metriatyla) scabra* Jaeger
204. *Holothuria (Microthlel) nobilis* (Selenka)
205. *Holothuria (Platy perona) difficilis* Semper
206. *Holothuria (Selenkothuria) erinaceus* Semper
207. *Holothuria (Semperothuria) cinerescens* (Brandt)
208. *Holothuria (Thymiosycia) arenicola* Semper
209. *Holothuria (Thymiosycia) gracilis* Semper
210. *Holothuria (Thymiosycia) hilla* Lesson
211. *Holothuria (Thymiosycia) impatiens* Forskal

Family LABIDODEMATIDAE

212. *Labidodemas rugosum* (Ludwig)

Family STICHOPODIDAE

213. *Stichopus chloronotus* Brandt
214. *Stichopus horrens* Selenka
215. *Stichopus japonicus* Selenka
216. *Stichopus variegatus* Semper
217. *Stichopus vastus* Sluiter

Order DENDROCHIROTIDA

Family CUCUMARIIDAE

218. *Aslia* forbesi (Bell)

Family PHYLLOPHORIDAE

219. *Afrocucumis africana* (Semper)
220. *Phyllophorus celer* Koehler and Vaney
221. *Phyrella fragilis* (Ohshima)

Order APODIDA

Family SYNAPTIDAE

222. *Opheodesoma grisea* (Semper)
223. *Patinapta ooplax* (von Marenzeller)
224. *Synapta maculata* (Chamisso and Esenhardt)
225. *Synaptula recta* (Semper)
226. *Synaptula striata* Sluiter

Family CHIRIDOTIDAE

227. *Polycheira rufescens* (Brandt)
228. *Trochodota havelockensis* Rao

Family MOLAPADIIDAE

229. *Acaudina molpadioides* (Semper)

Phylum ANNELIDA

Class POLYCHAETA

Family APHRODITIDAE

Subfamily APHRODITINAE

1. *Aphrodita talpa* Quatrephages
2. *Aphrogenia alba* Kinberg
3. *Hermonia hystrix* (Savigny)
4. *Pontogenia nuda* Host

Subfamily Polynoinae

5. *Admetella longipedata* McIntosh
6. *Allmaniella ptycholepis* (Grube)
7. *Eunoe pallida* (Ehlers)
8. *Gastrolepidia clavigera* Schmarda
9. *Halosydna* (*Hyperhalosydna*) *striata* (Kinberg)
10. *Harmothoe ampullifera* (Grube)
11. *Harmothoe dicxtyophora* (Grube)
12. *Harmothoe imbricata* (Linnaeus)
13. *Harmothoe minuta* (Potts)
14. *Iphione muricata* (Savignyi)
15. *Lepidasthenia microlepis* Potts
16. *Lepidonotus* (*Thormora*) *jukesi* (Baird)
17. *Lepidonotus cristatus* (Grube)
18. *Lepidonotus glaucus* (Peters)
19. *Lepidonotus hedleyi* Benham
20. *Lepidonotus jacksoni* Kinberg
21. *Lepidonotus melanogrammus* Haswell
22. *Lepidonotus tenuisetosus* (Gravier)
23. *Scalisetosus fragilis* (Claparede)

Subfamily Polydontinae

24. *Panthalis oerstedi* Kinberg
25. *Polydontes maxillosus* (Ranzani)
26. *Polydontes melanonotus* (Grube)

Subfamily Sigalioninae

27. *Psammolyce zeylanica* Willey

28. *Sthenolepis japonica* (McIntosh)

Family PALMYRIDAE

29. *Bhawania goodie* Webster

Family AMPHINOMIDAE

30. *Amphinome rostrata* (Pallas)
31. *Chloeia amphora* Horst
32. *Chloeia flava* (Pallas) *pulchella* Baird
33. *Chloeia flava flava* (Pallas)
34. *Chloeia fusca* McIntosh
35. *Chloeia parva* (Baird)
36. *Euphrosine foliosa* Audouin and Milne Edwards
37. *Eurythoe complanata* (Pallas)
38. *Eurythoe pervecarunculata* Horst
39. *Notopygos hispidus* Potts
40. *Notopygos labiatus* McIntosh
41. *Notopygos variabilis* Potts

Family PHYLLODOCIDAE

Subfamily PHYLLODOCINAE

42. *Eulalia albopicta* Marenzeller
43. *Phyllodoce (Anaitides) madeirensis* Langerhans
44. *Phyllodoce (Anaitides) tenussima* Grube
45. *Phyllodoce fristedti* Bergstrom
46. *Phyllodoce malmgreni* Gravier
47. *Phyllodoce quadraticeps* Grube

Family PILACIDAE

48. *Synelmis albini* (Langerhans)

Family HESIONIDAE

49. *Hesione intertexta* Grube
50. *Hesione splendida* Savigny
51. *Leocrates claparedei* (Costa)
52. *Leocrates filamentosus* Ehlers
53. *Ophiodromus angustifrons* (Grube)

Family SYLLIDAE

54. *Syllis (Syllis) gracilis* Grube
55. *Syllis (Typosyllis) armillaris* (Muller)

56. *Syllis (Typosyllis) exilis* Gravier
57. *Syllis (Typosyllis) okadai* Fauvel
58. *Trypanosyllis gigantea* (McIntosh)
59. *Trypanosyllis zebra* (Grube)

Family NEREIDAE

60. *Ceratonereis anchylochaeta* Horst
61. *Ceratonereis mirabilis* Kinberg
62. *Ceratonereis tripartite* Horst
63. *Namalycastis indica* (Southern)
64. *Nereis (Neanthes) cricognatha* Gravier
65. *Nereis (Neanthes) jacksoni* Kinberg
66. *Nereis (Nereis) coutierei* Gravier
67. *Perinereis albuhitensis* Grube
68. *Perinereis brevicirris* (Grube)
69. *Perinereis cultrifera* var. *helleri* Grube
70. *Perinereis cultrifera* var. *typica* (Grube)
71. *Perinereis neocaledoniae* Pruvot
72. *Perinereis nigropunctata* (Horst)
73. *Perinereis nuntia* var. *typical* Savigny)
74. *Perinereis singaporiensis* Grube
75. *Perinereis suluana* Horst
76. *Perinereis vancaurica* Ehlers
77. *Platynereis dumerilii* Audouin and Milne Edwards
78. *Platynereis polyscalma* Chamberlin
79. *Platynereis pulchella* Gravier
80. *Pseudonereis anomala* Gravier
81. *Pseudonereis rottenstiana* Augener
82. *Pseudonereis variegata* (Grube)
83. *Tylonereis bogoyawlenskyi* Fauvel

Family NEPHTYIDAE

84. *Nephtys* (*Aglaophamus*) *malmgreni* Theel

Family GLYCERIDAE

85. *Glycera* cirrata Grube
86. *Glycera prashadi* Fauvel
87. *Glycera rouxi* Audouin and Milne Edwards

88. *Glycera tessellata* Grube

Family EUNICIDAE

Subfamily Eunicinae

89. *Eunice (Palolo) siciliensis* Grube.
90. *Eunice afra afra* Peters
91. *Eunice afra paupera* Grube
92. *Eunice afra punctata* Peters
93. *Eunice antennata* (Savigny)
94. *Eunice aphroditois* (Pallas)
95. *Eunice australis* Quatrephages.
96. *Eunice grubei* Gravier
97. *Eunice indica* Kinberg
98. *Eunice marenzeller* Gravier
99. *Eunice norwegica* (Linnaeus)
100. *Eunice tentaculata* Quatrephages
101. *Lysidice collaris* Grube
102. *Marphysa mossambica* Peters
103. *Marphysa sanguinea* (Montagu)

Subfamily Onuphinae

104. *Hyalinoecia tubicola* (Muller)
105. *Onuphis (Nothria) conchylega* Sars
106. *Onuphis (Nothria) holobranchiata* Marenzeller
107. *Onuphis (Onuphis) aucklandensis* Augener
108. *Rhamphobrachium chuni* Ehlers

Subfamily Lysaretinae

109. *Oenone fulgida* (Savigny)

Subfamily Lumbrinerinae

110. *Lumbrinereis sphaerocephale* (Schmarda)
111. *Lumbrinereis tetraura* (Schmarda)

Subfamily Arabellinae

112. *Arabella iricolor iricolor* (Montagu)
113. *Arabella mutans* (Chamberlin)
114. *Drilonereis filum* (Claparede)

Family SPIONIDAE

115. *Nerinides knightjonesi* de Silva

Family MAGELONIDAE

116. *Magelona japonca* Okuda

Family CIRRATULIDAE

117. *Cirriformia filigera* (Delle Chiaje)

118. *Cirriformia punctata* (Grube)

119. *Cirriformia tentaculata* (Montagu)

Family TROCHOCHAETIDAE

120. *Poecilochaetus serpens* Allen

Family CHAETOPTERIDAE

121. *Mesochaetopterus minutus* Potts

Family ORBINIDAE

Subfamily Orbininae

122. *Nainereis laevigata* (Grube)

123. *Scoloplos marsupialis* Southern

Family OPHELIIDAE

124. *Armandia lanceolate* Willey

125. *Armandia leptocirris* Grube

126. *Travisia arborifera* Fauvel

Family CAPITELLIDAE

127. *Capitellethus dispar* Ehler

128. *Dasybranchus caducus* (Grube)

129. *Notomastus latericeus* Sars

Family ARENICOLIDAE

130. *Arenicola brasiliensis* Nonato

Family MALDANIDAE

131. *Asychis gotoi* (Izuka)

132. *Axiothella australis* Augener

133. *Euclymene annandalei* Southern

134. *Euclymene grossa* Baird

135. *Maldane sarsi* Malmgren

Family STERNASPIDAE

136. *Sternaspis scutata* (Renier)

Family OWENIIDAE

137. *Owenia fusiformis* Delle Chiaje

Family FLABELLIGERIDAE

138. *Pherusa eruca indica* (Fauvel)

Family SABELLARIIDAE

139. *Idanthyrus pinnatus* (Peters

140. *Lygdamis indicus* Kinberg

Family PECTINARIIDAE

141. *Pectinaria antipoda* Schmarda

142. *Pectinaria (Amphictene) crassa* Grube

Family AMPHARETIDAE

Subfamily Ampharetinae

143. *Amphicteis gunneri* (Sars)

Family TEREBELLIDAE

Subfamily Trichobranchinae

144. *Terebellides stroemi* Sars

Subfamily Thelepinae

145. *Eupolymnia nebulosa* (Montagu)

146. *Loimia muduse* (Savigny)

147. *Nicolea gracilibranchis* (Grube)

148. *Streblosoma persica* (Fauvel)

Subfamily Terebellinae

149. *Terebella ehrenbergi* Grube

150. *Thelepus cincinnatus* (Fabricius)

Family SABELLIDAE

Subfamily SABELLINAE

151. *Branciomma nigromaculata* (Baird)

152. *Branciomma serratibranchis* (Grube)

153. *Hypsicomus phaeotaenia* (Schmarda)

154. *Sabella fusca* Grube

155. *Sabella melanostigma* Schmarda

156. *Sabellastrare sanctijosephi* (Gravier)

Family SERPULIDAE

Subfamily Spirorbinae

157. *Spirorbis (Dexiospira) foraminosus* Busch

Subfamily Serpulinae

158. *Ditrupa arietina arietina* Muller

159. *Ditrupa arietina* Muller var. *monilifera* Fauvel

160. *Pomatostegus stellatus* (Abildgard)

161. *Spirobranchus giganteus* (Pallas)

Class CHONDRICHTHYES

Subclass ELASMOBRANCHII

Order ORECTOLOBIFORMES

Family HEMISCYLLIDAE

1. *Chiloscyllium griseum* Muller & Henle
2. *Chiloscyllium indicum* (Gmelin)
3. *Chiloscyllium punctatum* Muller & Henle
4. *Stegostoma fasciatum* (Hermann)

Order CARCHARHINIFORMES

Family CARCHARHINIDAE

5. *Carcharhinus albimarginatus* (Ruppell)
6. *Carcharhinus amblyrhynchos* (Bleeker)
7. *Carcharhinus dussumieri* (Muller & Henle)
8. *Carcharhinus limbatus* (Muller & Henle)
9. *Carcharhinus longimanus* (Poey)
10. *Carcharhinus melanopterus* (Quoy & Gaimar)
11. *Carcharhinus sealei* (Pietschmann)
12. *Carcharhinus sorrah* (Valencienneus)
13. *Galeocerdo cuvier* (Peron & Lesueur)
14. *Loxodon macrorhinus* (Muller & Henle)
15. *Rhizoprionodon acutus* (Ruppell)
16. *Rhizoprionodon oligolinx* Springer
17. *Scoliodon laticaudus* (Muller & Henle)
18. *Triaenodon obesus* (Ruppell)

Family SPHYRNIDAE

19. *Eusphyra blochii* (Cuvier)
20. *Sphyrna lewini* (Griffith & Smith)
21. *Sphyrna mokarran* (Ruppell)
22. *Sphyrna zygaena* (Linnaeus)

Order TORPEDINIFORMES

Family NARKIDAE

23. *Narke* sp.

Order RAJIFORMES

Family RHINOBATIDAE

24. *Rhina ancylostoma* Schneider

25. *Rhinobatos granulatus* Cuvier
26. *Rhynchobatus djiddensis* (Forsskal)

Order MYLIOBATIFORMES

Family MYLIOBATIDAE

27. *Aetobatus narinari* (Euphrasen)
28. *Manta birostris* (Walbaum)

Family DASYATIDAE

29. *Dasyatis kuhlii* Muller & Henle
30. *Dasyatis thetidis* Ogilby
31. *Gymnura poecilura* (Shaw)
32. *Himantura gerrardi* (Gray)
33. *Himantura uranak* (Forsskal)
34. *Hypolophus sephen* (Forsskal)
35. *Taeniura lymma* (Forsskal)
36. *Taeniura meyeni Muller* & Henle

Class OSTEICHTHYES

Order ANGUILLIFORMES

Family CONGRIDAE

37. *Gorgasia maculata* (Klausewitz & Eibl-Eibesfeldt)
38. *Heteroconger hassi* (Klausewitz & Eibl-Eibesfeldt)

Family MURAENIDAE

39. *Echidna nebulosa* (Ahl.)
40. *Gymnomuraena zebra* (Shaw)
41. *Gymnothorax favagineus* Bloch & Schneider
42. *Gymnothorax fimbriatus* Bennett
43. *Gymnothorax flavimarginatus* (Ruppell)
44. *Gymnothorax javanicus* (Bleeker)
45. *Gymnothorax picta* (Ahl.)
46. *Gymnothorax ruppelliae* (McClelland)
47. *Gymnothorax thyrsoideus* (Richardson)
48. *Gymnothorax undulatus* (Lacepede)
49. *Scuticaria tigrina* (Lesson)
50. *Uropterygius concolor* (Ruppell)
51. *Uropterygius marmoratus* (Lacepede)

Family OPHICHTHIDAE

52. *Cirrhimuraena playfairii* (Gunther)

53. *Leiuranus semicinctus* (Lay & Bennett)
54. *Muraenichthys macropterus* Bleeker
55. *Muraenichthys schultzei* Bleeker
56. *Myrichthys colubrinus* (Boddaert)
57. *Myrichthys maculosus* (Cuvier)

Order CLUPEIFORMES

Family CLUPEIDAE

58. *Herklotsichthys quadrimaculatus* (Ruppell)
59. *Spratelloides delicatulus* (Bennett)

Order GONORHYNCHIFORMES

Family CHANIDAE

60. *Chanos chanos* (Forsskal)

Order SILURIFORMES

Family PLOTOSIDAE

61. *Plotosus canius* Hamilton
62. *Plotosus lineatus* (Thunberg)

Order AULOPIFORMES

Family SYNODONTIDAE

63. *Saurida gracilis* (Quoy & Gaimard)
64. *Saurida tumbil* (Bloch)
65. *Saurida undosquamis* (Richardson)
66. *Synodus variegatus* (Lacepede)
67. *Trachinocephalus myops* (Forster

Order OPHIDIIFORMES

Family OPHIDIIDAE

68. *Brotula multibarbata* Temminck & Schlegel

Family CARAPIDAE

69. *Carapus homei* (Richardson)

Family BYTHITIDAE

70. *Dinematichthys* sp.

Order LOPHIIFORMES

Family ANTENNARIIDAE

71. *Antennarius coccineus* (Lesson)
72. *Antennarius commersoni* (Latreille)
73. *Histrio histrio* (Linnaeus)

Order ATHERINIFORMES

Family ATHERINIDAE

74. *Atherinomorus duodecimalis* (Valenciennes)
75. *Atherinomorus lacunosus* (Forster)

Order CTPRINODONTIFORMES

Family BELONIDAE

76. *Strongylura strongylura* van Hasselt
77. *Tylosurus crocodilus crocodilus* (Peron & Lesueur)

Family HEMIRAMPHIDAE

78. *Hemiramphus far* (Forsskal)
79. *Hyporhamphus dussumieri* (Valenciennes)

Family EXOCOETIDAE

80. *Cypselurus furcatus* (Mitchiell)
81. *Cypselurus oligolepis* (Bleeker)

Order BERCIFORMES

Family MONOCENTRIDAE

82. *Monocentris japonicus* (Houttuyn)

Family HOLOCENTRIDAE

83. *Myripristis adusta* (Bleeker)
84. *Myripristis murdjan* (Forsskal)
85. *Neoniphon sammara* (Forsskal)
86. *Sargocentron caudimaculatum* (Ruppell)
87. *Sargocentron diadema* (Lacepede)
88. *Sargocentron ittodai* (Jordan & Fowler)
89. *Sargocentron melanospilos* (Bleeker)
90. *Sargocentron praslin* (Lacepede)
91. *Sargocentron punctatissimum* (Cuvier)
92. *Sargocentron rubrum* (Forsskal)
93. *Sargocentron spiniferum* (Forsskal)

Order SYNGNATHIFORMES

Family PEGASIDAE

94. *Eurypegasus draconis* (Linnaeus)
95. *Pegasus volitans* Linnaeus

Family FISTULARIIDAE

96. *Fistularia commersonii* Ruppell

Family SYNGNATHIDAE

97. *Choeroichthys sculptus* (Gunther)
98. *Corythoichthys haematopterus* (Bleeker)
99. *Doryramphus dactyliophorus* (Bleeker)
100. *Doryramphus excisus excisus* Kaup
101. *Halicampus mataafae* (Jordan & Seale)
102. *Hippocampus histrix* Kaup
103. *Hippocampus kuda*, Bleeker
104. *Hippocampus trimaculatus* Leach
105. *Phoxocampus tetrophthalmus* (Bleeker)
106. *Syngnathoides biaculeatus* (Bloch)

Family SOLENOSTOMIDAE

107. *Solenostomus cyanopterus* Bleeker
108. *Solenostomus paradoxus* (Pallas)

Family CENTRISCIDAE

109. *Aeoliscus strigatus* (Gunther)
110. *Centriscus scutatus* Linnaeus

Order SCORPAENIFORMES

Family SCORPAENIDAE

111. *Dendrochirus brachypterus* Cuvier
112. *Dendrochirus zebra* (Cuvier)
113. *Pterois antennata* Bloch
114. *Pterois radiata* Cuvier
115. *Pterois russelli* Bennett
116. *Pterois volitans* (Linnaeus)
117. *Scorpaena picta* Cuvier
118. *Scorpaendoes guamensis* (Quoy & Gaimard)
119. *Scorpaenopsis gibbosa* Bloch & Schneider
120. *Scorpaenopsis oxycephalus* (Bleeker)
121. *Scorpaenopsis venosa* (Cuvier)
122. *Sebastapistes strongia* (Cuvier)

Family TETRAROGIDAE

123. *Ablabys macracanthus* (Bleeker)
124. *Ablabys taenianotus* (Cuvier)
125. *Tetraroge barbata* (Cuvier)

126. *Tetraroge niger* (Cuvier)
127. *Vespicula depressiforns* (Richardson)
128. *Vespicula trachinoides* (Cuvier)

Family SYNANCEIIDAE

129. *Inimicus didactylus* (Pallas)
130. *Synanceia horrida* (Linnaeus)
131. *Synanceia verrucosa* Bloch & Schneider
132. *Trachicephalus uranoscopus* (Bloch & Schneider)

Family CARACANTHIDAE

133. *Caracanthus unipinna* (Gray)

Family PLATYCEPHALIDAE

134. *Cociella crocodila* (Tilesius)
135. *Eurycephalus carbunculus* (Valenciennes)
136. *Onigocia oligolepis* (Regan)
137. *Platycephalus indicus* (Linnaeus)
138. *Sorsogona tuberculata* (Cuvier)

Family DACTYLOPTERIDEA

139. *Dactyloptena orientalis* (Cuvier)

Order PERCIFORMES

Family KUHLIDAE

140. *Kuhlia mugil* (Forster)
141. *Kuhlia rupestris* (Lacepede)

Family SERRANIDAE

142. *Pseudanthias squamipinnis* Peters
143. *Aethaloperca rogaa* (Forsskal)
144. *Anyperodon leucogrammicus* (Valenciennes)
145. *Aulacocephalus temmincki* Bleeker
146. *Cephalopholis argus* Bloch & Schneider
147. *Cephalopholis boenak* (Bloch)
148. *Cephalopholis cyanostigma* (Valenciennes)
149. *Cephalopholis formosa* (Shaw & Nodder)
150. *Cephalopholis leopardus* (Lacepede)
151. *Cephalopholis microprion* (Bleeker)
152. *Cephalopholis miniata* (Forsskal)
153. *Cephalopholis sonnerati* (Valenciennes)

154. *Cephalopholis urodeta* (Forster)
155. *Cromileptes altivelis* (Valenciennes)
156. *Epinephelus areolatus* (Forsskal)
157. *Epinephelus bleekeri* (Vaillant)
158. *Epinephelus coeruleopunctatus* (Bloch)
159. *Epinephelus chlorostigma* (Valenciennes)
160. *Epinephelus coioides* (Hamilton)
161. *Epinephelus corallicola* (Valenciennes)
162. *Epinephelus erythrurus* (Valenciennes)
163. *Epinephelus fasciatus* (Forsskal)
164. *Epinephelus faveatus* (Valenciennes)
165. *Epinephelus flavocaeruleus* (Lacepede)
166. *Epinephelus fuscoguttatus* (Forsskal)
167. *Epinephelus hexagonatus* (Forster)
168. *Epinephelus lanceolatus* (Bloch)
169. *Epinephelus longispinis* (Kner)
170. *Epinephelus macrospilos* (Bleeker)
171. *Epinephelus malabaricus* (Bloch & Schneider)
172. *Epinephelus melanostigma* Schultz
173. *Epinephelus merra* Bloch
174. *Epinephelus miliaris* (Valenciennes)
175. *Epinephelus ongus* (Bloch)
176. *Epinephelus quoyanus* (Valenciennes)
177. *Epinephelus sexfasciatus* (Valenciennes)
178. *Epinephelus spilotoceps* Schultz
179. *Epinephelus tauvina* (Forsskal)
180. *Epinephelus undulosus* (Quoy & Gaimard)
181. *Grammistes sexlineatus* (Thunberg)
182. *Plectropomus areolatus* (Ruppell)
183. *Plectropomus pessuliferus* (Fowler)
184. *Variola albimarginata* Baissac
185. *Variola albimarginata* Baissac

Family PSEUDOCHROMIDAE

186. *Pseudochromis cyanotaenia* Bleeker
187. *Pseudochromis dutoiti* Smith

188. *Pseudochromis fuscus* Muller & Troschel
189. *Pseudochromis xanthochir* Bleeker

Family PLESIOPIDAE

190. *Plesiops coeruleolineatus* Ruppell
191. *Plesiops corallicola* Bleeker
192. *Plesiops oxycephalus* Bleeker

Family TERAPONIDAE

193. *Terapon jarbua* (Forsskal)
194. *Pelates quadrilineatus* (Bloch)

Family PRIACANTHIDAE

195. *Priacanthus blochii* Bleeker
196. *Priacanthus hamrur* (Forsskal)
197. *Pristigenys niphonia* (Cuvier)

Family APOGONIDAE

198. *Apogon aureus* (Lacepede)
199. *Apogon coccineus* Ruppell
200. *Apogon cookii* Macleay
201. *Apogon cyanosoma* Bleeker
202. *Apogon endekataenia* Bleeker
203. *Apogon fasciatus* (White)
204. *Apogon fraenatus* Valenciennes
205. *Apogon fragilis* Smith
206. *Apogon guamensis* Valenciennes
207. *Apogon hyalosoma* Bleeker
208. *Apogon kallopterus* Bleeker
209. *Apogon lateralis* Valenciennes
210. *Apogon novemfasciatus* Cuvier
211. *Apogon sangiensis* Bleeker
212. *Apogon savayensis* Gunther
213. *Apogon trimaculatus* Cuvier
214. *Apogonichthys ocellatus* (Weber)
215. *Apogonichthys perdix* Bleeker
216. *Archamia fucata* (Cantor)
217. *Cheilodipterus arabicus* Gmelin
218. *Cheilodipterus macrodon* (Lacepede)

219. *Cheilodipterus quinquelineatus* Cuvier
220. *Fowleria punctulata* (Ruppell)
221. *Rhabdamia gracilis* (Bleeker)
222. *Sphaeramia orbicularis* (Cuvier)

Family HAEMULIDAE

223. *Diagramma pictum* (Thunberg)
224. *Plectorhinchus chaetodonoides* Lacepede
225. *Plectorhinchus diagrammus* (Linnaeus)
226. *Plectorhinchus flavomaculatus* (Cuvier)
227. *Plectorhinchus gibbosus* (Lacepede)
228. *Plectorhinchus orientalis* (Bloch)
229. *Plectorhinchus schotaf* (Forsskal)

Family LUTJANIDAE

230. *Aphareus furca* (Lacepede)
231. *Aphareus rutilans* Cuvier
232. *Aprion virescens* Valenciennes
233. *Lutjanus argentimaculatus* (Forsskal)
234. *Lutjanus bengalensis* (Bloch)
235. *Lutjanus biguttatus* (Valenciennes)
236. *Lutjanus bohar* (Forsskal)
237. *Lutjanus boutton* (Lacepede)
238. *Lutjanus carponotatus* (Richardson)
239. *Lutjanus decussatus* (Cuvier)
240. *Lutjanus ehrenbergii* (Peters)
241. *Lutjanus erythropterus* Bloch
242. *Lutjanus fulviflamma* (Forsskal)
243. *Lutjanus fulvus* (Schneider)
244. *Lutjanus gibbus* (Forsskal)
245. *Lutjanus johnii* (Bloch)
246. *Lutjanus kasmira* (Forsskal)
247. *Lutjanus lemniscatus* (Valenciennes)
248. *Lutjanus lunulatus* (Park)
249. *Lutjanus lutjanus* Bloch
250. *Lutjanus madras* (Valenciennes)
251. *Lutjanus malabaricus* Bloch & Schneider

252. *Lutjanus monostigma* (Cuvier)
253. *Lutjanus quinquelineatus* (Bloch)
254. *Lutjanus rivulatus* (Cuvier)
255. *Lutjanus russellii* (Bleeker)
256. *Lutjanus sebae* (Cuvier)
257. *Lutjanus vitta* (Quoy & Gaimard)
258. *Macolor niger* (Forsskal)
259. *Paracaesio sordida* Abe & Shinohare
260. *Paracaesio xanthurus* (Bleeker)
261. *Pinjalo pinjalo* (Bleeker)

Family CAESIONIDAE

262. *Caesio caerulaurea* Lacepede
263. *Caesio cuning* (Bloch)
264. *Caesio lunaris* Cuvier
265. *Caesio teres* Seale
266. *Caesio varilineata* Carpenter
267. *Caesio xanthonota* Bleeker
268. *Dipterygonotus balteatus* (Valenciennes)
269. *Gymnocaesio gymnoptera* (Bleeker)
270. *Pterocaesio chrysozona* (Cuvier)
271. *Pterocaesio marri* Schultz
272. *Pterocaesio pisang* (Bleeker)
273. *Pterocaesio tessellata* Carpenter
274. *Pterocaesio tile* (Cuvier)

Family LETHRINIDAE

275. *Gnathodentex aureolineatus* (Lacepede)
276. *Gymnocranius elongatus* Senta
277. *Gymnocranius grandoculis* (Valenciennes)
278. *Gymnocranius griseus* (Temminck & Schlegel)
279. *Lethrinus amboinensis* Bleeker
280. *Lethrinus borbonicus* Valenciennes
281. *Lethrinus conchyliatus* (Smith)
282. *Lethrinus erythracanthus* Valenciennes
283. *Lethrinus erythropterus* Valenciennes
284. *Lethrinus harak* (Forsskal)

285. *Lethrinus lentjan* (Lacepede)
286. *Lethrinus mahsena* (Forsskal)
287. *Lethrinus microdon* Valenciennes
288. *Lethrinus nebulosus* (Forsskal)
289. *Lethrinus obsoletus* (Forsskal)
290. *Lethrinus ornatus* Valenciennes
291. *Lethrinus rubrioperculatus* Sato
292. *Lethrinus variegatus* Valenciennes
293. *Lethrinus xanthochilus* Klunzinger
294. *Monotaxis grandoculis* (Forsskal)

Family NEMIPTERIDAE

295. *Nemipterus bipunctatus* (Valencienneus)
296. *Nemipterus hexodon* (Quoy & Gaimard)
297. *Nemipterus japonicus* (Bloch)
298. *Nemipterus luteus* (Schneider)
299. *Nemipterus mesoprion* (Bleeker)
300. *Nemipterus zysron* (Bleeker)
301. *Nemipterus nemurus* (Bleeker)
302. *Nemipterus peronii* (Valenciennes)
303. *Scolopsis bilineatus* (Bloch)
304. *Scolopsis ciliatus* (Lacepede)
305. *Scolopsis ghanam* (Forsskal)
306. *Scolopsis lineatus* Quoy & Gaimard
307. *Scolopsis margaritifer* (Cuvier)
308. *Scolopsis monogramma* (Cuvier)
309. *Scolopsis personatus* (Cuvier)
310. *Scolopsis taeniopterus* (Cuvier)
311. *Scolopsis xenochrous* Gunther

Family KYPHOSIDAE

312. *Kyphosus cinerascens* (Forsskal)
313. *Kyphosus vaigiensis*(Quoy & Gaimard)

Family DREPANIDAE

314. *Drepane punctata* (Linnaeus)
315. *Ephippus orbis* (Bloch)

Family EPHIPPIDAE

316. *Platax orbicularis* (Forsskal)

317. *Platax pinnatus* (Linnaeus)

Family MONODACTYLIDAE

318. *Monodactylus argenteus* (Linnaeus)

Family GERREIDAE

319. *Gerres filamentosus* Cuvier

320. *Gerres oyena* (Forsskal)

Family MULLIDAE

321. *Mulloidichthys flavolineatus* (Lacepede)

322. *Mulloidichthys vanicolensis* (Valenciennes)

323. *Parupeneus barberinus* (Linnaeus)

324. *Parupeneus bifasciatus* (Lacepede)

325. *Parupeneus cyclostomus* (Lacepede)

326. *Parupeneus heptacanthus* (Lacepede)

327. *Parupeneus indicus* (Shaw)

328. *Parupeneus macronema* (Lacepede)

329. *Parupeneus pleurostigma* (Bennett)

330. *Upeneus sulphureus* Cuvier

331. *Upeneus tragula* Richardson

332. *Upeneus vittatus* (Forsskal)

Family MALACANTHIDAE

333. *Malacanthus brevirostris* Guichenot

334. *Malacanthus latovittatus* (Lacepede)

Family MENIDAE

335. *Mene maculata* (Bloch & Schneider)

Family POMACANTHIDAE

336. *Centropyge bicolor* (Bloch)

337. *Centropyge bispinosus* (Gunther)

338. *Centropyge vrolikii* (Bleeker)

339. *Genicanthus lamarck* (Lacepede)

340. *Pomacanthus annularis* (Bloch)

341. *Pomacanthus imperator* (Bloch)

342. *Pomacanthus semicirculatus* (Cuvier)

343. *Pomacanthus xanthometapon* (Bleeker)

344. *Pygoplites diacanthus* (Boddaert)

Family CHAETODONTIDAE

345. *Chaetodon auriga* Forsskal

346. *Chaetodon citrinellus* Cuvier
347. *Chaetodon collare* Bloch
348. *Chaetodon decussatus* Cuvier
349. *Chaetodon ephippium* Cuvier
350. *Chaetodon falcula* Bloch
351. *Chaetodon guttatissimus* Bennett
352. *Chaetodon kleinii* Bloch
353. *Chaetodon lineolatus* Cuvier
354. *Chaetodon lunula* (Lacepede)
355. *Chaetodon melannotus* Bloch & Schneider
356. *Chaetodon meyeri* Bloch & Schneider
357. *Chaetodon octofasciatus* Bloch
358. *Chaetodon ornatissimus* Cuvier
359. *Chaetodon plebeius* Cuvier
360. *Chaetodon punctatofasciatus* Cuvier
361. *Chaetodon rafflesii* Bennett
362. *Chaetodon semeion* Bleeker
363. *Chaetodon triangulum* Cuvier
364. *Chaetodon trifascialis* Quoy & Gaimard
365. *Chaetodon trifasciatus* Mungo Park
366. *Chaetodon unimaculatus* Bloch
367. *Chaetodon vagabundus* Linnaeus
368. *Chelmon rostratus* (Linnaeus)
369. *Forcipiger flavissimus* Jordan & McGregor
370. *Forcipiger longirostris* (Broussonet)
371. *Hemitaurichthys polylepis* (Bleeker)
372. *Heniochus acuminatus* (Linnaeus)
373. *Heniochus diphreutes* Jordan
374. *Heniochus singularius* Smith & Radcliffe
375. *Heniochus varius* (Cuvier)

Family CARANGIDAE

376. *Alectis ciliaris* (Bloch)
377. *Alectis indicus* (Ruppell)
378. *Alepes djedaba* (Forsskal)
379. *Alepes kleinni* (Bloch)

380. *Atule mate* (Cuvier)
381. *Carangoides armatus* (Ruppell)
382. *Carangoides caeruleopinnatus* (Ruppell
383. *Carangoides chrysophrys* (Cuvier)
384. *Carangoides fulvoguttatus* (Forsskal)
385. *Carangoides gymnostethus* (Cuvier)
386. *Carangoides hedlandensis* (Whitely)
387. *Carangoides malabaricus* (Bloch & Schneider)
388. *Carangoides talamparoides* Bleeker
389. *Caranx ignobilis* (Forsskal)
390. *Caranx melampygus* Cuvier
391. *Caranx sexfasciatus* Quoy & Gaimard
392. *Elagatis bipinnulatus* (Quoy & Gaimard)
393. *Gnathanodon speciosus* (Forsskal)
394. *Megalaspis cordyla* (Linnaeus)
395. *Scomberoides commersonianus* Lacepede
396. *Scomberoides lysan* (Forsskal)
397. *Scomberoides tol* (Cuvier)
398. *Selar boops* (Cuvier)
399. *Selar crumenophthalmus* (Bloch)
400. *Selaroides leptolepis* (Cuvier)
401. *Seriola rivoliana* Valenciennes
402. *Seriolina nigrofasciata* (Ruppell)
403. *Trachinotus baillonii* (Lacepede)
404. *Trachinotus blochii* (Lacepede)

Family CORYPHAENIDAE

405. *Coryphaena hippurus* Linnaeus

Family RACHYCENTRIDAE

406. *Rachycentron canadus* (Linnaeus)

Family ECHENEIDAE

407. *Echeneis naucrates* Linnaeus
408. *Remora remora* (Linnaeus)

Family CIRRHITIDAE

409. *Cirrhitichthys aprinus* (Cuvier)
410. *Cirrhitus pinnulatus* (Forsterr)

411. *Oxycirrhites typus* Bleeker
412. *Paracirrhites forsteri* (Schneider)

Family PEMPHERIDAE

413. *Pempheris moluca* Cuvier
414. *Pempheris oualensis* Cuvier
415. *Pempheris vanicolensis* Cuvier

Family POMACENTRIDAE

416. *Abudefduf bengalensis* (Bloch)
417. *Abudefduf notatus* (Day)
418. *Abudefduf septemfasciatus* (Cuvier)
419. *Abudefduf sordidus* (Forsskal)
420. *Abudefduf vaigiensis* (Quoy & Gaimard)
421. *Amblyglyphidodon aureus* (Cuvier)
422. *Amblyglyphidodon leucogaster* (Bleeker)
423. *Amblypomacentrus breviceps* (Schlegel & Muller)
424. *Amphiprion akallopisos* Bleeker
425. *Amphiprion clarkii* (Bennett)
426. *Amphiprion ephippium* (Bloch)
427. *Amphiprion frenatus* Brevoort
428. *Amphiprion ocellaris* (Cuvier)
429. *Amphiprion perideraion* Bleeker
430. *Amphiprion polymnus* (Linnaeus)
431. *Amphiprion sebae* Bleeker
432. *Cheiloprion labiatus* (Day)
433. *Chromis atripectoralis* Welander & Schultz
434. *Chromis margaritifer* Fowler
435. *Chromis ternatensis* (Bleeker)
436. *Chromis viridis* (Cuvier)
437. *Chrysiptera biocellata* (Quoy & Gaimard)
438. *Chrysiptera caeruleolineatus* (Allen)
439. *Chrysiptera glauca* (Cuvier)
440. *Chrysiptera leucopoma* (Cuvier)
441. *Chrysiptera unimaculata* (Cuvier)
442. *Dascyllus aruanus* (Linnaeus)
443. *Dascyllus marginatus* (Ruppell)

444. *Dascyllus reticulatus* (Richardson)
445. *Dascyllus trimaculatus* (Ruppell)
446. *Dischistodus perspicillatus* (Cuvier)
447. *Dischistodus prosopotaenia* (Bleeker)
448. *Hemiglyphidodon plagiometopon* (Bleeker)
449. *Neoglyphidodon melas* (Cuvier)
450. *Neoglyphidodon nigroris* (Cuvier)
451. *Neopomacentrus azysron* (Bleeker)
452. *Plectroglyphidodon dickii* (Lienard)
453. *Plectroglyphidodon lacrymatus* (Quoy & Gaimard)
454. *Pomacentrus amboinensis* Bleeker
455. *Pomacentrus moluccensis* Bleeker
456. *Pomacentrus tripunctatus* Cuvier
457. *Premnas biaculeatus* (Bloch)
458. *Stegastes lividus* (Forster)
459. *Stegastes nigricans* (Lacepede)

Family LABRIDAE

460. *Anampses caeruleopunctatus* Ruppell
461. *Anampses meleagrides* Valenciennes
462. *Bodianus axillaris* (Bennett)
463. *Bodianus diana* (Lacepede)
464. *Bodianus mesothorax* (Bloch & Schneider)
465. *Cheilinus chlorourus* (Bloch)
466. *Cheilinus fasciatus* (Bloch)
467. *Cheilinus trilobatus* Lacepede
468. *Cheilinus undulates* Ruppell
469. *Cheilo inermis* (Forsskal)
470. *Choerodon anchorago* (Bloch)
471. *Choerodon robustus* (Gunther)
472. *Coris aygula* Lacepede
473. *Coris gaimard* (Quoy & Gaimard)
474. *Cymolutes praetextatus* (Quoy & Gaimard)
475. *Cymolutes torquatus* (Valenciennes)
476. *Dipiroctacanthus xanthurus* (Bleeker)
477. *Epiibulus insidiator* (Pallas)

478. *Gomphosus caeruleus* Lacepede
479. *Halichoeres argus* (Bloch & Schneider)
480. *Halichoeres bicolor* (Bloch & Schneider)
481. *Halichoeres chloropterus* (Bloch)
482. *Halichoeres chrysus* Randall
483. *Halichoeres hortulanus* (Linnaeus)
484. *Halichoeres margaritaceus* (Val.)
485. *Halichoeres marginatus* Ruppell
486. *Halichoieres melanurus* (Bleeker)
487. *Halichioeres nebulosus* (Valenciennes)
488. *Halichoeres nigrescens* (Bloch & Schneider)
489. *Halichoeres scapularis* Bennett
490. *Halichoeres timorensis* (Bleeker)
491. *Hemigymnus fasciatus* (Bloch)
492. *Hemigymnus melapterus* (Bloch)
493. *Hologymnosus annulatus* (Lacepede)
494. *Labrichthys unilineatus* (Guichenot)
495. *Labroides bicolor* Fowler & Bean
496. *Labroides dimidiatus* (Valenciennes)
497. *Macropharyngodon meleagris* (Val.)
498. *Novaculichthys taeniourus* (Lacepede)
499. *Oxychelinius diagrammus* (Lacepede)
500. *Pseudodax moluccanus* (Valenciennes)
501. *Stethojulis interrupta* (Bleeker)
502. *Stethojulis strigiventer* (Bennett)
503. *Stethojulis trilineata* (Bloch & Schneider)
504. *Thalassoma hardwicke* (Bennett)
505. *Thalassoma herbraicum* (Lacepede)
506. *Thalassoma jansenii* (Bleeker)
507. *Thalassoma lunare* (Linnaeus)
508. *Thalassoma lutescens* (Lay & Bennett)
509. *Thalassoma purpureum* (Forsskal)
510. *Thalassoma quinquevittatum* (Lay & Bennett)
511. *Xyrichthys pentadactylus* (Linnaeus)

Family SCARIDAE

512. *Calotomus spinidens* (Quoy & Gaimard)

513. *Cetoscarus bicolor* (Ruppell)
514. *Chlorurus enneacanthus* (Lacepede)
515. *Leptoscarus vaigiensis* (Quoy & Gaimard)
516. *Scarus frenatus* Lacepede
517. *Scarus ghobban* Forsskal
518. *Scarus gibbus* Ruppell
519. *Scarus globiceps* Valenciennes
520. *Scarus niger* Forsskal
521. *Scarus prasiognathos* Valenciennes
522. *Scarus psittacus* Forsskal
523. *Scarus rivulatus* Valenciennes
524. *Scarus rubroviolaceous* Bleeker
525. *Scarus scaber* Valenciennes
526. *Scarus sordidus* (Forsskal)

Family MUGILIDAE

527. *Crenimugil crenilabis* (Forsskal)
528. *Liza melinoptera* (Valenciennes)
529. *Liza vaigiensis* (Quoy & Gaimard)

Family SPHYRAENIDAE

530. *Sphyraena barracuda* (Walbum)
531. *Sphyraena flavicauda* Ruppell
532. *Sphyraena forsteri* Cuvier
533. *Sphyraena jello* Cuvier
534. *Sphyraena obtusata* Cuvier

Family TRICHONOTIDAE

535. *Trichonotus setiger* Bloch & Schneider

Family PINGUIPEDIDAE

536. *Parapercis clathrata* Ogilby
537. *Parapercis cylindrica* (Bloch)
538. *Parapercis hexophtalma* (Cuvier)
539. *Parapercis tetracanthus* (Lacepede)
540. *Parapercis xanthozona* (Bleeker)

Family BLENNIIDAE

541. *Andamia heteroptera* (Bleeker)
542. *Aspidontus taeniatus* taeniatus Quoy & Gaimard

543. *Astrosalarias fuscus fuscus* (Ruppell)
544. *Blenniella bilitonensis* (Bleeker)
545. *Blenniella cyanostigma* (Bleeker)
546. *Blenniella leopardus* (Fowler)
547. *Blenniella periophthalmus* (Val.)
548. *Ecsenius bicolor* (Day)
549. *Ecsenius lineatus* Klausewitz
550. *Ecsenius midas* Starck
551. *Enchelyurus kraussi* (Klunzinger)
552. *Entomacrodus striatus* (Valenciennes)
553. *Istiblennius dussumieri* (Valenciennes)
554. *Istiblennius edentulus* (Schneider & Forster)
555. *Istiblennius lineatus* (Valenciennes)
556. *Parenchelyurus hepburni* (Synder)
557. *Petroscirtes breviceps* (Valenciennes)
558. *Petroscirtes mitratus* Ruppell
559. *Plagiotremus rhinorhynchos* (Bleeker)
560. *Plagiotremus tapeinosoma* (Bleeker)
561. *Rhabdoblennius snowi* (Fowler)
562. *Salarias fasciatus* (Bloch)
563. *Xiphasia setifer* Swainson

Family TRIPTERYGIIDAE

564. *Enneapterygius fasciatus* (Weber)
565. *Helcogramma gymnauchen* (Weber)
566. *Helcogramma trigloides* Bleeker

Family CALLIONYMIDAE

567. *Callionymus filamentosus* Valenciennes
568. *Callionymus japonicus* Houttuyn
569. *Eleutherochir opercularis* (Valenciennes)
570. *Synchiropus splendidus* (Herre)
571. *Synchiropus stellatus* Smith

Family GOBIIDAE

572. *Acentrogobius baliurus* (Valenciennes)
573. *Amblygobius albimaculatus* (Ruppell)
574. *Amblygobius bynoensis* (Richardson)

575. *Asterropteryx semipunctatus* Ruppell
576. *Bathygobius fuscus* (Ruppell)
577. *Callogobius hasseltii* (Bleeker)
578. *Exyrias puntang* (Bleeker)
579. *Gobiodon citrinus* (Ruppell)
580. *Gobiodon histrio* (Valenciennes)
581. *Gobiodon quinquesrigatus* (Valenciennes)
582. *Gobiopsis quinquecincta* (Smith)
583. *Gobiopsis woodsi* Lachner & Mc Kinney
584. *Istigobius goldmanni* Bleeker
585. *Istigobius ornatus* (Ruppell)
586. *Mahidolia mystacina* (Valenciennes)
587. *Oplopomus caninoides* (Bleeker)
588. *Oplopomus oplopomus* (Valenciennes)
589. *Parachaeturichthys polynema* (Bleeker)
590. *Paragobiodon echinocephalus* (Ruppell)
591. *Priolepis semidoliatus* (Valenciennes)
592. *Valenciennea sexguttata* Valenciennes
593. *Yongeichthys criniger* (Valenciennes)

Family ELEOTRIDAE

594. *Ptereleotris evides* (Jordan & Hubbs)
595. *Ptereleotris hanae* (Jordan & Snyder)
596. *Ptereleotris heteroptera* (Bleeker)
597. *Ptereleotris microlepis* Bleeker

Family ACNATHURIDAE

598. *Acanthurus dussumieri* Valenciennes
599. *Acanthurus leucosternon* Bennett
600. *Acanthurus lineatus* (Linnaeus)
601. *Acanthurus mata* Cuvier
602. *Acanthurus nigricauda* Duncker & Mohr
603. *Acanthurus thompsoni* (Fowler)
604. *Acanthurus triostegus* (Linnaeus)
605. *Acanthurus xanthopterus* Valenciennes
606. *Ctenochaetus striatus* (Quoy & Gaimard)
607. *Naso annulatus* (Quoy & Gaimard)

608. *Naso brevirostris* (Valenciennes)
609. *Naso hexacanthus* (Bleeker)
610. *Naso lituratus* (Forsterr)
611. *Naso unicornis* (Forsskal)
612. *Naso vlamingii* (Valenciennes)
613. *Paracanthurus hepatus* (Linnaeus)
614. *Zebrasoma scopas* (Cuvier)
615. *Zebrasoma veliferum* (Bloch)

Family ZANCLIDAE

616. *Zanclus cornutus* (Linnaeus)

Family SIGANIDAE

617. *Siganus magnificus* (Burgess)
618. *Siganus argenteus* (Quoy & Gaimard)
619. *Siganus canaliculatus* (Park)
620. *Siganus corallinus* (Valenciennes)
621. *Siganus fuscescens* (Houttuyn)
622. *Siganus guttatus* (Bloch)
623. *Siganus javus* (Linnaeus)
624. *Siganus puelloides* Woodland & Randall
625. *Siganus spinus* (Linnaeus)
626. *Siganus stellatus* (Forsskal)
627. *Siganus vermiculatus* (Valenciennes)
628. *Siganus virgatus* (Valenciennes)

Family SCOMBRIDAE

629. *Auxis rochei* (Rasso)
630. *Auxis thazard* (Lacepede)
631. *Euthynnus affinis* (Cantor)
632. *Grammatorcynus bicarinatus* (Quoy & Gaimard,
633. *Gymnosarda unicolor* (Ruppell)
634. *Rastrelliger brachysoma* (Bleeker)
635. *Rastrelliger faughni* Matsuai
636. *Rastrelliger kanagurta* (Cuvier)
637. *Sarda orientalis* (Temminck & Schlegel)
638. *Scomberomorus commerson* (Lacepede)

Family ISTIOPHORIDAE

639. *Istiophorus platypterus* (Shaw & Nodder)

640. *Makaira mazara* (Jordan & Snyder)
641. *Tetrapturus audax* (Philippi)

Order PLEURONECTIFORMES

Family PSETTODIDAE

642. *Psettodes erumei* (Bloch)

Family BOTHIDAE

643. *Bothus pantherinus* (Ruppell)
644. *Pseudorhombus arsius* (Ham.-Buch)
645. *Pseudorhombus elevatus* (Ogilby)

Family CYNOGLOSSIDAE

646. *Cynoglossus lida* (Bleeker)
647. *Paraplagusia bilineata* (Bloch)

Family SOLIDAE

648. *Aesopia cornuta* Kaup
649. *Heteromycteris oculus* (Alcock)
650. *Pardachirus marmoratus* (Lacepede)
651. *Pardachirus pavoninus* (Lacepede)
652. *Solea bleekeri* Boulenger
653. *Soleichthys heterorhinos* Bleeker
654. *Zebrias quagga* (Kaup)

Order TETRAODONTIFORMES

Family BALISTIDAE

655. *Abalistes stellatus* (Lacepede)
656. *Balistapus undulatus* (Mungo Park)
657. *Balistoides conspicillum* (Bloch & Schneider)
658. *Balistoides viridescens* (Bloch & Schneider)
659. *Canthidermis maculatus* (Bloch)
660. *Melichthys indicus* Randall & Klausewitz
661. *Melichthys vidua* (Richardson)
662. *Odonus niger* (Ruppell)
663. *Pseudobalistes flavimarginatus* (Ruppell)
664. *Pseudobalistes fuscus* (Bloch & Schneider)
665. *Rhinecanthus aculeatus* (Linnaeus)
666. *Rhinecanthus rectangulus* (Bloch & Schneider)
667. *Rhinecanthus verrucosus* (Linnaeus)

668. *Sufflamen bursa* (Bloch & Schneider)
669. *Sufflamen chrysopterus* (Bloch & Schneider)
670. *Sufflamen fraenatus* (Latreille)
671. *Aluterus monoceros* (Linnaeus)
672. *Aluterus scriptus* (Osbeck)
673. *Amanses scopas* (Cuvier)
674. *Anacanthus barbatus* (Gray)
675. *Cantherhines pardalis* (Ruppell)
676. *Monacanthus chinensis* (Osbeck)
677. *Oxymonacanthus longirostris* (Bloch & Schneider
678. *Paramonacanthus choirocephalus* Bleeker
679. *Paramonacanthus japonicus* (Tilesius)
680. *Paramonacanthus nematophorus* (Gunther
681. *Pervagor melanocephalus* (Bleeker)
682. *Pseudotriacanthus srigillifer* (Cantor)
683. *Triacanthus biaculeatus* (Bloch)

Family OSTRACIIDEA

684. *Lactoria cornuta* (Linnaeus)
685. *Ostracion cubicus* Linnaeus
686. *Ostracion meleagris* Shaw
687. *Rhynchostracion nasus* (Bloch)

Family TETRAODONTIDAE

688. *Tetrosomus gibbosus* (Linnaeus)
689. *Arothron hispidus* (Linnaeus)
690. *Arothron immaculatus* (Bloch & Schneider)
691. *Arothron mappa* (Lesson)
692. *Arothron nigropunctatus* (Bloch & Schneider)
693. *Arothron reticularis* (Bloch & Schneider
694. *Arothron stellatus* (Bloch & Schneider)
695. *Canthigaster bennetti* (Bleeker)
696. *Canthigaster solandri* (Richardson)
697. *Canthigaster valentini* (Bleeker
698. *Chelonodon patoca* (Hamilton)
699. *Lagocephalus guentheri* Miranda-Ribeiro
700. *Lagocephalus lunaris* (Bloch & Schneider)

701. *Lagocephalus sceleratus* (Gemlin)

Family DIODONTIDAE

702. *Diodon holocanthus* Linnaeus

703. *Diodon hystrix* Linnaeus

704. *Diodon liturosus* Shaw

BIRDS

Order CICONIFORMES

Family ARDEIDAE

1. *Ardea alba* Linnaeus
2. *Ardea cinerea* Linnaeus
3. *Ardea purpurea* Linnaeus
4. *Ardeola bacchus* Bonaparte
5. *Ardeola grayii* Linnaeus
6. *Bubulcus ibis* Bonaparte
7. *Egretta grazetta* Foster
8. *Egretta intermedia* Wagler
9. *Egretta sacra* (Gmelin)
10. *Gorsachius melanolophus* Raffles
11. *Ixobrychus sinensis* Gemlin
12. *Nycticorax nycticorax* Linnaeus

Order CHARADRIIFORMES

Family CHARADRIIDAE

13. *Pluvialis squatarola* (Linnaeus)
14. *Charadrius alaxandrinus* Linnaeus
15. *Charadrius asiaticus* Pallas
16. *Charadrius dubius* Scopoli
17. *Charadrius leschenaultii* Lesson
18. *Charadrius mongolous* Pallas
19. *Numenius phaeopus* (Linnaeus)
20. *Numenius arquata* (Linnaeus)
21. *Limosa lapponica* (Linnaeus)
22. *Tringa glaerola* Linnaeus
23. *Tringa hypoleucos* Linnaeus
24. *Tringa nebularia* (Gunnerus)
25. *Tringa ochropus* Linnaeus

26. *Tringa terek* (Latham)
27. *Tringa tetanus* (Linnaeus)
28. *Calidris alba* (Pallas)
29. *Calidris minuta* (Leisler)
30. *Calidris subminuta* (Modedendorff)
31. *Calidris tenuirostris* (Horsfield)
32. *Calidris testacea* (Pallas)
33. *Limicola falcinellus* (Pontoppidan)
34. *Arenaria interpress* (Linnaeus)
35. *Pluvialis dominica* (P.L.S. Muller)

Family RECURVIROSTRIDAE

36. *Himantopus himantopus* Brisson

Family BURHINIDAE

37. *Esacus magnirosrtis* (Vieillot)
38. *Burhinus oedicnemus* Illinger

Family DROMADIDAE

39. *Dromas ardeola* Paykull

Family STERNIDAE

40. *Larus ridibundus* Linnaeus
41. *Chlidonias leucopterus* (Temminck)
42. *Gelochelidon nilotica* (Gmelin)
43. *Anous stolidus* (Linnaeus)
44. *Sterna sumatrana* Raffinesque
45. *Sterna anaethetus* Scopoli
46. *Sterna bengalensis* Lesson
47. *Sterna bergii* Lichtenstein
48. *Sterna dougallii* Montagu
49. *Sterna fuscata* Linnaeus

Order CORACIIFORMES

Family ALCEDINIDAE

50. *Pelargopsis capensis* (Linnaeus)
51. *Halcyon chloris* (Boddaert)
52. *Halcyon pileata* (Boddaert)
53. *Halcyon smyrnensis* (Linnaeus)

Order GALLIFORMES

Family MEGAPODIIDAE

54. *Megapodius freycinet* Gaimard

Family PHASIANIDAE

55. *Coturnix chinensis* Linnaeus

Order FALCONIFOREMES

Family ACCIPITRIDAE

56. Haliaetus leucogaster (Gmelin)

REPTILES

1. *Crocodilus porosus* (Schneider)
2. *Chelonia mydas* Linnaeus
3. *Eretmochelys imbricata* Garman
4. *Lepidochelys olivacea* Eschschlotz
5. *Dermochlys coriacea* Vandelli

Family HYDROPHIIDAE

1. *Hydrophis spiralis*
2. *Hydrophis cynocinctus*
3. *Hydrophis mamillaris*
4. *Hydrophis caerulescens*
5. *Lapemis curtus*
6. *Microcephalaphis gracilis*
7. *Microcephalaphis cantoris*
8. *Laticauda laticauda*
9. *Laticauda colubrinus*

MAMMALS

Family DELPHINIDAE

1. *Delphinus delphis* Linnaeus

Family DUGONGIDAE

2. *Dugong dugon* Muller

Dr. D. V. Rao, Senior Scientist is currently working in Zoological Survey of India (ZSI) under the Ministry of Environment and Forests, New Delhi. He has over 25 years research experience in marine and brackish water fish taxonomy and ecology and coral reef associates. He served in Andaman & Nicobar Islands for about one and half decades and made extensive studies on reef fauna, particularly fish. Faunal explorations made along the reefs of entire length and breadth of the Archipelago including remote and uninhabited islands. He published many scientific papers of and authored several books and field guides on fishes. The most important of them are Guide to Reef Fishes of Andaman and Nicobar Islands, Poisonous and venomous Fishes of A & N Islands, Guide to Butterfly and Anemone Fishes of A & N Islands, Field Guide to Fishes of Acanthuridae and Siganidae of A & N Islands, Mangrove Fishes of A & N Islands, Ichthyofauna of A N Islands, A Field Guide to Fishes : Chilka Lake, Orissa, East Coast of India, Soft corals of A N Islands etc.

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