

ZOOLOGY

PROJECT

(Submitted for partial fulfilment of B.Sc 1st Sem Zoology Honours curriculum of DU.)

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COLLEGE TITABOR**

TOPIC: CORAL REEF



SUBMITTED BY

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Certificate:

This is to certify that "Manashjyoti kaehari" student of Bsc 1st Semester 'Zoology' & has successfully completed ^{his} their zoology project on "Coral reefs" under the guidance "of Miss Priyanka saikia."

Date - /11/22

Priyanka Saikia

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Acknowledgement :

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Hence, I would like to thanks for all.

Manash Jyoti Kachari
BSC 1st sem.

INTRODUCTION:

Coral reefs have existed for hundreds of millions of years and provided a habitat for some of the richest diversity on the Earth's surface. They are the marine version of tropical rainforests. Reefs harbor a slice of the marine food chain all the way from tiny autotrophic protists (Autotrophs fix carbon through photosynthesis) to large, predatory fish. Hundreds of millions of humans live near reefs, host productive fisheries; They also provide protection to low-lying coastal areas from storms and are vital for a number of key habitats, including mangrove forests.

A coral reef is an underwater ecosystem characterized by reef-building corals. Reefs are formed of colonies of coral polyps held together by calcium carbonate. Most coral reefs are built from stony corals, whose polyps cluster in groups.



Distribution and conditions of coral Reef Formation:

Coral have built a thick stratum of the earth's crust, they have coral reefs in the Caribbean seas and in the Indo-Pacific region from east coast of Africa to the north-eastern coast of Australia which is known as the Great Barrier Reef. However, Fiji islands of Pacific Ocean and those situated in Bahama Islands region are the best known coral islands of the world.

Bermuda is a coral island where houses are built of coral blocks. Around India, coral reefs are found off Port Okha and Dwarka in the Gulf of Kutch and also off Remeshwaran in the Gulf of Mannar between India and Sri Lanka. The coral reefs are also located at Andaman and Nicobar islands and at Lakshadweep Islands.

The coral reefs grow best at a depth of about 30 metres or less and normally in warm water up to about 20°C . Light and amount of sediment also fail to grow in dark shaded areas and they completely die in total darkness. Below 50 metres no reef building corals are found though some solitary corals exist up to 8000 metres.

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Components of coral Reefs:

In addition of stony corals, other components in the formation of coral reefs are Millepora, Tubipora, Heliopora, Aleyonatia, Gorgonians, Foraminifera, Coralline algae and branching algae, etc. The coral reefs are also inhabited by a number of sponges, anemones, sea urchins, starfishes, crabs, snails, bivalves, etc.

Types of Coral Reefs :-

Scientists generally agree on four different coral reef classifications :

1. Fringing Reefs - The fringing reefs also referred to as the shore reefs are built from the sea bottom and extend from the shore up to 1/4 miles having no navigable channel between the shore and reef. This zone of the sea is called edge or front. However sometimes reef beds are broken to result into irregular channels called lagoon.

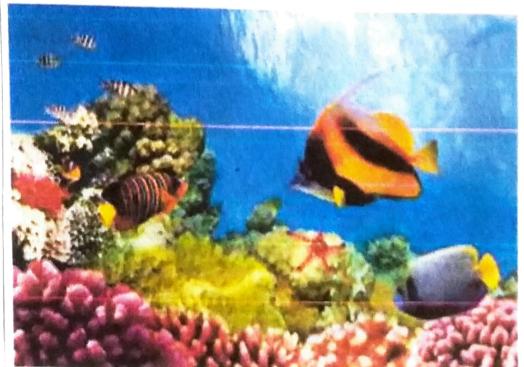
Such reefs are composed largely of coral sand having living and dead corals building reefs, mud and other animals. Fringing reef is very common in East Indies.



2. Barrier Reef - The barrier reefs are like fringing reefs but they are situated in the sea nearly 1 km to 15 km away from the shore. Therefore, navigable channel called lagoon.

Separates these reefs from the shore. The Lagoon may be 20 to 40 fathoms deep, hence, it becomes navigable.

The great Barrier Reef on the north-east coast of Australia is 1,200 miles long about 20-70 miles wide and situated nearly 90 miles away from the shore.



3. Atoll Reef - The atoll reef, also referred to as coral island or lagoon island, is a circular or horse-shoe-shaped reef enclosing a lagoon of water which may be small or large up to 50 miles across.

An atoll reef may be broken to form channels; some suitable for navigation and others may not be suitable for it. An interesting atoll reef example is Aldabra in the Indian Ocean, about 260 miles northeast of the Malagasy Republic and 400 miles from the coast of Africa.



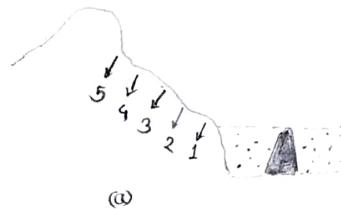
4. Patch reefs - Patch reefs are small, isolated reefs that grow up from the open bottom of the island platform or continental shelf. They usually occur between fringing reefs and barrier reefs. They vary greatly in size, and they rarely reach the surface of the water.

Formation of coral Reefs:

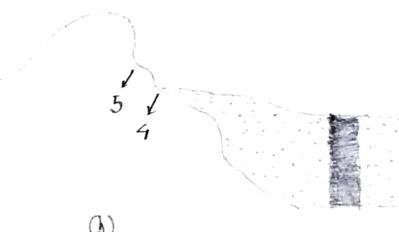
The coral reefs have great vertical thickness though reef-building corals live only up to depth 50 metres, and those of past geological ages also lived in shallow littoral waters. How the great thickness of coral reefs has been made is explained by several theories of which two may be considered.

1. Darwin's subsidence theory: The theory states that from fringing reef arise other types of reefs.

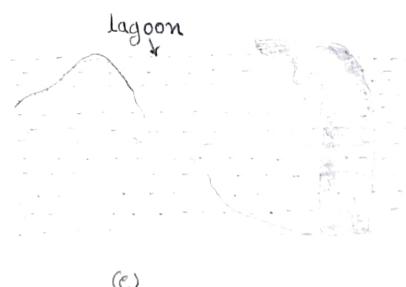
(a) Beginning of reef formation at shallow depth



(b) Sometimes the shore between the developing fringing reef and the land mass shrinks turning it into barrier reef



(c) When coral reef grows in a horse-shoe or circular shape around completely subsided long nois, and atoll is formed.

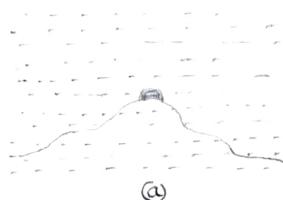


(d) First given by Charles Darwin in 1842. But there were some doubts. A general sinking of a great belt of land between the tropics over a long period seems to be unbelievable. The theory was supported by James Dana with a change that the sinking of each landmass might have taken independently.

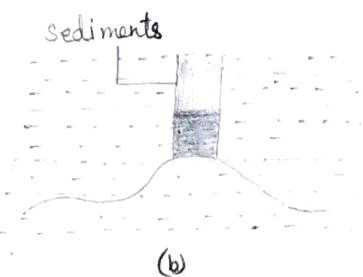
④ Finally verified in 1950 for Indo-Pacific reefs at Bikini.

2. Semper - Murray solution theory : (1880)

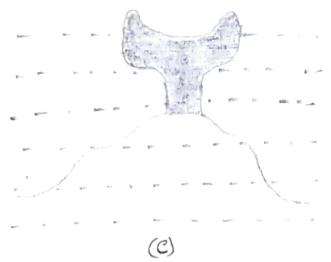
① Corals grows on the highest peak in the ocean bottom.



② Deposition of sediments bring them to an optimum level.



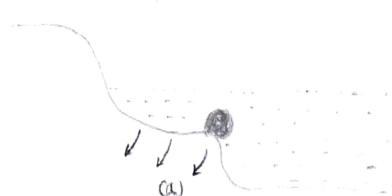
③ The barrier reefs and atolls are produced by better growth of the corals in the edges of coral deposition and by the solution of its inner part.



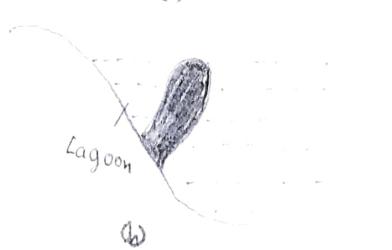
3. Submerged Bank theory :

① Advocates independent origin of cliff reefs.

② The coral reefs are formed on flat surfaces which at first remain in lesser depths.



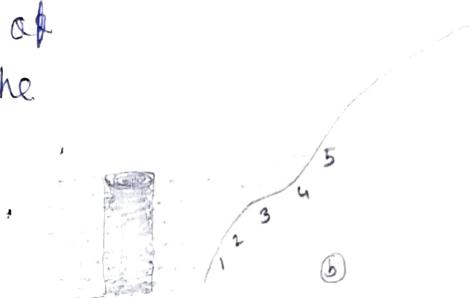
③ Such surfaces with growing reef submerge slowly long on and go down to greater depths.



4. Dolly glacial control theory:

(a) Glaciation reduced the height of the ocean by withdrawing water to form ice caps. Coral reefs started to form at that time in shallow depths.

(b) As ice melted, the level of waters along with the growth of coral reef



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Coral reef ecosystems:

Coral reefs are some of the most diverse ecosystems in the world. Coral polyps, the animals primarily responsible for building reefs, can take many forms: large reef building colonies, graceful flowing fans, and even small, solitary organisms. Thousands of species of corals have been discovered; some live in warm, shallow, tropical seas and others in the cold, dark depths of the ocean.

Benefits of coral reef ecosystems:

Coral reefs protect coastlines from storms and erosion, provide jobs for local communities, and offer opportunities for recreation. They are also a source of food and new medicines. Over half a billion people depend on reefs for food, income, and protection. Fishing, diving, and snorkeling on and near reefs add hundreds of millions of dollars to local businesses. The net economic value of the world's coral reefs is estimated to be nearly tens of billions of U.S. dollars per year. These ecosystems are culturally important to indigenous people around the world.

Coral characteristics:

Shallow water, reef-building corals have a symbiotic relationship with photosynthetic algae called zooxanthellae, which live in their tissues. The coral provides a protected environment and the compounds zooxanthellae need for photosynthesis. In return, the algae produce carbohydrates that the coral uses for food, as well as oxygen. The algae also help the coral remove waste. Since both partners benefit from association, this type of symbiosis is called mutualism.

Deep-sea corals live in much deeper or colder oceanic waters and lack zooxanthellae. Unlike their shallow water relatives, which rely heavily on photosynthesis to produce food, deep sea corals take in plankton and organic matter for much of their energy needs.

Threats to coral reef ecosystems:

Unfortunately, coral reef ecosystems are severely threatened. Some threats are natural, such as diseases, predators, and storms. Other threats are caused by people, including pollution, sedimentation, unsustainable fishing practices, and climate change, which is raising ocean temperatures and causing ocean acidification. Many of these threats can stress corals, leading to coral bleaching and possible death, while others cause physical damage to these delicate ecosystems. During the 2014-2017 coral bleaching event, unusually warm waters (partially associated with a strong El Niño) affected 70% of coral reef ecosystems worldwide. Some areas were hit particularly hard, like the Great Barrier Reef in Australia, where hundreds of miles of coral were bleached.

Coral are able to recover from bleaching events if conditions improve before they die, though it can take many years for the ecosystems to fully heal. Scientists are also testing new ways to help coral reef ecosystems, such as growing coral in a nursery and then transplanting it to damaged areas.

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