

Diversity and Types of Corals and Coral reefs

Corals

Corals are animals belonging to the phylum **Coelenterata**. Some solitary or colonial polypoid forms live in a skeleton of calcium carbonate secreted by themselves. Some of them grow into huge mounds. Most of the corals belong to the class **Anthozoa** and a few others to the class **Hydrozoa**.

Types of corals in different groups.

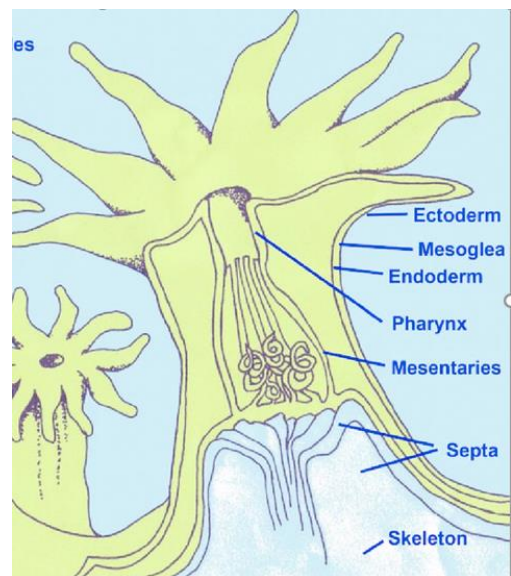
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- a) **Hydrozoa**: The Hydrozoan corals belong to the order **Millepora**, e.g., *Millepora* and order **Stylasterina**, e.g., *Stylaster*.
- b) **Anthozoa**: The Anthozoan corals belong to subclasses **Octocorallia** and **Hexacorallia**. The Octocorallia corals belong to the order **Stolonifera** eg., *Tubipora*; order **Alcyonacea** e.g., *Alcyonium*; order **Coenothecalia**, eg., *Heliopora* and order **Gorgonacea** including sea fans like *Gorgonia*.

The Hexacorallia corals belong to the order **Madreporaria**, includes stony corals or true corals like mushroom coral (*Fungia*), star coral (*Astraea*), stony coral (*Favia*), horn coral (*Madrepora*) and brain coral (*Meandrina*); and the order **Antipatharia**, eg., *Antipathes*. Among these, some are solitary, while most of them are colonial forms and the principal builders of the **coral reefs**.

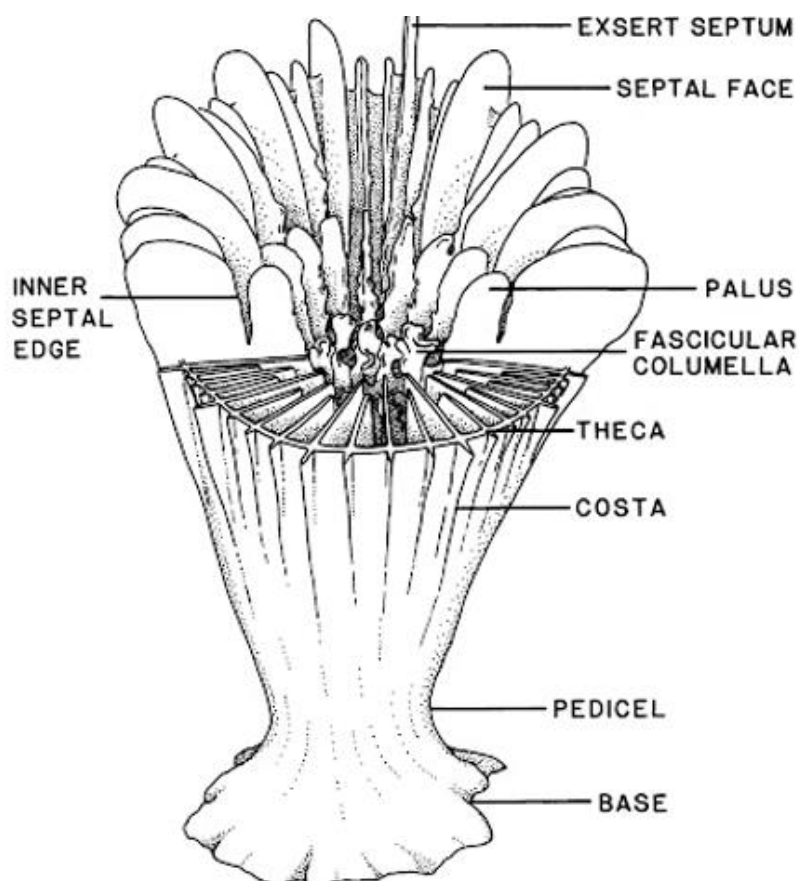
Structure of Coral Polyp

A typical coral polyp is a small organism about 10 mm long and 1 to 3 mm in diameter. A basal disc is absent because the basal region of the polyp is surrounded by a calcareous exoskeleton, a **basal plate**. The ectoderm cells secreting the corals are called **calicoblasts**. The **Oral disc** bears numerous **tentacles**. The **pharynx** or stomodaeum is short. Mesenteries are restricted to the upper part of the coelenteron. Living polyps are found only on the surface layers of coral masses.



Structure of Coral Skeleton

1. **Basal plate:** Secreted between the base of the poly and the substratum.
2. **Septa:** On the basal plate a number of vertical ridges called septa are secreted. These septa increase in height pushing the poly upwards.
3. **Theca:** The outer edges of the septa fuse together to form a theca.
4. **Epitheca:** Another calcareous covering formed around theca, is called epitheca.
5. **Costae:** The theca is connected with the epitheca by plates called costae.
6. **Columella:** The inner edges of the septa fuse together producing a calcareous pillar called columella in the centre of the coral.
7. **Corallite:** Thus, the coral appears as a cup. This cup-like coral is formed of a basal plate, septa, a theca, an epitheca and a central columella. The skeleton of a solitary coral is known as a corallite. It is a calcareous exoskeleton secreted by the epidermis.
8. **Corallum:** Thousands of such corallites fuse together to form a large coral-stone called corallum.



Diversity and Types of Coral Reefs

Coral reef

According to **Vaughan** (1917), “a coral reef is a ridge or a mound of limestone, the upper surface of which lies near the surface of the sea; it is formed of calcium carbonate and is produced by the action of coral polyps”.

Composition and Habitat

It is formed by the deposition of calcareous secretion of the coral polyps. Chemically it is formed of CaCO_3 . The coral reef is a suitable habitat for marine organisms. It is occupied by marine algae and a wide variety of marine animals. The coral reef provides food and shelter for these organisms.

Coral reef-producing corals

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Conditions required for coral reef formation

The growth of the coral reefs requires an optimum temperature of **21° C**. Hence they survive only in **tropical seas**. They are absent from cold waters. Again, they grow only in shallow waters. They cannot grow below a depth of 150 feet. Light is very essential for reef formation. They are limited to the **Indo-Pacific** and the **Central-Western Pacifica**. The coral reefs are also located in the **Gulf of Mannar, Andaman and Nicobar, and Lakshadweep**.

The coral polys are yellow, green or brown in colour. The skeletons of corals are white. They are occupied by red and green algae. Hence, the coral reefs are described as the beautiful gardens of the eye.

Types of Coral Reefs

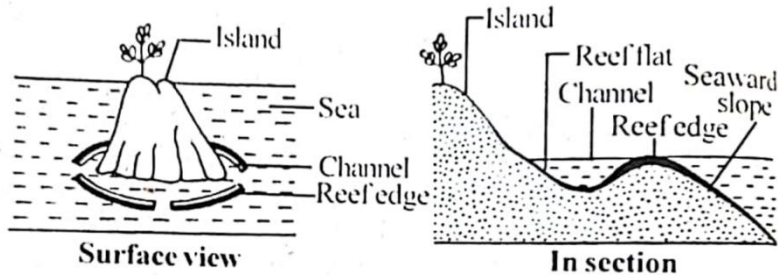
There are three types of coral reefs, depending on how they are formed.

1. Fringing reefs
2. Barrier reefs
3. Atolls.

1. Fringing Reefs

A fringing reef has the following features:

1. It is a coral reef growing around the islands. It extends to a distance of about 200 meters.
2. It grows in shallow waters. The fringing reefs are also referred to as **shore reefs**.
3. The fringing reef has three regions, namely, **reef flat**, **reef edge** and **seaward slope**.



Reef flat: It lies close to the shore around the island. It is a flat surface.

Reef edge: It is an elevated ridge of a breadth upto 40 yards. It is exposed during low tide.

Seaward slope: It is a slope extending into the sea from the reef edge; corals grow in this region.

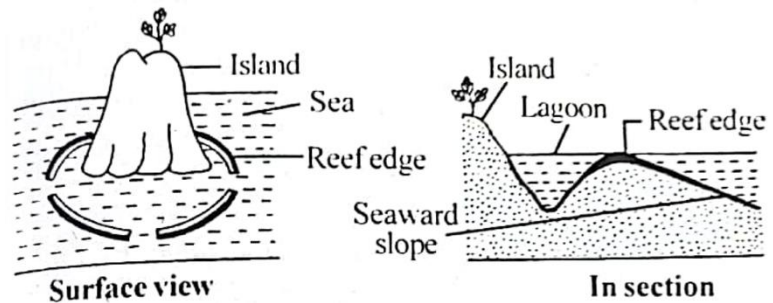
4. A shallow channel of sea water lies on the reef flat between the shore and the reef edge. Only small boats can go in this channel. The depth of the water channel is 37 to 55 meters.

Example: The fringing reef is very common in East Indies.

2. Barrier Reefs:

1. Barrier reef is a coral reef growing around the island. They are situated in the sea nearly 1 km to 15 km away from the shore.

2. It grows in deep waters.
3. The barrier reef has three regions namely, reef flat, reef edge and seaward slope.



4. The sea water lying

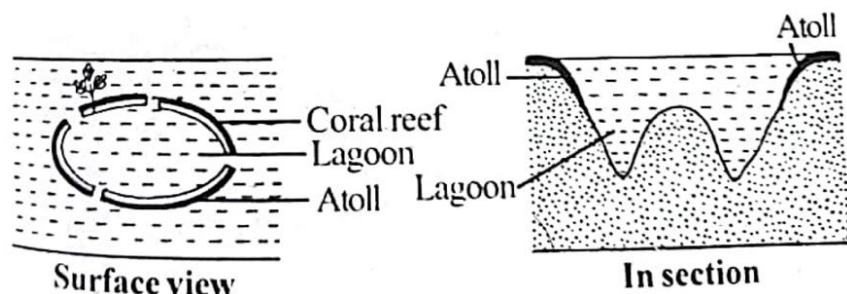
between the island and the reef is called a **lagoon**. It is deep and ships can travel along the lagoon. It has a depth of 90 to 110 meters.

Example: The **Great Barrier Reef** of the North-East Coast of Australia is a well-known barrier reef. It is over 1920 km long and has a width of 80 to 145 km from the shore.

3. Atolls

1. An atoll is a **coral island** or lagoon island.
2. It is located hundreds of miles away from land.
3. It is circular or horse-shoe shaped.
4. It does not enclose an island. But it encloses a deep lagoon. The diameter of the lagoon varies from a few kilometres to 80 km.
5. The rim of the reef is broken into channels. By these channels, the sea is connected to the lagoon.

Example: Aldabra in the Indian Ocean.



Theories of Coral Reef Formation:

There are four theories explaining the formation of coral reefs. They are as follows:

- a. Subsidence theory
- b. Glacial control theory
- c. Volcanic crater theory
- d. Submerged bank theory

a) Subsidence theory

This theory was proposed by **Darwin** in 1931. According to this theory, coral reefs start growing on the sides of the islands as fringing reefs. The reef flat

deepens to form a lagoon converting the fringing reef into a barrier reef. The island, then, sinks down-converting the barrier reef into an atoll

b) Glacial Control Theory

This theory was proposed by **Daly**, This theory assumes that during the glacial period sea water is converted into ice caps in the polar region. This lowers the sea level to about 150 feet. Hence several flat platforms of sand and mud are exposed. During the interglacial period, the sea level rose and water gradually covered the flat platforms. Now coral reefs begin to grow on these flat platforms.

c) Volcanic Crater Theory

This theory was proposed by **Stutchbury** (1932). It states that atolls were built up on the summits of extinct volcanoes. The crater of the volcano became the lagoon while on its elevated rim, the coral reefs grew.

d) Submerged Bank Theory

According to this theory, coral reefs begin to grow on submerged flat surfaces of islands.

Economic Importance of Coral Reefs

Coral reefs provide the following benefits:

1. They protect the seashore from erosion.
2. Coral fragments are used for decorating houses, aquaria and rock gardens. Large quantities of corals are shipped every year for the curio trade.
3. Stones carved out from the coral reefs are used for constructing buildings and for paving roads.
4. Coral reefs provide an ideal habitat for various marine animals and thus they form a paradise for animal collectors.
5. Coral produce islands. The coral islands form habitats for human beings and land animals. Eg. Lakshadweep, Maldives, Figi islands, etc.
6. Certain brilliantly coloured corals are used to make ornaments like necklaces.
7. Corals of the remote geological past formed reef structures that were highly favourable sites for the accumulation of petroleum deposits. Thus, coral reefs are of much importance to oil industry.