

FAUNA OF OUR OCEANS – LITTORAL LIFE

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The word 'ocean' is derived from the name 'oceanus' which the Greeks had given to a river that flowed, according to them, around the earth considered by them to be flat. However, as our knowledge about the earth and the oceans surrounding it increased, the wheel maps of the olden days were replaced by the most modern ones which now tell us that there are three great oceans in this world, viz., the Atlantic, the Pacific and the Indian. The last one is named as such because it washes our shores which extend over nearly 4700 kilometres.

Regarding the origin of these oceans, it may be stated that in the beginning, even the earth was just a part of the sun. It was, therefore, as hot as the sun itself when it separated from it. Gradually, however, it cooled down with the result that its outer surface became rocky, but the inner portion still remained at a very high temperature on account of the hot gases which originally constituted it. These occasionally caused the eruptions of some of the rocks at their tips with the result that huge craters were formed and the hot lava flowed down the rocks. As a consequence of the high temperatures prevailing on the surface of the earth, it remained surrounded by clouds formed due to the condensation of the atmospheric vapour. Gradually, however, these clouds rained and the water, this collected in the

huge craters and the valleys in between the rocks, formed the oceans.

Those who have been to any coast know that the sea water rises and falls at regular intervals. Such arise and fall in the level of sea water constitute what we call the high and the low tides respectively. These are caused by the force of attraction which both the moon and the sun exert on our waters. The impact of the rising tides on the rocks is so great that they are broken completely with the result that we have sometime a shore which, instead of being rocky, is just in the form of a sandy beach. Besides these two types of shores, i.e., rocky and sandy, there is still another type which is muddy. Such a shore is found either at the mouths of the rivers or in some sheltered creeks.

The strip of land which lies between the high- and low-water marks and which becomes uncovered twice daily when the tide is at its lowest ebb is known as the littoral zone of the sea shore. The conditions in the zone are so variable that the animals living comfortably in the cool waters of the high tide may be found stranded at the time of the low tide in a rock pool in which the temperature of water on account of the hot sun may even rise to such an extent as to cause the death of all the organisms living therein. Even the

nature of the sea water itself is bound to change especially near the mouths of the rivers on account of its mixing up with the fresh water. On the other hand, the sea water in certain enclosed areas may become even more salty on account of its greater evaporation during summer.

In order, therefore, to successfully adapt themselves to such varying conditions, the animals living in the littoral zone have to be very tough and hardy. In spite of all these handicaps the fauna of the sea shore is so varied and dense that we have not got its parallel anywhere else. There is a continuous struggle going on between the inhabitants of the sea shore not only for their own existence but also for their food and reproduction. In this struggle only those animals which are strong and well protected survive and the others die. Their death can, however, be avoided only if they succeed in hiding themselves from their enemies.

We shall now describe some of those animals which live on our rocky shores. First of all we come across the sessile barnacles like *Balanus* firmly attached to the rocks in the form of small pyramids. They constitute a definite *Balanus* zone near the high-water mark. The common limpet, *Patella* may also be seen browsing on the sea weeds found in this area. Then there are the *Chitons* with their shells divided into eight pieces. Near the low-water mark the rocks are found covered over with a carpet of sponges of the various colours, colonial sea squirts like *Botryllus* and sea mats like *Membranipora*. We may also get here the various types of bivalves like the oysters, *Mytilus* and *Pecten* etc. whereas the oyster is permanently attached to the rocks by means of its shell, *Mytilus* and *Pecten* make use of their tough

fibres constituting the 'byssus' to secure themselves.

Some other animals become exposed as soon as we start turning over the loose stones lying on the sea shore.

Just near the high-water mark, we get a number of small crustaceans like *Gammarus* and insects like beetles. As we go down the sea shore, we get *Lineus* and some other nemertines. These worms are sometimes so long that it becomes impossible to take out a complete specimen without breaking them. We may also come across small techni-coloured flatworms, moving slowly on the surface of the stones. Then there are the various types of bristle worms and as we reach the low-water mark, we also get specimens of *Nereis* which are generally used as a bait. There is another common worm *Polynoe* which is not only broad but also flattened. It is also provided with two rows of very large scales on its dorsal side, enclosing a space between them and the body wall which serves as a respiratory chamber. From amongst the crustaceans, the crabs are so common that you will get one variety or the other whenever you turn over any stone. The most characteristic of these is the hermit-crab which lives inside the empty shell of a gastropod and on that may occasionally be found attached either a small sea anemone or a sponge. Such an association of animals belonging to widely different groups is known as commensalism. In this type of association the sea anemone or the sponge provides protection to the hermit-crab and in return gets food by going from one place to the other riding on the swift moving hermit-crab. Starfishes and sea-urchins are also quite common near the low-water mark. Where the

former have five arms radiating from the central disc, the latter are globular and covered over with long and thick spines. Another unique feature of both of these echinoderms is the possession of a water vascular system which is so useful in locomotion. Some of the small fishes are also found hiding underneath the stones on the sea shore. Once, while looking for animals on the rocky shore near Dwaraka, we could collect even an eel in a similar situation. But it was really in a very ferocious mood when we located it underneath a stone and we had to do quite a good bit of manoeuvring before we could get at it.

Then in the holes and creeks of rocks are also available the various kinds of worms, crustaceans and echinoderms like the Holothurians. Some of the rock burrowing molluscs like *Lithophaga* strydomi which may be lurking here and there in search of fish or crustaceans on which it may dart without giving them any notice whatever. Another interesting feature about octopus is it can evade its enemies by making the water turbid with the ink which it gives out from its ink-sac while fleeing swiftly.

The most fascinating spot on the sea shore for a zoologist is, however, a typical rock pool. The various types of sponges, hydroids, sea-mats and sea-squirts cover its sides. But among them the sea-anemones become all the more prominent because they just look like flowers with their rich and beautiful colours. Then there are the sea-slugs with their backs covered over with soft and grey projections, the sea-lemon, *Doris* and the prawns of various kinds.

In contrast to a rocky shore, the sandy shore has an entirely different type of fauna. On such a shore all the encrusting animals are quite conspicuous

by their absence because they do not find here any hard structures to attach themselves. As most of the animals on a sandy shore have to spend a good deal of their time under sand, they are very efficient in burrowing. For example *Cardium* can not only move about but also burrow by means of its wedge shaped foot which it can protrude through the opening in between the two halves of its shell. In some of the burrowing molluscs, the shell is ridged so that they may have a better grip on sand. The razor-fish, *Solen* may also be dug out occasionally at the time of low tide. The two halves of the shell in this mollusc form a cylinder which is open at both ends. Whereas the lower opening is for the protrusion of the foot, the siphons come out of the upper one. Besides the molluscs, there are a number of worms found buried in the sand with only their tentacles exposed. Of these, the Terebellids can be easily made out on account of their sandy tubes.

Amphitrite is another important member of the fauna available on the sandy shore and so is *Arenicola* which can be easily recognised by its peculiar castings just like those of the earthworm on land. Quite near these castings one can also notice a small depression at the base of which is situated the head of the animal, its burrow being U-shaped. Another animal found on a sandy shore and which may be easily mistaken for a worm is *Synapta*. This is, however, an echinoderm and is related to the sea-cucumbers. Similarly, the cake-urchin, *Clypeaster* may also be occasionally dug out of the sand.

We also get here a number of crustaceans like the shrimps which can often be missed on account of their sandy colour. Besides them we have the various types of sea anemones which lie buried in sand with only their mouths and tentacles

exposed. Some of the fishes can also be encountered in the shallow waters of the sandy shores. Occasionally they may be stranded in small pools on the sea beach. Similarly, some of the jelly-fishes and Siphonophores like *Physalia* or the Portuguese Man-of-War and some sea-snakes are also left stranded on our sandy shores.

On a muddy shore also the burrowing forms are as abundant as they are on a sandy shore. They may be bivalved molluscs or worms of the various types especially those found in the tubes. Of these, *Sabella* is provided with a rubber-like tube which, on the other hand, is quite thick and gelatinous in *Myxicola*. Then there are several varieties of sea anemones and crabs. Some of the air breathing fishes like *Periophthalmus* and *Boleophthalmus* may also be encountered on our muddy shores. It is, however, very risky to collect these animals because one may often sink knee deep while hunting after them in mud. Another group of animals which is equally well represented on a muddy as well as a sandy shore is that of Gephyreans. They include the Echiurids and Sipunculids. The Echiurids have a ribbon-like proboscis which is richly ciliated and glandular. The cilia help this animal in bringing towards its mouth minute microscopic organisms which are then glued together by the secretions of the glands. The forms which are commonly met with in our littoral zone belong to the genera *lkedosoma*, *Ochetostoma* and *Anelassorhynchus*.

The Sipunculids are characterised by the possession of a peculiar organ called the 'introvert' which can be withdrawn when not in use. Another feature of this animal is the shifting of the anus towards the anterior end with the result that the antero-posterior axis is shortened.

This brief survey of the animals in our littoral zone will not be complete if I do not make any mention of the coral reefs and islands. They are formed mainly by the stony or Madreporarian corals which are also coelenterates just like the sea anemones. The only difference is that they secrete around and underneath themselves a thick skeleton of calcium carbonate. The corals may be solitary but most of them are colonial, each colony comprising a large number of individuals, their skeletons being fused together to form a very big stony structure. The corals which are generally displayed in our museums are only these skeletal remains which during life are covered over by the living tissues of the animal with the feeding polyps opening and closing rhythmically. There are also a number of corals which are just hydroids differing from them only in having a thick and calcareous skeleton. *Millepora* which is one such coral possesses two types of polyps—one devoid of a mouth but with batteries of stinging cells used for capturing the prey and the other with mouth for swallowing and digesting it. *Tubipora* or the organ pipe coral is another important constituent of the coral reefs. It is, however, a false or Alcyonarian coral in which the skeleton is in the form of a large number of small tubes running parallel to one another. They are deep red in colour and are united by horizontal platforms. During life the green tentacles of the polyps can be seen projecting out from the free ends of these tubes. Only the upper portion of this coral is provided with living tissues, the lower being abandoned with the gradual growth of the colony. The latter, therefore, becomes a wonderful abode for a large variety of animals. The Bonellids, for example, with a bifid proboscis are usually found in some of these coral rocks. The males of

Bonellids are minute worm-like creatures showing no resemblance whatever to the female which, however, is quite big. The former lives like a parasite inside the nephridia or the uterus of the latter drawing its full nourishment from the host. The sex in this case is supposed to be determined by the environment, because the embryo grows into a female if it is allowed to develop independently. But if during development it comes in contact with a female, it grows into a male.

It will, thus, be seen that in the littoral zone of the sea shore one can find a great variety of animals, ranging from the minute unicellular protozoa right up to the most highly evolved mammals like the dolphins and porpoises which are sometimes left stranded there. Similarly, the penguins, seals and walruses visit the coasts during their breeding season. Even the sea turtles are known to lay their eggs in sand on the sea shore.