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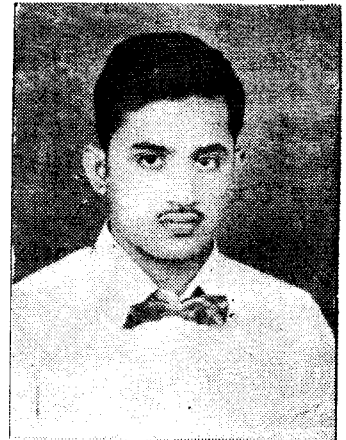


Sponges-

A GROUP OF COMMERCIALY IMPORTANT ANIMALS

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Sponges are supposed to have evolved more than 600 million years ago, in the precambrian period. They are regarded as an evolutionary blind alley. Biologists believe them to be the most primitive of the many celled animals. They do not have tissues, or organs. Their cells have a large degree of independence. All sponges are attached to the substrate. They display little detectable movement. Technically speaking, they can be defined as "metazoans without organs, mouth or nervous tissue and with a body permeated by pores and cavities some of which are lined with flagellated collar cells". Although the mists of time have made the origin of sponges uncertain, most zoologists think that sponges diverged early from the main line of evolution and have given rise to other groups of animals.

About 2,000 years ago Aristotle thought sponges to be animals. But even in comparatively recent times many competent zoologists thought them to be plants. This 'plant theory' was

shattered by James Clark in 1860. He discovered that sponges have flagellated collar cells closely resembling a well known group of protozoans.

Sponges act like animated filters, feeding on the great variety of microscopic fauna and flora as well as on the fine bits of detritus that usually occur in the waters surrounding them. Most of the sponges are marine except one family which occurs in fresh water. During the last century the simplicity and primitiveness of sponges stimulated much research to solve the many riddles in biology. Now by means of the electron microscope, biologists are gathering data on their cell behaviour. The comparative independence of their cells makes sponges ideal material for studies of cells. The colour of sponges vary from light greyish yellow though a considerable range of browns to black. Shape also varies with the species, age and habitat. The habitat of fresh water sponges is restricted but in the oceans sponges live both near shore and at very great depths of over a mile or more. Water is constantly

taken into the sponge body through minute pores called ostia for gathering food and oxygen. After passing through the body wall it gets into the sac like body cavity and then it goes out of the body through a larger opening called the 'Osculum'.

One of the important characteristics of sponges for both the biologists and the animal itself are the numerous interlocking spicules or crystalline rods made of calcium carbonate or of a silicon compound secreted by a special group of cells. Spicules form the delicate internal skeleton of the animals. The infinite variety of sizes, shapes and combinations of spicules provide an important taxonomic characteristic for Zoologists to distinguish one species of sponge from another. These calcareous and silicious spicules of sponges, together with their disagreeable odour and poisonous chemicals make them unsuitable food for a number of predators. Even then certain species of sea-slugs (Nudibranchs) feed on them. The many cavities in the body of large sponges provide shelter and sometimes food for many types of small crustaceans, worms, echinoderms and molluscs. One genus of crab (Dromia) cuts and places a small piece of sponge on its back and holds it in place with its legs while it moves about. Gradually the sponge grows over it and covers its back. This forms a good disguise for the crab. Members of the clonid family of sponges bore into the interior of molluscan shells and cause destruction to oysters.

Since sponges are sedentary animals and cannot move about, they produce motile larvae to enhance their

distribution over a wide area. Almost all the sponges are hermaphrodites with eggs and sperms developing at different times in the same organism. The eggs are fertilized inside the sponge and grow there into minute larvae that finally go through the 'osculum' into the surrounding water. After a varying period of planktonic life they settle and become fixed on a hard substrate, metamorphose and grow into adults.

Sponges have great powers of regeneration. The most remarkable discovery ever made about sponges was that of H. V. Wilson in 1907. He found that the common scarlet *Microciona* sponge can be squeezed alive through fine silk bolting cloth. Many of the cells are killed by this treatment, but those that survive will creep together and organise themselves into little sponges if allowed to settle in a dish of sea water. Recent experiments have shown that it is even possible to induce cells from two different species of sponges to unite into a single individual. How does a cell know the species to which it belongs? What makes it 'forget' its species identity here? These questions can be solved only by molecular biologists.

Sponges have been articles of commerce from very ancient times. Sponge diving is one of the oldest of occupations and, despite competition from plastics, is still an active business. There was an extensive and profitable sponge trade several centuries before the Christian era and the sponge fishery was a recognised industry. It was mentioned in early Greek literature. Upto 1841 the world's sponge supply was derived

solely from the Mediteranean sea. From 1841 onwards sponge merchants started to exploit the sponges around the Bahama islands. Now the sponge production in the world is contributed by United States, Cuba, Bahamas, Greece, Turkey, Egypt, Syria, Lebanon, Libya, Italy, Tunisia, Philippines, Japan and the Far Eastern islands like Marshall and Caroline. Sponges are thriving at certain places along the east and west coast of India. As in the case of many other valuable marine resources, sponges also do not receive much attention as an exploitable resource.

Sponges of commerce are only the skeletons or supporting framework from which the soft fleshy matter of the living animal has been removed. This skeleton consists of fibres of a material called spongin. Spongin is an albuminoid related to conchiolin, found in the shells of molluscs and fibroin and sericin, the principal constituents of silk. It also contains Iodine, Bromine, other organic acids, Silica and Potash. It is upon the physical properties of sponges and the way in which the fibres are disposed that the economic value of sponges depends. The network formed by the fibres is composed of small, close meshes. The qualities which affect the commercial value of sponges are their colour, size, shape, softness, fineness, durability, resiliency and absorptiveness.

For surgical and toilet purposes small ones are preferred. For bath, medium sizes and for cleaning, larger

ones which can hold considerable quantities of water are desired. Sponges upto 20 cms. in diameter are used entire. They are known as 'Forms'. Larger ones, irregular and torn sponges are usually cut into pieces called 'cuts'. Valuable commercial sponges are regular, massive and free from protruding processes or 'Fingers'. They are spherical, cake-shaped or conical. Resiliency is the property of sponges which causes them to recoil after being pressed. It depends on the size, arrangement of the fibres and also on the method of curing. Sponges which rapidly regain their original shape after compression are more useful. Absorptiveness is the ability to absorb and retain a large volume of water. It is the fundamental quality which determines the usefulness of a sponge. The water is mainly held by the capillary action of the sponge skeleton.

The form and general structure of sponges are influenced by the environment in which they grow. Turkey cup or solid, Turkey toilet, Zimocca, Elephant ear, Hony Comb, Sheepswool, Velvet, Yellow, Grass, Glove, Reef, Hardhead and Wire are some of the common names of commercial sponges. Sponges are collected from the sea by wading in the coastal areas, nude diving, hooking, harpooning, dredging or trawling.

Fresh sponges are covered with a 'Skin' or membrane and a large part of their interior is filled with a soft, pulpy, fleshy substance. These are removed