

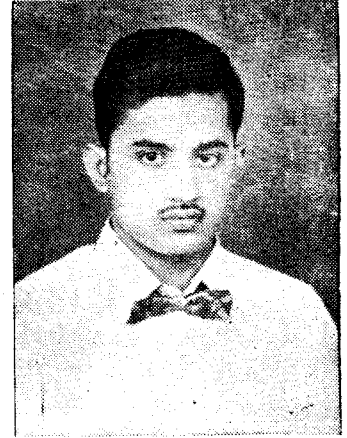
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Sea Cucumbers



P. G. JACOB

Central Marine Fisheries Research Institute, Cochin-11

Sea cucumbers or Holothuroideans are a class of marine animals belonging to the spiny skinned Phylum Echinodermata of the animal kingdom. Sea stars, sea urchins, brittle stars and sea lillies are some other classes of this Phylum. They have been known from ancient times. Over 2000 years ago, Aristotle himself has described the beautifully precise and complex jaw apparatus of sea urchins. Echinoderms are closely related to chordata to which group man also belongs. In fact the two phyla are believed to have developed from a common ancestral Echinoderm super phylum. All Echinoderms are marine. Biologically speaking, few animal phyla can match the Echinodermata in the variety and extent of the challenging problems presented by its members. Palaeontologists, comparative anatomists, embryologists—all are fascinated by them. Their evolutionary origin and most of the functions of their components are even now a matter of controversy. Their structure, development and physiology are peculiar and they seem to have little in common with other

groups of animals. There are about 26,000 species of echinoderms, most of which are extinct now. Only about 6,000 living species are there at present. They are exclusively marine and are found from tide lines to great depths.

Echinoderms, as a group, have little economic importance. The spines of sea urchins were once used to write on school slates. Preserved or dried and painted starfishes, sea urchins, brittle stars, sea lillies and sea cucumbers are used as fancy articles. The outer 'Shell' of some of the spherical sea urchins after removing the spines and inner fleshy matter are thoroughly cleaned and painted. They are used as ash trays. A common sea urchine called *Arbacia* has become a standard laboratory animal for the cell physiologists. The eggs of sea urchins and starfishes are favorite experimental material for embryologists. Sea urchin's eggs are also edible.

Sea cucumbers are commercially the most important echinoderms. There are about 500 species of sea cucumbers.

They are found strewn on and buried slightly below the bottom of shallow seas. At first glance they seem to have little resemblance to other echinoderms like sea urchins or brittle stars. But basically they all have the same five part (pentamerous) arrangement. A typical holothurian resembles a big black or dark brown cucumber slowly crawling along the bottom or adhering to the side of a wharf pile. Surrounding the mouth there are a circular set of tentacles. The tentacles are covered with a sticky mucoid material to which living and nonliving particles adhere. When a tentacle is covered with material it is put into the mouth and whatever has stuck to it is scrapped off. Food consists entirely of microscopic plants, animals and decaying organic matter. They are collected by waving the tentacles slowly and sweeping through the water, or along the surface of sand or mud substratum. Like earth worms, sea cucumbers also burrow and eat bottom sand and digest nutritive material contained in it. They are the only really successful-burrowing forms among the echinoderms. This living habit probably might have been brought about by their armless condition, sausage shaped body and muscular body wall with small widely separated calcium carbonate skeletal elements. In other echinoderms, these calcium carbonate ossicles are more numerous and closer together which result in the formation of a more or less rigid skeleton.

Sea cucumbers are relatively insensitive to light. But their sense of touch is well developed. When attacked by an enemy like a lobster or fish most of the sea cucumbers throw out their intestine, respiratory organs, tentacles, muscles and even the reproductive

structures. This process is called evisceration and is a defensive adaptation. All the eviscerated structures are later regenerated from the torn stumps which remain in the empty body cavity. Rate of locomotion of sea cucumbers is very slow. Maximum speed is about one meter per 15 minutes. They have been reported to remain motionless for over 2 years in captivity. Small varieties grow upto a few cm in length, medium ones upto 30-50 cm while certain giant Philippine varieties grow upto one meter in length and 21 cm in diameter. Sea cucumbers are observed to gain weight by slowly absorbing water when transferred to less saline water. Under normal conditions their muscles contain about 77% water. They are supposed to live upto 10 years. Some of the sea cucumbers are poisonous. Sometimes fishes are found to be affected by their poison. Sea cucumbers are distributed mainly in the tropical and temperate parts of the oceans.

In some places of the Indo-Pacific, sea cucumbers are eaten raw. 'Trepang' which consists of the sun-dried body walls of several species belonging to *Holothuria*, *Stichopus* and *Thelendia* groups of the sea cucumber class is relished by the Chinese. "It is employed", says Forbes, "in the preparation of nutritious soups, in common with an esculent sea-weed, sharks fins, edible birds nets.....affording much jelly". Sea cucumbers may also come to the table as "*Beche-de-Mer*". This is cured holothurian and is considered a delicacy in some of the south east Asian countries. *Beche-de-Mer* preparation is an ancient industry and it was introduced to India by the Chinese. In addition to India its preparation is carried out in Japan, Australia, Caroline and Mariana Islands, New Guinea, New

Caledonia, Samoa, Tahiti, Hawaii, Indo-China, Somalia, Kenya, Zanzibar, Madagascar and Mauritius.

In India, this industry is confined to the south-east coast, along the Palk Bay and Gulf of Mannar. Annually about 30,000 kg of *Beche-de-Mer* is produced here. All of this is exported to far eastern countries like Singapore, Hong-Kong and Penang.

In the Gulf of Mannar and Palk Bay they are found along the shallow sea beds of 1.5 to 6 meters depth. Sea cucumbers are commonly known as "Kadal attai" in Tamil Nadu. Although

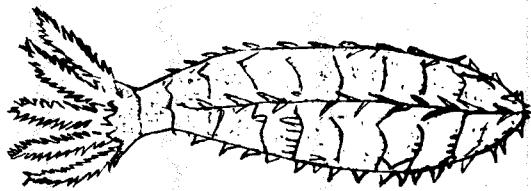


FIG. 1. *Sea-Cucumber*

2 species of sea cucumbers are found along the Rameswaram coasts, only *Holothuria scabra* or "Vellai attai" is found in abundance. Most of the commercial product is made from this species. *Holothuria atra* (Black fish) is the less common species.

There was a period of decline for this industry after 1910 because of the carelessness of the merchants in properly curing the product. From 1965 the industry has revived. *H. scabra* grows to 35cm in length and it weighs over 500 gm in fresh condition. Fishing starts in February and lasts till October. Peak season is April - August. During

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lowtide they can be either picked up by hand or small scoop-nets tied to the end of a bamboopole. Trawl nets are used in Australia and Philipines. Collection of the animals in the Rameswaram area is stopped with the onset of the north-east monsoon because of the turbulent sea which results in poor visibility for the divers. Tirupalakudi of Palk Bay is the most important sea cucumber collection centre. During peak periods about 30,000 holothurians are collected daily at this centre. Fresh specimens depending on the size are sold at 4-6 paise. On processing they reduce to half in size and the weight decreases to 1/7th of the original.

Sea cucumbers are first heated slightly. Then they throw out their internal organs. After washing they are heated strongly in a vessel. During heating their bodies expel the body fluids. Cooking is continued for about one hour. Then they are buried in the sand on the beach and sea water is sprinkled over them to prevent drying up. Their outer skin is removed after about 18 hours, again cleaned by washing and boiled for a few minutes in sea water. Then they are dried in the sun. Smoking is also done towards the final stages of drying. When they are thoroughly dried the product is generally dark red in colour. *Beche-de-Mer* is highly nutritious. It contains about 22% moisture, 35-82% protien, 15-30% ash and traces of fat. The protien is easily digestible.

It is cut into slices and added to soups and stews. According to another recipe the dry product is washed clean and soaked in water for a few hours of

Then they are boiled for one hour and salt and spices are also added. The resulting soup is believed to possess curative properties for whooping cough, bronchial inflation and other respiratory troubles. Several other excellent recipes for the preparation of *Beche-de-Mer* are contained in Gloria Bey Miller's "The Thousand Recipe Chinese Cook Book" published in 1966 by the Athanæum Press, U. S. A.

In addition to the South east coast, sea cucumbers occur in large numbers in the Gulf of Kutch and in the seas around Laccadives and Andamans. Large sized species of sea cucumbers like *Thelenota ananas*, *Holothuria marmorata* and *Actinopyga mauritiana* occur in the coral reefs and lagoons of the Laccadives and Andamans. The bottom regions of Kerala Coast in general, are muddy. This accounts for the variety of sea cucumbers in this area. With proper exploitation of the totally unexploited grounds of the Laccadives and Andamans, by the intensification of mechanised fishing in the Gulf of Mannar and Palk Bay, and by the transplantation of the larger and commercially important species from the Laccadives and the Andamans to the Gulf of Mannar and Palk Bay the annual production of *Beche-de-Mer* can be increased substantially. During 1969 *Beche-de-Mer* valued at about 5 lakhs of rupees was exported from India. This can be increased many times by devising methods for the artificial breeding of the commercially important sea cucumbers, adopting scientific and systematic manner of fishing, processing them under hygienic conditions and packing the commercial product attractively. ●