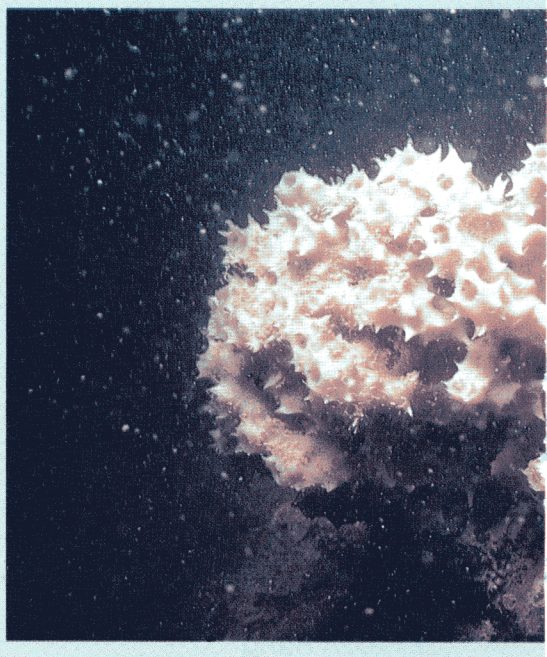
Marine Sponges

by Jeffrey K Y Low and L M Chou



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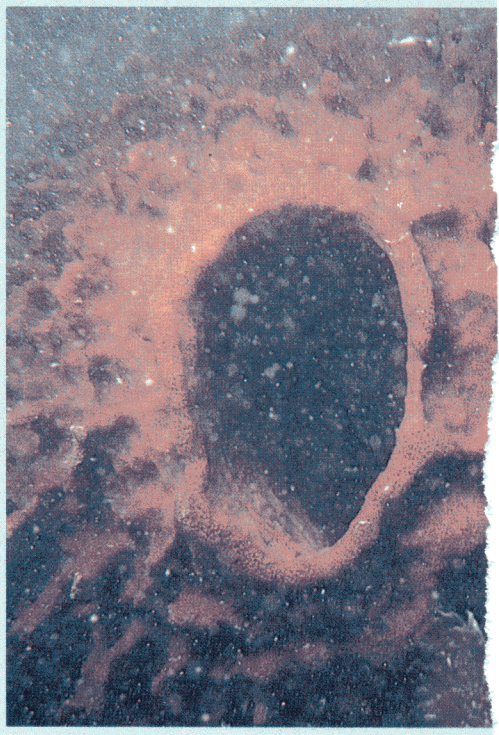

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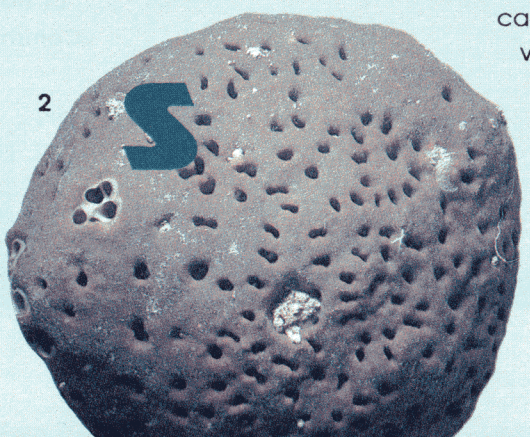
Many species of sponges occur on our reefs. They are in fact animals and are considered to have the lowest form of organisation at the multicellular level. The sponge represents an aggregation of cells, specialised for certain functions. These cells can be thought of as being organised around a series of water canals or chambers, through which a one-way flow of water is maintained, bringing with it nutrients and oxygen. The body wall is made of either spongin (a horny material), chalk or silica. Needle-like structures of silica or calcium called "spicules" are embedded in the body wall for additional support, which gives the sponge's surface a rough texture in many species. These spicules (and chemicals secreted by some sponges) can cause irritation when they come in contact with the human skin.

Sponges are sessile (attached to the substratum) and come in a myriad of shapes, sizes and colours - they may be encrusting, barrel-shaped, irregular, or tubular and may be brightly coloured or have deep dark colours. The simple sponges usually have a tubular structure, which encloses a single chamber. Water flows into this chamber through small pores called "ostia". The water, after circulating through the sponge, then leaves via a larger opening called the "osculum". The larger sponges usually consist of a complex network of inter-connected chambers. The water movement is caused by special cells which line these chambers. These cells have a single hair-like structure, whose whipping motion moves the water through the sponge. In addition they filter the water for food particles. They can be onsidered highly efficient "vacuum cleaners".



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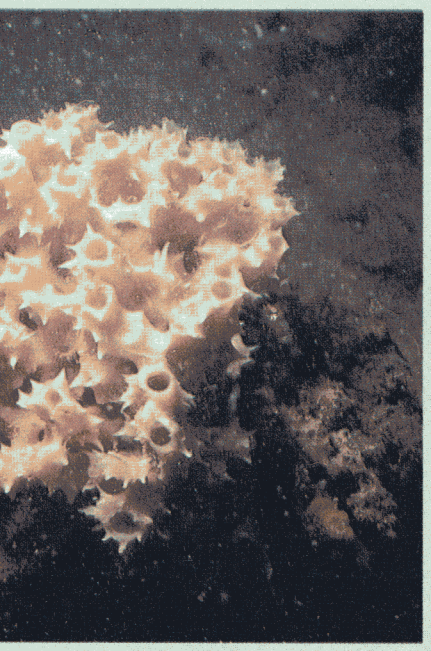

1. ***Dysidea*** *sp., one of the "spiny" sponges.*
2. ***Suberities*** *sp., common on our reef flats.*
3. ***Petrosia*** *sp., or Neptune's cup, common on the lower part of the reef slope.*
4. ***Adocia*** *sp. The numerous chambers can be seen through the osculum.*
5. ***Ianthella*** *sp. A branching sponge.*

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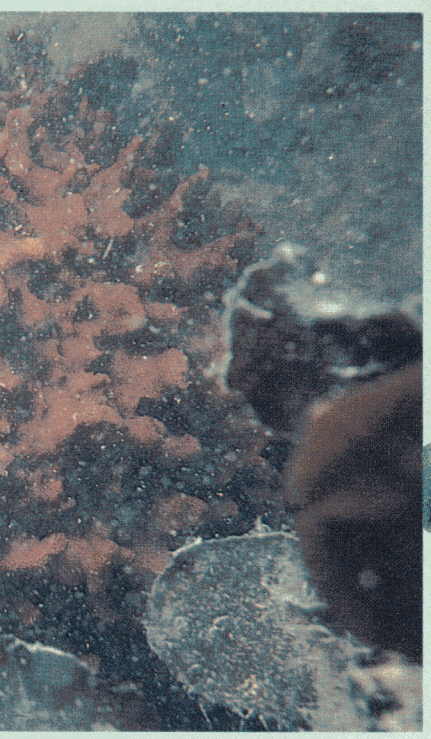

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Sponges can reproduce either sexually or asexually. Asexual reproduction is effected by budding, or more commonly, by the release of packets of cells which are resistant to adverse conditions. Being hermaphroditic, sponges are able to produce both sperm and eggs, but do so only at different times. Sperm is released through the osculum, to drift in the current until they reach another sponge of the same species. They are then ingested by the cells of the sponge but instead of being digested, are brought in contact with the eggs to effect fertilization. The larvae thus produced is free-living for a short period of time before settling down.

Sponges are relatively hardy animals, and even in our sediment-stressed waters, close to a 100 different species exist. They can be found on the reef flat and slope, and sometimes on the sea floor. Sponges are also capable of remarkable feats of regeneration. Even if a sponge is broken up, and the cells sieved through a fine mesh, cell aggregates are capable of forming new colonies. This has prompted many commercial sponge collectors to "sow" the collecting grounds with cuttings of valuable sponges for collection when they mature. Besides the commercial value of sponges (which is now overtaken by synthetic products), there has been, in recent years, research into the anti-cancer properties of some chemicals produced by some sponges. The hunt for these "bioactive" chemicals has even brought researchers to our waters. Who knows? In years to come, thousands who suffer the agony of cancer may be giving thanks to this lowly lifeform.