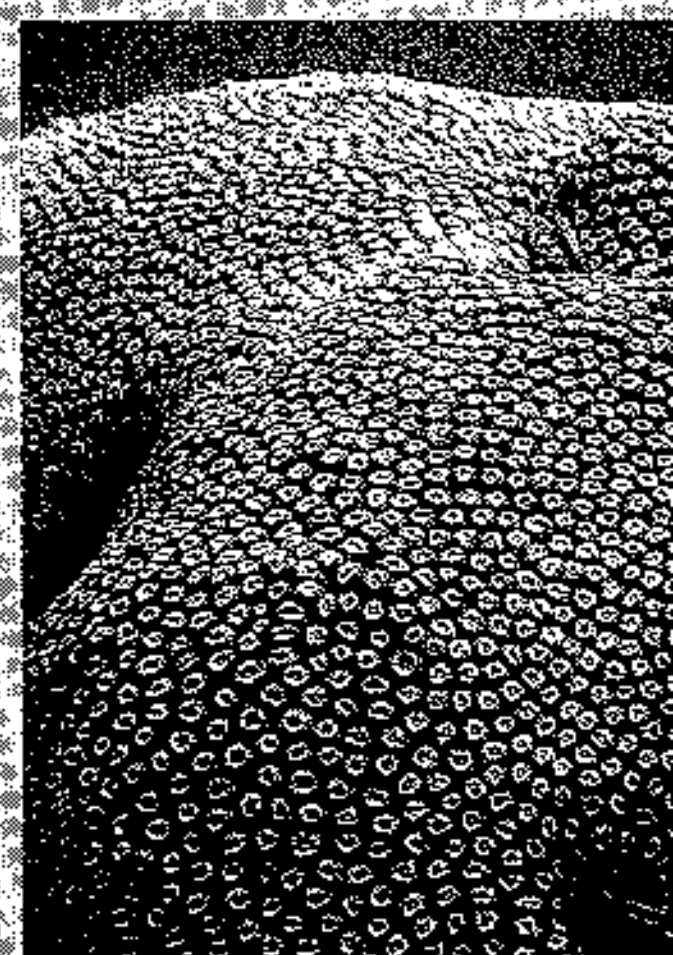


Partnership



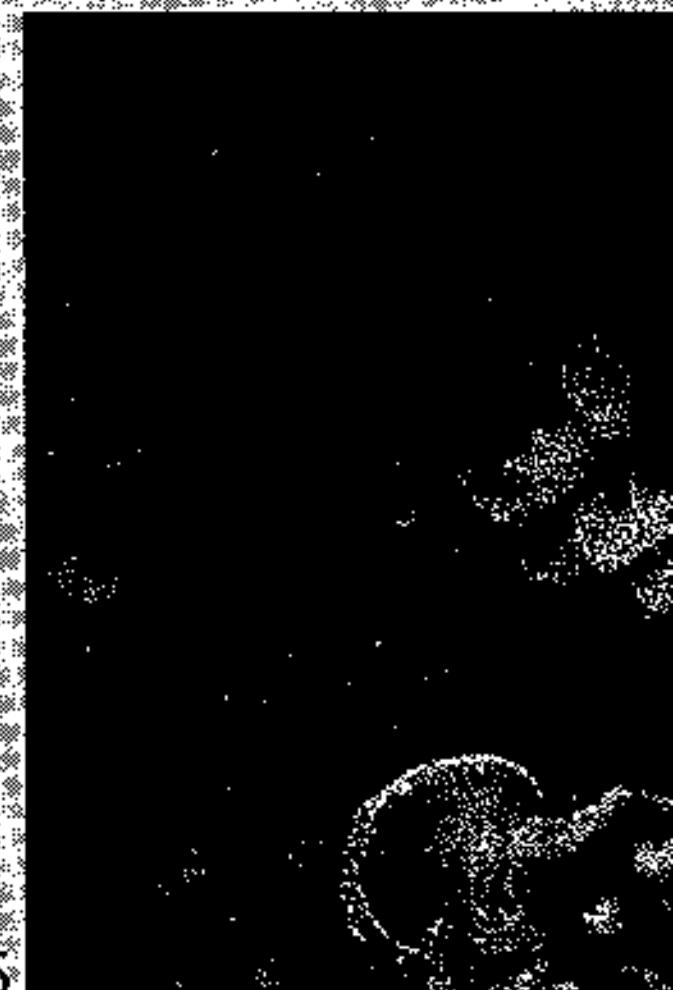
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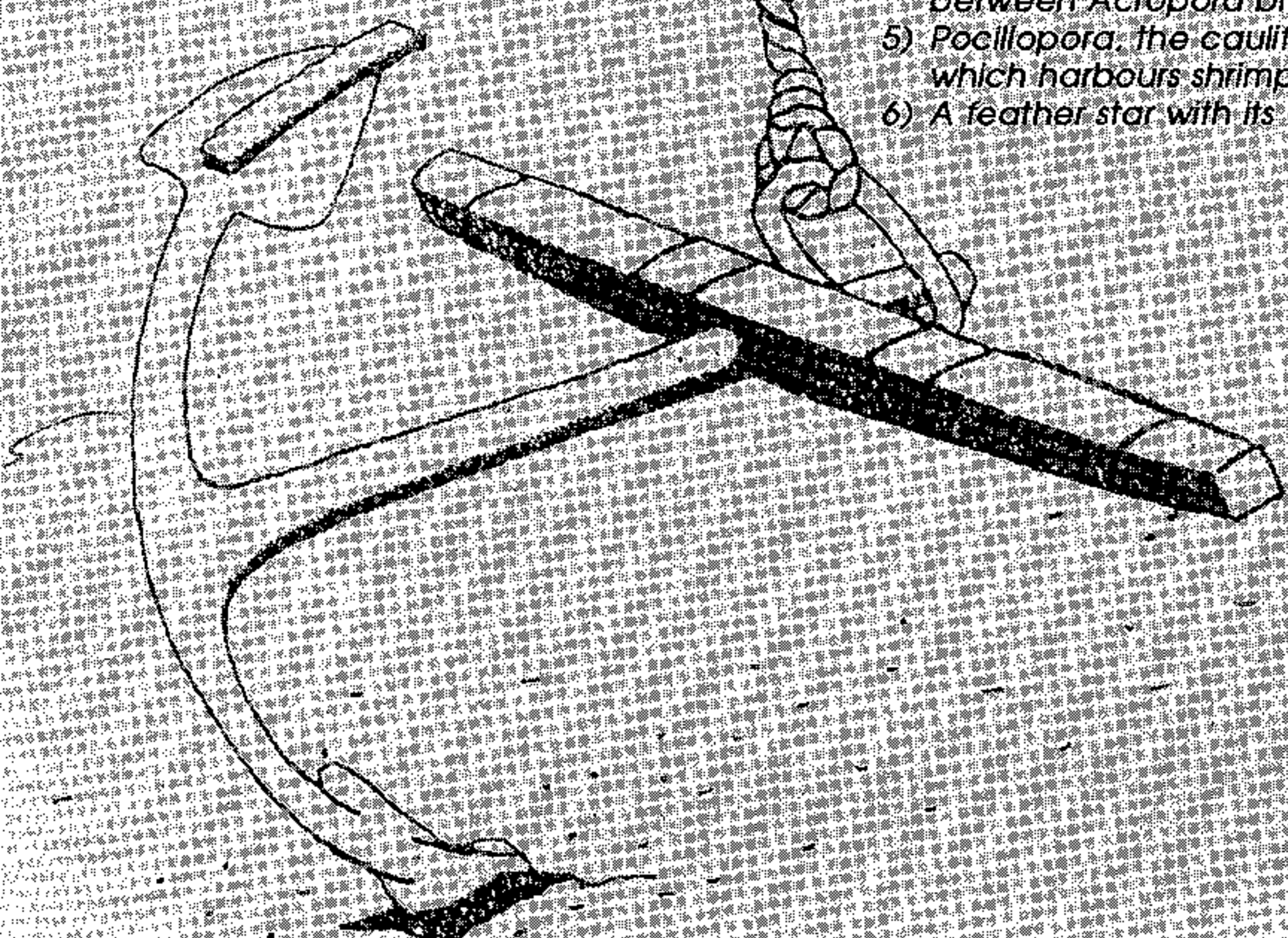
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- 1) A clown fish tenant in its sea anemone host.
- 2) Reef building coral and its massive skeleton, built over many centuries with the aid of the resident zooxanthellae.
- 3) The crab, *Tetralia* sitting on a branch of the table coral, *Acropora* on which it lives for life.
- 4) A pair of gobies often found between *Acropora* branches.
- 5) *Pocillopora*, the cauliflower coral which harbours shrimp symbionts.
- 6) A feather star with its crab resident.

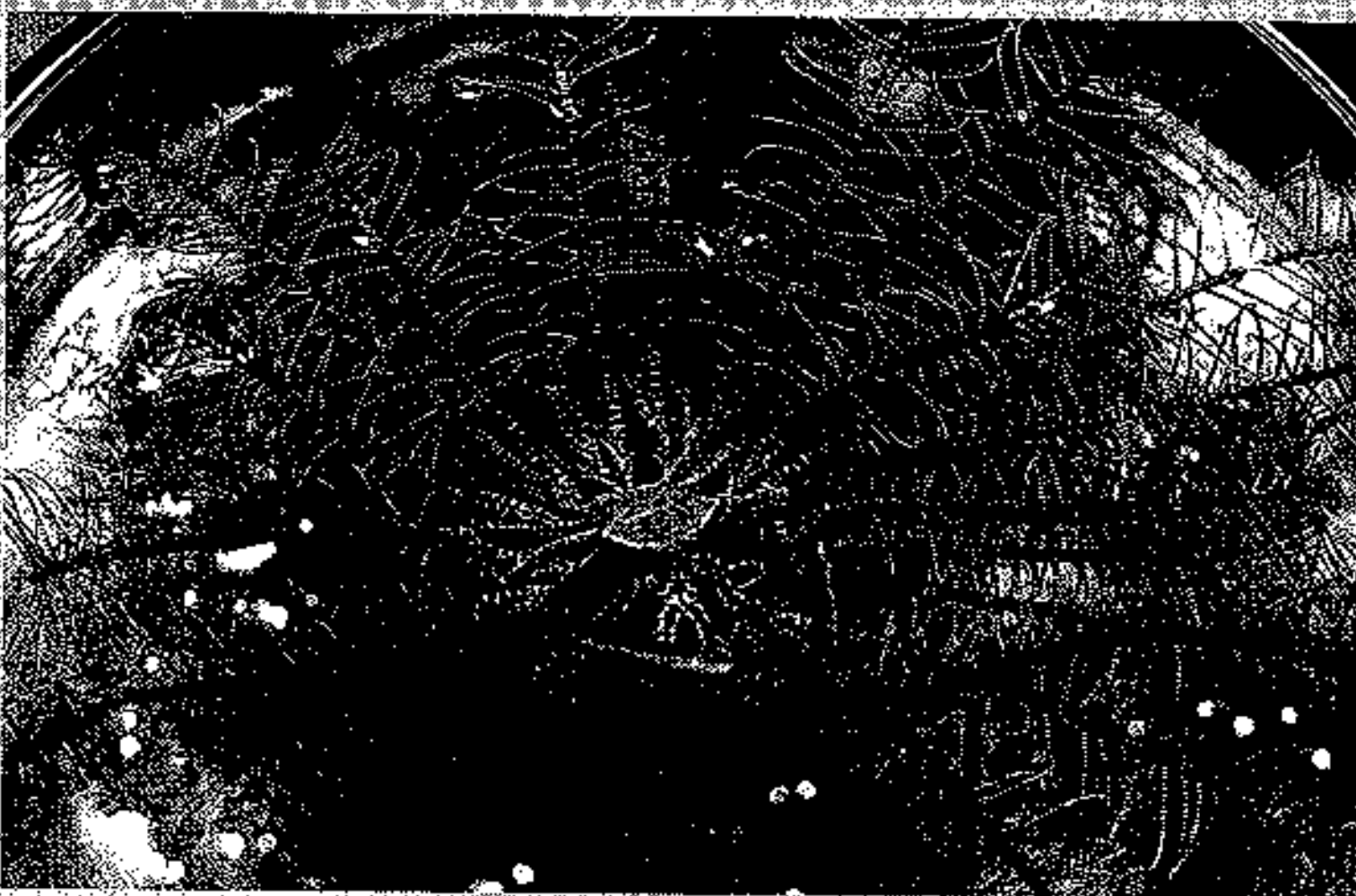
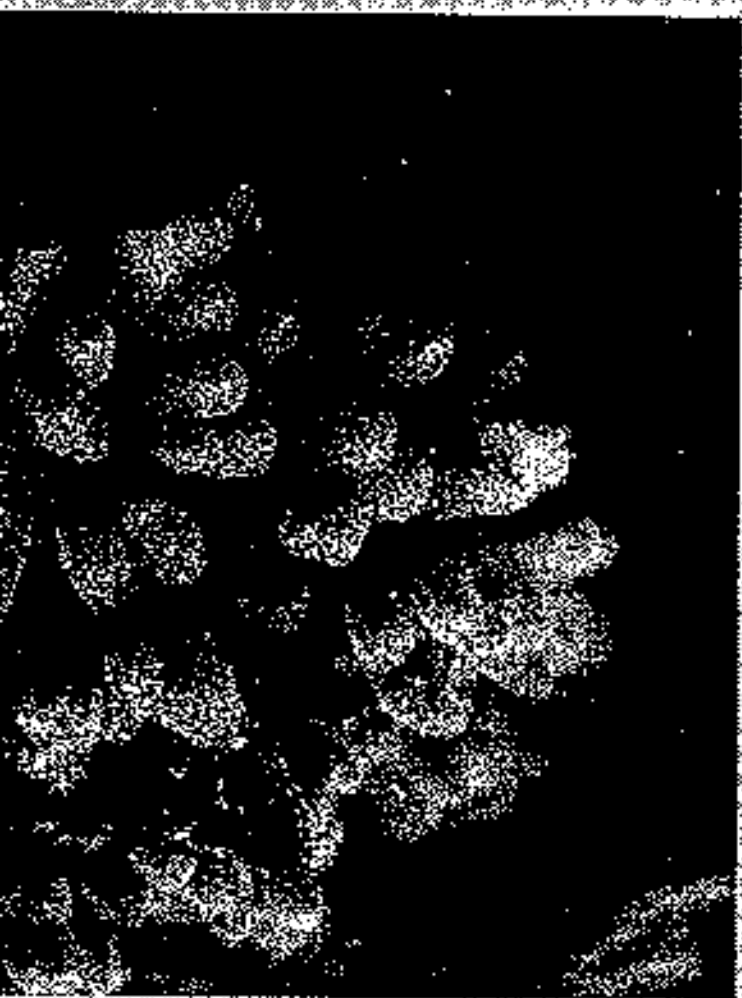
"Symbiosis" is a phenomenon in nature where two organisms, plant or animal, live together in close association. Symbiotic relationships range from partnership in which both parties mutually benefit, to those in which only one partner gains and the other suffers substantial loss.

The coral reef is an environment where important resources like food and space are limited, and much sought after by various organisms. Over time, the reefs have nurtured many symbiotic relationships as plants and animals went into partnership to tap the limited resources as efficiently as possible.

Perhaps the most common example of symbiosis in coral reefs is that of sea anemones and the clown fish. Anemones are carnivorous animals and their tentacles harbour numerous tiny stinging cells, some of which are barbed and filled with toxins.



in Reefs



coral skeleton. That is why when sunlight is cut off from corals due to heavily sedimented or polluted water, the zooxanthellae are not able to photosynthesize, and reefs die. The reef building corals depend on their algal tenants in a life-and-death relationship, but the zooxanthellae are able to live individually apart from the corals. It is believed that the zooxanthellae evolved such a lifestyle to obtain protection within the body of corals, and coral reefs have been able to grow to such huge proportions supporting a wide variety of life because of this simple partnership.

Some corals, especially branching types, also harbour smaller organisms externally. These "tenants", usually small crabs, shrimps or fish live all their lives between the branches of their coral hosts and will not venture out into the open, even if their hosts are killed. Examples of such faithful tenants are the crab (*Tetralia*) and goby (*Gobiodon*) living on table *Acropora* corals, and pistol shrimp (*Alpheus*) found on the cauliflower corals.

Feather stars may also have crab and shrimp symbionts living between their arms, staying very close to their mouths. The coral and crinoid hosts offer both food and protection from predators to their tenants. But the benefit is also mutual as some of these tenants are extremely fierce and are known to chase away other animals preying upon their hosts. A pair of external symbionts are usually found on each host.

The coral reef is a fascinating world, complex and yet hanging in perfect balance. Symbiosis, where animals depend on one another for survival, is just one way in which this ecosystem has managed to maintain its diversity and productivity.

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These stinging cells are readily triggered to paralyse and catch food - anything from the smallest zoo plankton to large fish. Clown fishes, however, seem to have developed an immunity to the stings of anemones, by secreting certain chemicals from their skins. They are often seen flitting about amongst the tentacles of the anemones, their body colours clashing wildly with that of the anemones. The colours of the clown fish attract other carnivorous organisms to their anemones hosts, and these animals are unwittingly caught and fed on by both the anemones and their clown fish tenants.

Another interesting symbiotic relationship is that of the wrasse, *Labroides* and other fish. Commonly called "cleaner wrasses" because of the nature of their behaviour, these specialised fish maintain "cleaning stations" on the reef where other fish

frequently visit to have their bodies vacuumed. The wrasses keep a specific diet of parasites and other fouling organisms that seem to have the knack of settling on the bodies of marine fish. In this way, the cleaner wrasses are ensured a steady diet of good food and the other fish have clean, healthy bodies. The next time you scuba dive, keep an eye out for these cleaner wrasses at their cleaning stations - the coral reef's own version of private manicurists.

Corals themselves act as hosts of various symbionts which live both within the bodies of the corals as well as externally. Reef building corals harbour unicellular algae called "zooxanthellae" within their tissues in a lifelong partnership. It is this algae that photosynthesize, using sunlight energy, manufacturing food which they share with the corals. More importantly, the algae play an essential role in the growth of the