Dendronephthya sp.

Stylophora pistillata

Euphyllia ancona

Seriatopora hystrix

Goniastrea australensis

Sarcophyton sp

Gorgonian crab

Dendronephya close-up

Walt's Coral Masterclass

WALT DEAS

Legendary diver and respected cinematographer Walt Deas is a regular contributor to SCOTTISH DIVER. The emigre Scot is now in his 70s and based in Australia. He continues to film and write on numerous underwater themes. In this feature Walt looks at corals and explains how they are formed

DIVERS TRAVEL and enjoy ..... coral sand the colour of light brown cereal, sun splashed beaches, swaying palm trees, turquoise water under bright blue skies, cool green leafy forests behind the beaches. However it is the coral reefs in these locations that are the main attraction.

With scuba gear, slip down through the pellucid waters, and you enter a domain of symmetry and wonder that is like no other of sea and land. A palletteful of fishes, towering archways, colonnades, boulders, and prongs of coral encircle you. Groves of staghorn coral reach up towards the glinting surface. Convoluted domes of brian coral stud the reef slopes. Orange and yellow hued gorgonian fans undulate in the deeper currents.

In the coral reef, where nourishment and shelter are plentiful, living creatures of many colours, compositions and sizes thrive. From the tiny organisms - plankton, on which the reef obtains nourishment, to the large reef-dwellers like the manta ray and shark.

Geographic distribution of corals depends upon the temperature of the water in which they live. Temperatures most favourable to vigorous growth, range from 23° C (75° F) to 29° C (85°F) and this limits most reefs to the subtropics and tropical zones.

There are basically four types of reefs.

o *Fringing reefs:* Commonly found around elevated tropical islands.

o *Platform reefs:* Large raised areas of reef often found in shallow seas.

o *Barrier reefs:* These are generally developed around continental land masses. The Great Barrier off the East Coast of Australia the best known.

o *Coral Atolls:* One associates these with tropical islands in the Pacific and the Maldives in the Indian Ocean.

Coral reefs are among some of the richest and most complex ecosystems in the world. Although coral was often mistaken for a rock or a plant in earlier times, it is actually composed of tiny, fragile animal, called a coral polyp.

In 1723 naturalist Jean Andre Peyssonel proposed to the French Academy of Science that corals were animals. His view was derided and he eventually abandoned his scientific work. Since, then he has been proven right. Study has shown that there are two distinct types of animals - reef-building corals and non reef-building corals.

The world's oldest coral reef is said to be 530 million years old and can be found in South Australia. In localities in Derbyshire and South West England outcrops of ancient reef can be found showing that these areas were much warmer than they are today.

The stony corals, Scleratinia, belong to the large and varied phylum of coelenterates that are simple multicellular animals; these include sea anemones, jellyfish and hydroids. These animals have tentacles with stinging cells and a single opening in the body through which food and wastes pass.

Coral colonies secret a hard skeleton of limestone, (calcium carbonate) that protects the coral polyp. Each polyp lives in a skeletal cup called a calyx. It can 'hide' in this when threatened or when inactive. As the colony grows, new skeletal material is formed on top of the old.

Reef formation itself occurs through the breakdown of coral by the action of waves, boring and scraping animals. Fragmented coral and sand are compacted into a rock base, which comprises 90%-98% of the reef.

Walt's Coral Masterclass

The living corals form only a thin veneer over the dead coral. The architects of the industrious living community are small animals that construct their cup-shaped calyxes on top of their departed ancestors forming living sculptures. One or several rows of tentacles surround each opening in multiples of six.

The reef is and was built by infinite ratios of animals climbing towards the sun. A stony alga helps to build the structure more firmly. Some corals grow into very large colonies, while others live a solitary existence such as the Fungias.

Corals have living within themselves small plant-like cells called zooxanthella, and since these organisms require light in order to live, reef corals are generally found in water depths of less than 30 metres (100 feet).

The hard coral's primary source of food comes from microscopic algae, zooxanthella in their tissues, which convert the sunlight into nutrients. This is called photosynthesis. Corals also feed on tiny planktonic animals using their tentacles to capture prey. These tentacles contain stinging cells called nematocysts that shoot out to capture the animal. Those that do not have tentacles use their body mucus to catch plankton and bacteria.

There are many species of coral, some very similar in appearance and form. Common varieties likely to be encountered on a dive are the Acroporas, commonly called staghorn. They are important reef building corals. Acropora is the largest genus of the reef building corals and extremely widespread. They can be fast growing (more than 10cm a year) and growth form varies from species to species in different habitats. Encrusting and branching forms may even be the same species. Colonies can be tiny clumps or up to 1.2 metres high and tabular forms can be 2 metres or more across.

Monitpora which is related is usually found growing as leafy plates and as an irregular encrusting form.

As you swim over a reef flat or a coral terrace you will come across brown and pink clusters of the bush coral, Pocillopora. Nearby a stubby clump of the purple coral, Stylophora. Small dense thickets of the needle coral, Seriatopora often have tiny female crabs living in a gall chamber.

Porites can be found as a micro-atoll on a reef flat, a branching form or as a massive spherical structure up to10 metres high and these can be at least 1,000 years old.

One coral that has its polyps extended during the day is the anemone coral Goniopora another is the dome shaped bubble coral, Euphyllia.

There are a number of corals called brian corals, rounded domes, although the genus can be flat and encrusting. These are Favia, Favities, Goniastrea, Platygyra, Leptoria, Oulophyllia and Monastrea.

Pavonia can be found in delicately sculptured forms or as massive colonies.

The majority of the genus Fungia commonly called mushroom corals are abundant and widespread. Common on the slopes of fringing reefs usually below the wave action. They are attached by a stalk to the substrate as juveniles, but, eventually become detached and live free usually on rubble substrates and are prevalent on the slopes of fringing reefs.

Soft corals and sea fans are the common name for species grouped under the scientific name Alcyonacea and do not build reefs. Their distinguishing characteristic is that their polyps have eight tentacles, and thus the name 'Octocorals'. Many can be found in warm and cold water environments in both shallow and deep locations. They are usually slow growers and lack the sold calcium carbonate skeleton. However some do contain a form of skeletal pieces called sclerites, often called spicules, which provide some support. These spicules can be used to identify the coral.

There are however, some that do not fit the soft coral term such the blue coral, Heliopora coerulea and the organ pipe coral, Tubipora musica. Blue coral has an internal sky-blue skeleton and the organ pipe coral has upright red-coloured calcium carbonate tubes joined together.

the heavenly Blue Angel

Coral reef and lagoon

Millepora, a Hydrozoan is an important coral in reef building. It can be distinguished from the stony (Scleractinian) corals by the tiny microscopic pores on its smooth surface and the lack of corallites and septa. Divers who come into contact with it will remember it, as its extended hair-like tentacles have a powerful and burning like sensation when brushed against. It earns the common names of stinging coral and fire coral.

The 'soft corals' are colonial growths, at times colourful and showing a tuber lobed or mushroom shape. The 'Sea Fans' or 'Gorgonians' form erect, branched or unbranched colonies. They have an axial skeleton of a horny material, which is covered by a softer sheath of tissue in which the polyps are imbeded. and are usually coloured, red, orange or yellow.

The above corals are only a fraction of the many species to be found throughout the world. Coral reefs abound, they vary in size, form and type, and all are extremely rich biologically. They are the marine equivalent of a tropical rainforest.

These reefs have, for centuries, been bountiful providers of food, and shells were a source of currency. Reefs have been exploited commercially for trochus shell, beche-de-mer and fish. Today the biggest impact on many reefs is over exploitation - seashells and coral collected to sell to tourists; overfishing, pollution from a variety of sources; dynamiting a reef to collect fish and the impact of tourism.

Tourism is often the major income earner to small nations and adds significantly to their economies. We, as divers should take care to protect the coral reefs. Good operating techniques are essential to avoid unnecessary damage. Take care and don't destroy the very resource that attracts the visitor. Take photographs - not coral.

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Jean and Walt Deas