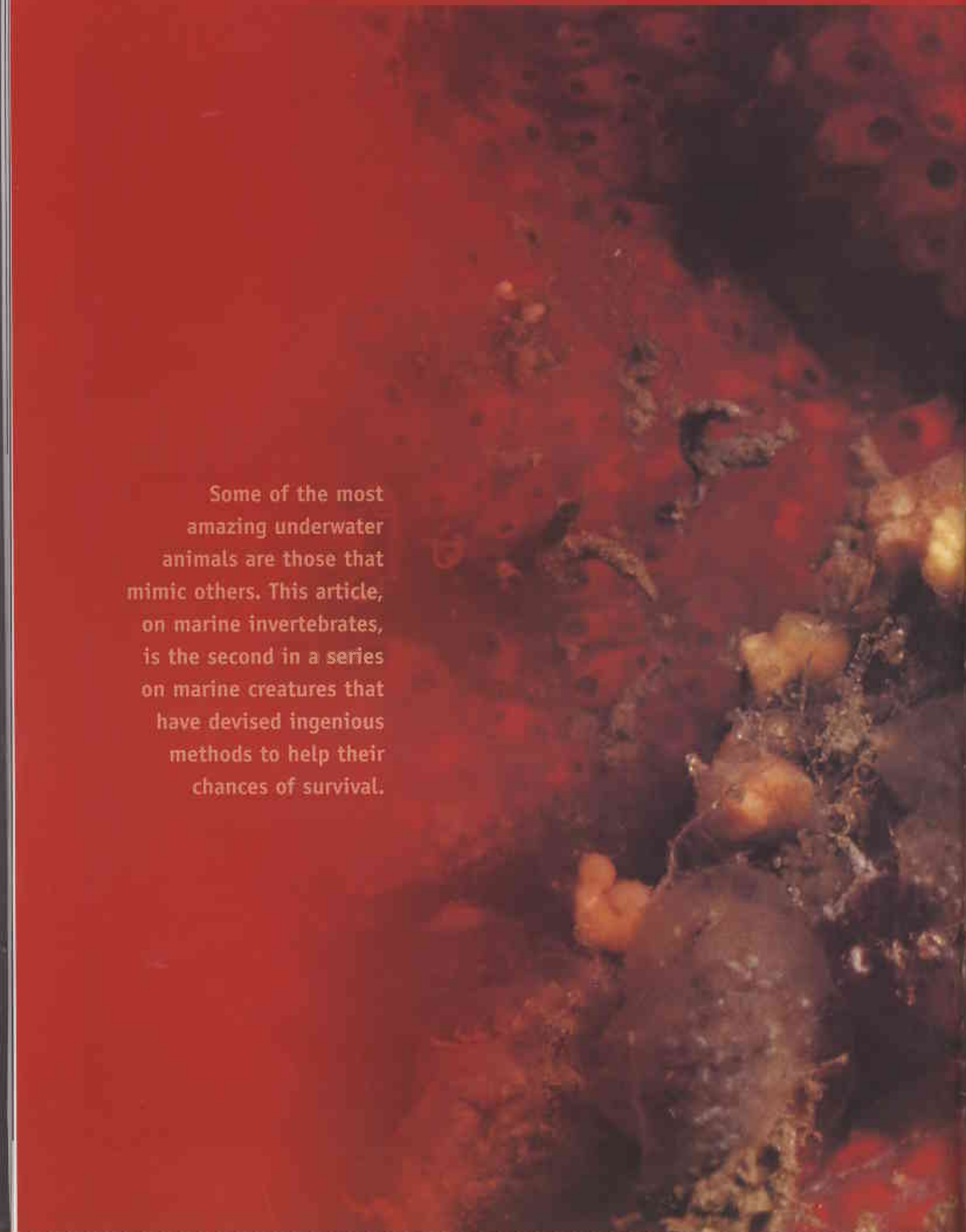
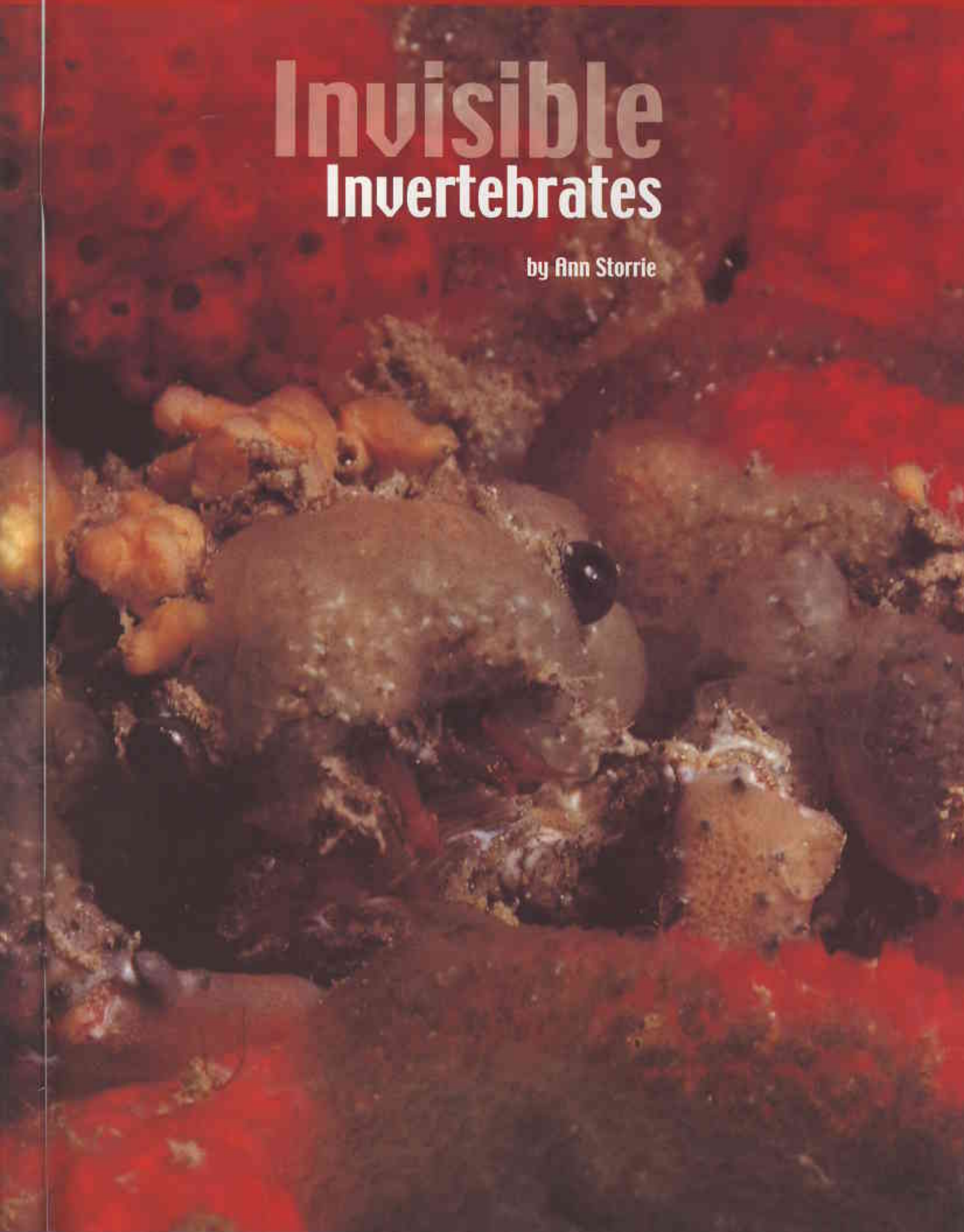
Some of the most amazing underwater animals are those that mimic others. This article, on marine invertebrates, is the second in a series on marine creatures that have devised ingenious methods to help their chances of survival.



Invisible Invertebrates

by Ann Storrie



To be a successful mimic, an animal has to manipulate either its colour, structure, pattern or behaviour, or a combination of these things, to look like something it is not. Some mimics blend so perfectly into their environment that they are difficult to see. Others use colours or shapes to resemble another creature that is either inedible or a predator. Whichever method is employed, it is one of the most successful ways to survive in the sea, especially if you are a tiny invertebrate that would be a tasty morsel for a fish.

Previous page:
These decorator crabs live in the local waters around Perth. They coat themselves with sponges and other invertebrates to aid in camouflage.

Left: The banding and tiny eyes of the shrimp *Periclimenes amboinensis* match the colour of the feather stars on which it lives.
Photos – Ann Storrie

Below: This minute shrimp is hard to distinguish from the nudibranch on which it is seen.
Photo – Clay Bryce/Lochman Transparencies

CAMOUFLAGED CRABS AND THEIR COUSINS

Crabs and shrimps are crustaceans with a hard, jointed, external skeleton and three distinct body segments. Many members of this large and successful group of invertebrates rely heavily on camouflage. A family of shrimps known as commensal shrimps are masters at mimicking parts of the animals in which they live. Many of these shrimps are found in tropical waters and can be seen in the Rowley Shoals or Ningaloo marine parks. The shrimps spend their entire lives living in one host, such as an anemone, a feather star, a large coral polyp or a soft coral 'tree'. In many cases, both the shrimp and its host benefit from this arrangement. The shrimp eats scraps of food caught by its host, while the host is cleaned of left-overs.

One such shrimp, *Periclimenes kororensis*, lives in mushroom corals or in sea anemones. It has a conspicuous white, spiny head and eyes that match the tips of the coral or anemone. Its body is transparent to pale orange and is usually hidden among the tentacles of its host. Its legs are very long, but are also transparent and very hard to see. Even looking through a macro lens on the camera does not always reveal these long appendages. Often, they will be cut out of the photograph, simply because the photographer did not see them.

Another commensal shrimp, the *Periclimenes brevicarpalis*, has large white spots on an almost transparent body. It lives in sea anemones and among a colonial coral (*Euphyllia ancora*). Several individuals may live in one small coral, and although they are quite large, they are often undetected by predators and divers.

Possibly the most difficult shrimps

Right: Commensal shrimps on a relatively small colonial coral.

Below right: There is a small crab under this leather coral. It has planted the coral on its carapace and can only be detected if it moves.
Photos – Ann Storrie

to find are those that live in the tentacles of feather stars (crinoids). All are very small and are the same colour as their hosts. The bands on the body of one shrimp, *Periclimenes amboinensis*, are identical to the banding on the feather star's arms. Its eye stalks and eyes also match the fluorescent tips of the pinnules that are side branches on the feather star's arms. Another tiny shrimp is almost the same thickness and colour of the feather star's pinnules. It is thought that these feather star shrimps settle on their host as larvae, then assume the feather star's colours after several moults. If, however, the shrimp needs to move to a new host, it can still change its colours in adulthood.

Spider or decorator crabs usually camouflage themselves by planting living algae, sponges, corals or other organisms on their carapace. They pinch off pieces of their surrounding environment and attach these to their back and legs. Some crabs even chew their decoration to coat it with a sticky substance that aids attachment. The planted alga or invertebrate often continues to grow, covering its host completely, and possibly even benefits from its mobile existence. Unfortunately, it will be shed when the crab moults. The crab then finds another creature or plant to coat its new carapace.

One crab species that is a very artistic decorator is very common in Perth waters, especially the Swan River. Dozens can be found (if you look carefully) on the wrecks at The Coombe dive site (described in CALM's new pocket-sized book *Discovering the Swan River and the Swan Estuary Marine Park*). This crab chooses several species of invertebrates with different colours for decoration. These colours match those of the encrusting invertebrates, among which the crab lives. It is often only identified by its tiny black eyes, which protrude from its decorated carapace.

SECRETIVE SEA SLUGS

Sea slugs include the shell-less nudibranchs (pronounced 'noo-dee-branks'). Many have evolved ingenious methods to deter enemies. Some simply take on the colour and texture of their surroundings, such as the food they eat, or the algae in which they live. Brightly coloured, easily seen slugs often produce a foul-tasting acid secretion, while others ingest and store stinging cells from their food, such as corals and hydroids. Other bright slugs have neither foul-tasting secretions, nor the ability to store stinging cells in their tissue, but they mimic those that do!

One species that uses colour and texture to mimic its surroundings is the rose sponge nudibranch (*Verconia verconis*). It looks exactly like the bright pink sponge upon which it feeds. Sometimes, several of these nudibranchs feed on the one sponge until there are no more than a few strands of the sponge left. Despite this, it is often difficult to tell which are nudibranchs and which are the remnants of the sponge.

Another small nudibranch looks just like a soft coral (*Carijoa* sp.). This beautiful coral is a telesto coral that grows in temperate waters. It has vivid

white polyps with eight feathery tentacles. Its stems are nearly always covered with an orange or grey sponge that provides a colourful contrast to the white polyps. Look for it under ledges in the Marmion Marine Park and around Rottnest Island. It is also prevalent under the Busselton Jetty, and this is where the 'telesto' nudibranch (probably *Tritonia* sp.) is most often found. The body of the nudibranch is similar in colour to the sponge that encrusts the coral, and its cerata (outgrowths on the back of its body) are feathery and vivid white like the corals' polyps. Unless you see it moving, it is extremely difficult to find.

SENSITIVE CEPHALOPODS

Cephalopods are soft-bodied molluscs whose arms are completely or partially fused to the head. They include nautilus, cuttlefish, squid and octopus. Of these, it is the octopus that is the master mimic. Octopuses have sophisticated nervous systems and are considered to be the most intelligent of all invertebrates. Their eyes are complex, similar to vertebrates, and they have acute senses of taste and touch. They can quickly adapt, learn and respond to stimuli in their environment.

By stretching and contracting cells of coloured pigment in their skin, octopuses can quickly change colour to express aggression, fear or sexual arousal, or to blend in with their surroundings. They can also alter the texture of their skin by raising projections on the skin to give them a larger, more spiky appearance. Usually, they simply mould into their environment, so unless you are specifically looking for them, most octopuses will be overlooked during a dive.

Above: The colour and texture of this Denison's nudibranch blends in with its surroundings.
Photo – Alex Steffe/Lochman Transparencies

Left: Possibly one of the most delicate and beautiful nudibranchs is an animal known locally as the telesto nudibranch (*Tritonia* species). Unlike the telesto decorator crab that plants coral on its carapace, the telesto nudibranch has white cerata that look like the telesto polyp's tentacles. This nudibranch is extremely hard to find, but it is very rewarding if you succeed.
Photo – Ann Storrie

Right: The rose sponge nudibranch (*Verconia verconis*) eats and lives on this pink sponge.
Photo – Peter & Margy Nicholas/Lochman Transparencies

Below right: A giant sea cuttle (*Sepia apama*) attempts to camouflage itself among staghorn coral.
Photo – Eva Boogard/Lochman Transparencies

Bottom right: The mimic octopus readily changes the colour and shape of its body to match its surroundings, or to mimic other animals.
Photos – Wayne Storrie

Just recently, a new species of octopus was discovered in Flores, Indonesia. It is commonly known as the mimic octopus. This incredible creature mimics the appearance and behaviour of several different animals that are common in its habitat. So far, 15 different disguises have been recorded. By tucking its arms alongside its body, flattening its body and turning a light shade of brown, it looks like a flounder. It can radiate its arms out like a sea star, or curl them at the tips to emulate a feather star. Hiding the arms beneath its stretched out body when sitting on the sand makes it look like a cuttlefish. By curling its arms around its body and floating in the water it can even pass for a jellyfish. A blenny poking out of the rocks, a sand eel's head above the sand, and even a stingray lying on the bottom, have all been copied. Unlike most other octopuses, this amazing creature hunts in broad daylight. Its only defence is its incredible ability to observe and then mimic the animals that live within its environment.

Ann Storrie is a freelance writer and underwater photographer. She has co-authored (with Sue Morrison) two full-colour books, *The Marine Life of Ningaloo Marine Park and Coral Bay* and *Wonders of Western Waters: the Marine Life of South-Western Australia*, which also feature many of her photographs. Both books are published by CALM. Ann can be contacted on (08) 9385 9355.

Winner of the 1998 Alex Harris Medal for excellence in science and environment reporting.

LANDSCOPE

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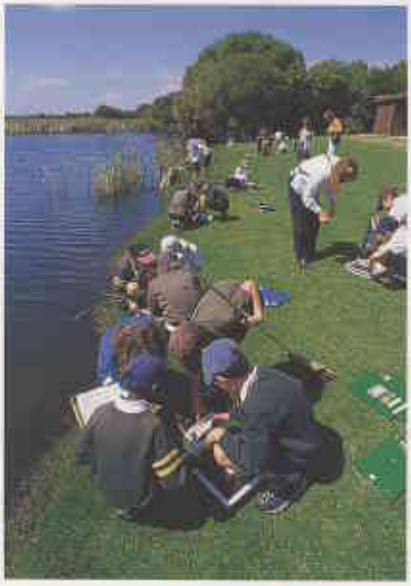
Botanists rediscover a presumed extinct grass perched on the mountain tops of the Stirling Range National Park. See page 43.

How can we preserve the Leeuwin-Naturaliste caves while catering for increasing visitation? See page 16.

Salinity Strategy surveys are revealing that salinity threatens more than 850 Wheatbelt plant species. How can managers intervene? See page 36.



Discover Perth's eight regional parks and their special features and attractions on page 28.

Learn about the spineless wonders of the marine world and their clever disguises on page 42.

FEATURES

REGULARS

COVER

More than 160 different bird species use Cape Arid National Park, which lies on the South Coast about 120 kilometres east of Esperance. The red-eared firetail is one of them. This exotic-looking finch is confined to south-western Australia. It is found in areas of dense heath and undergrowth in thick forest, never too far inland. Cape Arid National Park is the eastern limit of its distribution.

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Executive Editor: Ron Kawalilak
Editors: David Gough and Carolyn Thomson-Dans
Bush Telegraph Editor: Verna Costello
Advertising copy and editorial assistance: Caris Bailey
Scientific/technical advice: Andrew Burbidge, Paul Jones and staff of CALMScience Division
Design and production: Tiffany Aberin, Maria Duthie, Gooitzen van der Meer
Illustration: Gooitzen van der Meer
Marketing: Estelle de San Miguel ☎ (08) 9334 0296 Fax: (08) 9334 0498
Subscription enquiries: ☎ (08) 9334 0481 or (08) 9334 0437
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