

# *Hidden Life of an Undersea Desert*

By EUGENIE CLARK

Photographs by  
DAVID DOUBILET

**E**LEGANT DANCERS in a realm of illusions, wispy garden eels sway to the rhythm of the Red Sea off Sinai's Ras Muhammad. With their tails always anchored in their burrows, these dainty, yard-long creatures (*Gorgasia*) seem to be rooted in the sand like the stalks of willow sea plants. Bending their bodies into the gentle current, they eat, fight, and mate with eels around them. But when approached by a diver, they sink eerily into their holes.

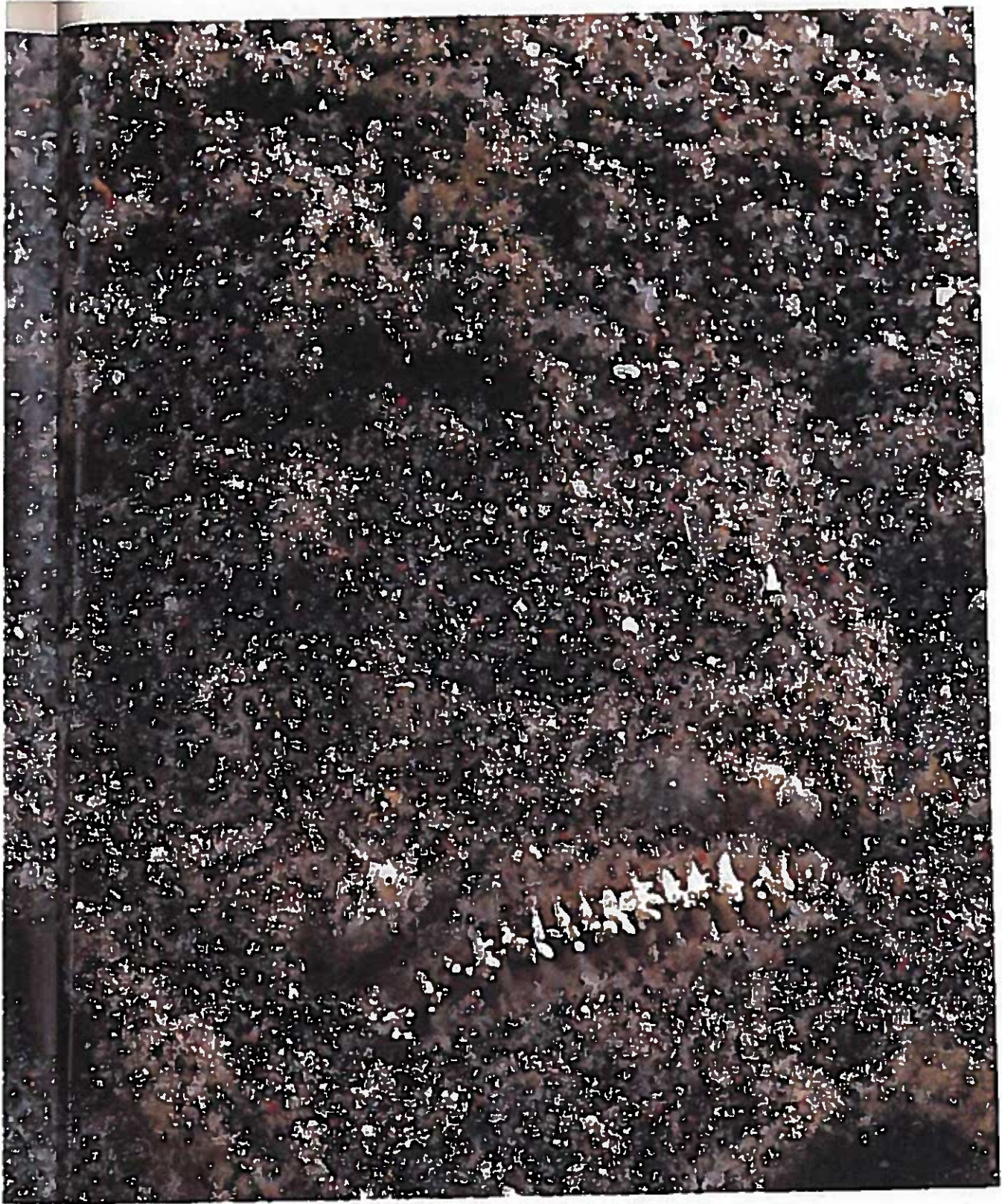
The appearance of emptiness in the shallow waters of the Red Sea conceals a world of strange creatures. Some disguise themselves with camouflage. Others hide in tiny shells. A few, like the garden eels, disappear into the seafloor. And some lie just below the bottom with only their eyes poking up through the sand. Not a barren place at all, this desert beneath the sea is a neighborhood of wonders.





**C**HESHIRE CAT of the sandy sea bottom, a stargazer (*Uranoscopus*) disappears from view, all except for its smile (above). What seem to be teeth are actually fringes on the fish's lips that allow it to breathe a steady flow of water while buried in the





sand. There it will remain until some unsuspecting prey ventures within its grasp, attracted perhaps by the dark skinny flap and noodle-like lures that the stargazer sticks out from its mouth (upper left). Its small eyes (left), cleared of sand by the photographer, look

upward. Two organs behind the eyes can generate as much as 50 volts, possibly creating an electric field around the stargazer to help detect approaching creatures. The 12-inch-long fish has been known to swallow victims nearly its own length.



**L**IKE A PLUMED WARRIOR of the deep, the jet black razor fish (right) glides serenely past my face mask. In the undersea realm, where most fish can either take on protective camouflage or vanish instantly into the sand, the bizarre-looking razor fish seems at a disadvantage. But appearances underwater can be deceptive.

Stretching out my hand toward the fish as it hovers near the bottom, I make a sudden threatening gesture. Instantly the razor fish tilts sideways, extends its plumelike dorsal fin, and lies motionless against the white sand like some bit of discarded rubbish on the seafloor. If I had not witnessed the transition myself, I would never have believed that the drab object before me could be a living creature.

Such marvels of adaptation and survival still intrigue me after many hundreds of dives in the Red Sea. Exploring that seemingly barren expanse of ocean floor is like playing the children's game of finding hidden faces in a picture; the longer you look, the more faces you discover.

Among all the areas of the undersea world that I know, none is more challenging, more enjoyable, more frustrating, and more a test of a diver's patience and endurance than that magical sandy bottom of the Red Sea (map, page 135).

Leaving the razor fish to recover from its game of undersea possum, I proceed across the sunlit ocean floor. As I pause farther on, the sand in front of me begins to jitterbug crazily like the prelude to some miniature volcanic eruption. Presently two tiny periscopes with eyes thrust above the surface and swivel toward me in a way that tells me I am being watched.

Beyond the periscopes a small snorkel camouflaged with spots resembling grains of sand busily pumps water in and out from some invisible source. Nearby, a dozen miniature noses emerge from the seafloor and simply remain there—whether sensing my presence I do not know.

Farther on, a shell gets up and walks unhurriedly away past a tuft of transparent needles that begin to undulate. From among the needles a crown of translucent tentacles gradually emerges. Finally, with the slow-motion grace of a time-lapse camera, the tentacles blossom into a huge, exquisite beige flower that I know will vanish instantly if I touch it.

I have learned the origins of most of these intriguing phenomena. The periscope eyes belong to a mantis shrimp. The walking shell is the home of a hermit crab bent on a change of scenery. The beautiful beige flower is the head of an anemone known as *Cerianthus*, and the small triangular noses are all that one sees of arrow-slim fish named *Trichonotus nikii* when they decide to go into hiding. As for the snorkel, it is merely the nostril of a buried Moses sole, that remarkable fish whose



STRICHTYS NIGER

*milky secretion acts as a powerful shark repellent.*

*Unfortunately, science has yet to develop a repellent for the lionfish, whose venomous spines can inflict severe wounds. For newcomers to the undersea desert, it is decidedly unsettling to lie quietly on the seafloor in contemplation of some small creature, only to turn and discover that several lionfish have cuddled companionably against one's legs. The reason is not friendship but the fact that any projection above the sandy bottom—an old shoe, a tin can, a concrete block, or a hapless diver—attracts a variety of small marine life on which the lionfish feeds. Fortunately, if the diver lifts slowly off the bottom, the lionfish soon goes in search of another decoy.*

*Despite thousands of hours of underwater observation and years of photography by my colleague David Doubilet, we have barely touched the wealth of information about marine life to be found in the shallows of the Red Sea.*

*In our eagerness to extend man's reach far beneath the sea, we often tend to overlook the challenges close at hand. To me some of the most exciting and rewarding areas for study are those seemingly barren shallows that actually teem with life—the world of the undersea desert.*

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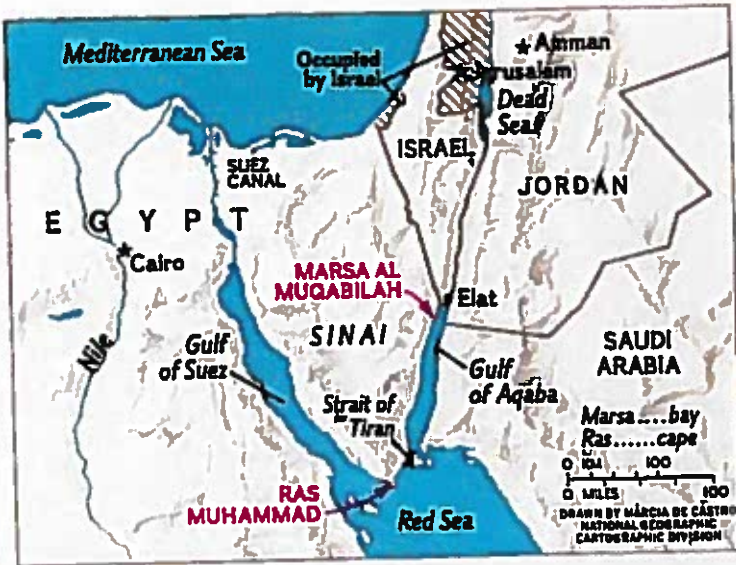
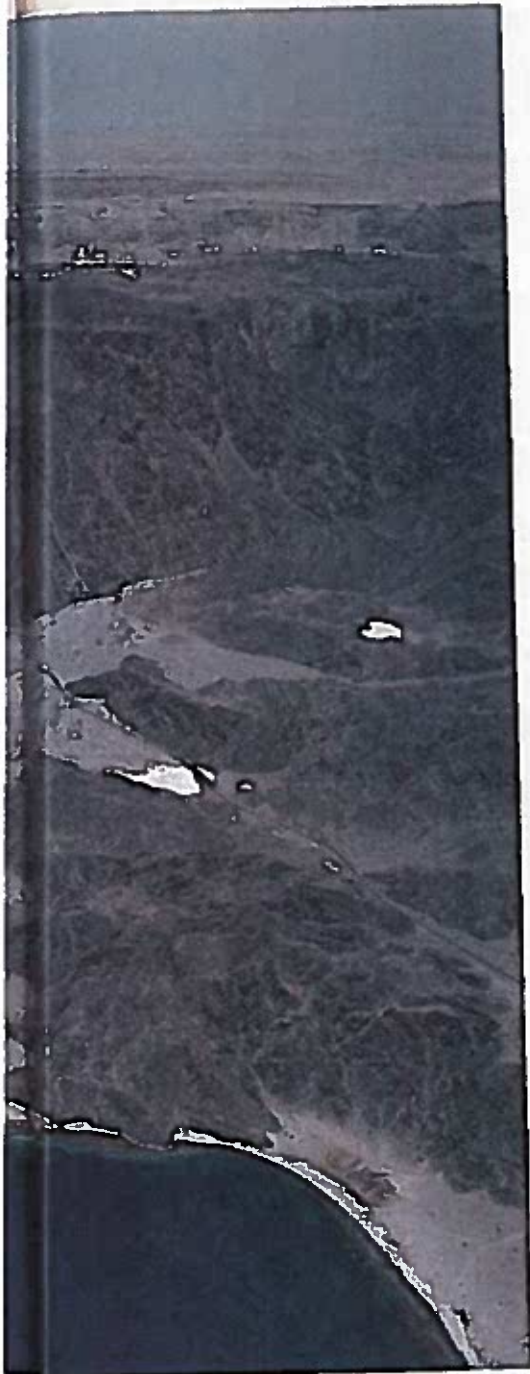
Marine biologist Eugenie Clark teaches at the University of Maryland. Her most recent NATIONAL GEOGRAPHIC article, "Sharks: Magnificent and Misunderstood," appeared in the August 1981 issue. Based in New York City, David Doubilet has been taking underwater photographs for NATIONAL GEOGRAPHIC since 1971.

**S**INAI SPILLS into the sea at the mouth of Wadi Magrashi (above), where rare torrential rains deposit sediments from the desert's mountains. Here in the sparkling waters of Marra al Mugbilah, a gentle bay ten miles south of the Egyptian-Israeli border, the author since 1969 has pursued research into the remarkable fish that inhabit the wadi's outwash.

Geologist Farouk El-Baz has identified three types of sand in this part of the Red Sea, each forming a

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SCARUS FERRUGINEUS, 18 INCHES



SCARUS CHOEBAN, 30 INCHES

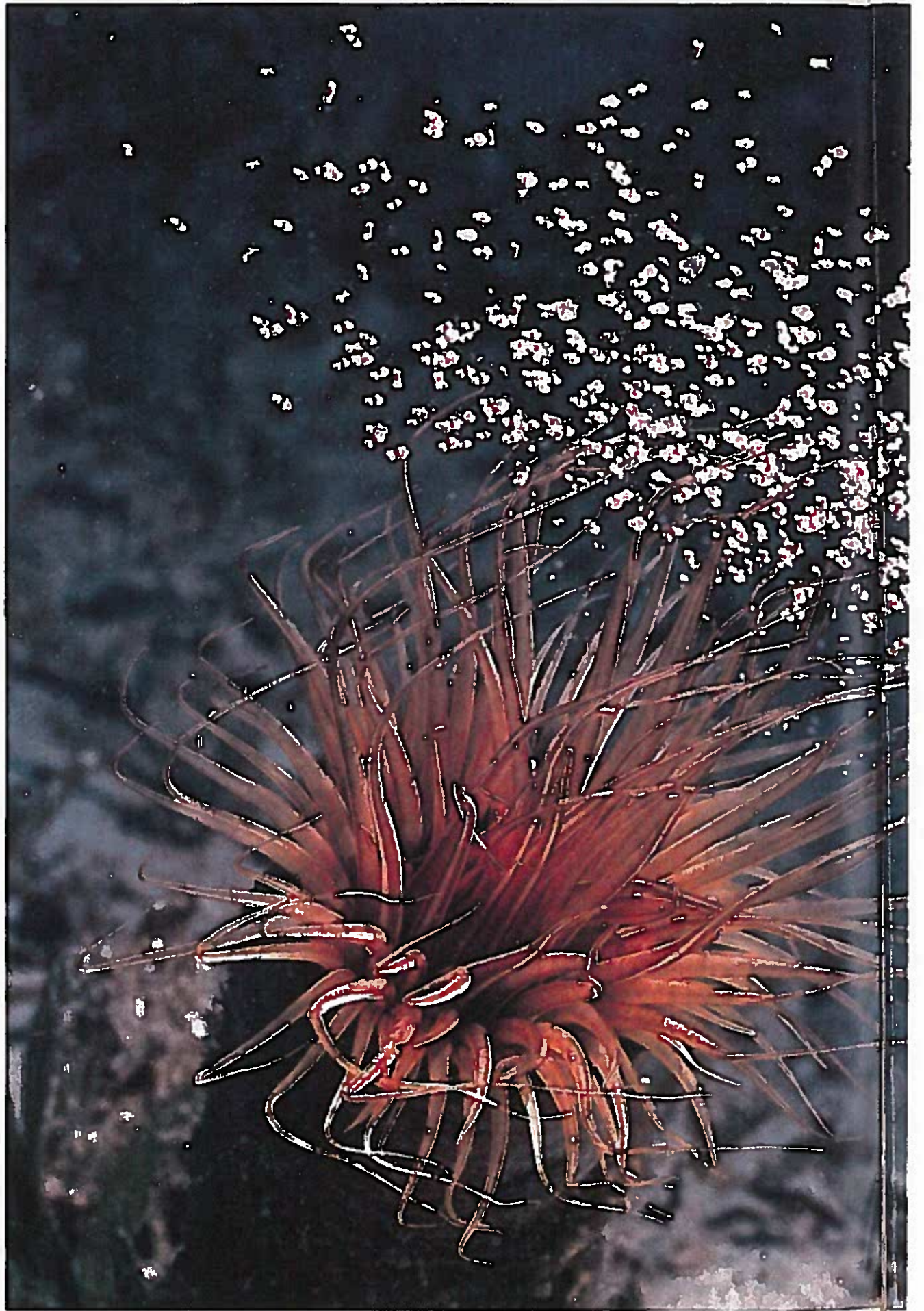
special habitat for unusual creatures. Wadi sands, composed of fine, angular grains, are washed into the sea from Sinai's mountains. These sands are so soft that some species of fish can dive into them headfirst when threatened.

A second type of sand, found in quiet, deeper waters, has highly rounded grains. Currents here carry nutrients to colonies of mysterious garden eels that seem to sway in an undersea breeze like flowers growing in the sea bottom.

The third sand is manufactured by fish that ingest stony coral while

feeding on the algae growing on it. A hungry parrot fish chews off tiny chunks with its strong beak (center), swallowing bits of dead coral as a chicken does gravel. Grinding plates in the fish's throat break down the coral. Then, having extracted nourishing organic materials from the algae, the fish passes the residue into the sea (bottom). In this way, swarms of parrot fish convert enormous quantities of stony coral into fine layers of sand, constantly renewing this desert beneath the sea.









**C**LEAR WARNING to predators—in a realm where most animals try to camouflage themselves—the bold red of a sea urchin (*Astropyga radiata*) signals trouble. Unable to flee or dive down a burrow like other creatures in the undersea desert, the six-inch-wide urchin (above), a relative of the starfish, wields hundreds of prickly spines to protect itself. Even so, some fish manage to penetrate its defenses and feast on its soft insides.

A blossom-like anemone (*Cerianthus*) delivers potent stings with the slender tentacles that encircle its mouth (left). Related to jellyfish and corals, the ten-inch-wide tube-bodied animal feeds on small invertebrates and fish. Yet somehow a cloud of opossum shrimp (order *Mysidacea*) seems to thrive among its deadly stingers.





EUGENIE CLARK





**P**UTTING ON A SHOW to drive off a razor fish, a male *Trichonotus nikii*, dubbed Tricky Niki by the author, flares three striped plumes above his streamlined body and quivers his pectoral fins (left) in a display of aggression. These arrow-shaped fish set up temporary territories in which to court females, sometimes encroaching on the home turfs of razor fish (*Xyrichtys*) that patrol nearer the bottom.

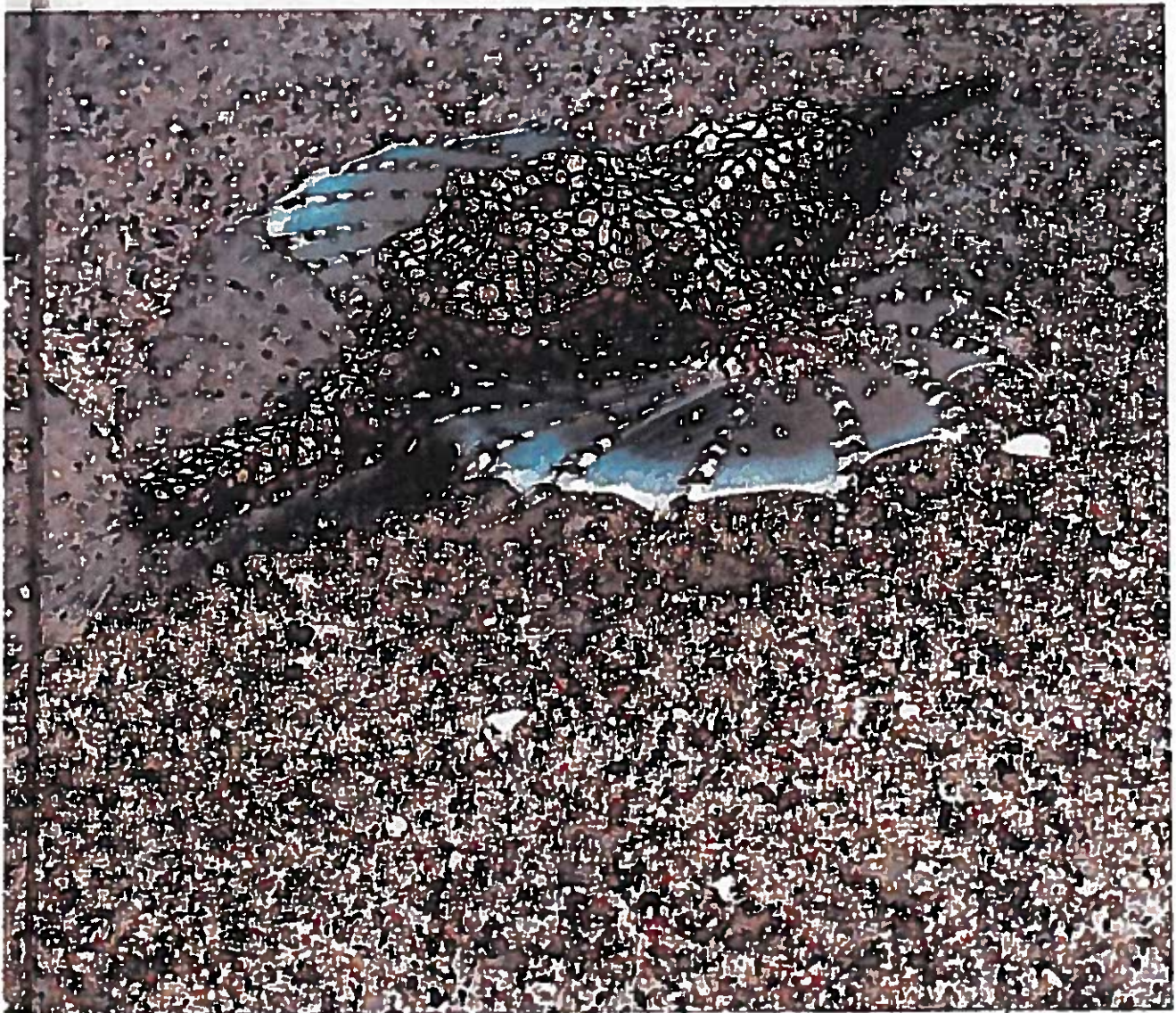
Half-inch-long juveniles, like six-inch-long adult *T. nikii*, hover in large swarms above the wadi outwash as they graze on plankton in Marsa al Muqabilah. Both are identified by their unique golden internal eyelashes. And both, like the razor fish, plunge into the sand whenever mackerel shoot by.

A pair of sea moths (*Eurypegasmus*

*draconis*) spread diaphanous "wings" (below) in another undersea drama—perhaps some stage of courtship. Like sea horses, these four-inch-long animals have stiff external skeletons, long tubular snouts, and small mouths. Barely visible against the sand, they glide slowly along the bottom, though they are capable of short bursts of swimming during such displays.

As they outgrow their bony armatures, sea moths shed them like skins, though these skins are in fact rigid castings of mucus. Specimens of the bizarre creatures, sometimes called pegasus fish after the winged horse of Greek myth, first reached Europe from China, where they were dried and sold as curios. Home remedies in the Far East still recommend using ground sea moth in tea as a curative for sore throats.

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**R**OOMMATES IN THE SAND, a snapping shrimp (*Alpheus*) and a six-inch-long goby

(*Cryptocentrus coeruleopunctatus*) help each other to survive. While the goby stands sentry (left), the shrimp uses enlarged claws to bulldoze debris from the mouth of their shared burrow. As it works, the shrimp keeps one antenna in contact with the fish. Then if the goby senses danger, it wiggles its body and the shrimp disappears down the hole—quickly followed by the goby.

A more reclusive resident of the sandy bottom, the delicate acorn worm (*Balanoglossus*) makes its presence known by leaving a coiled fecal mound (below left) on the seafloor above its burrow. The yard-long sea worm ingests sand and mud as it digs through the substrate, extracting microscopic organisms from the inorganic particles before passing them. In the process, it builds a burrow down below, hardening the walls with a lining of mucus. Highly sensitive to vibrations, the worm pulls back rapidly when disturbed. And if damaged or torn, it can regenerate the missing parts.

A volcano-like eruption catches a sand perch by surprise (far left). A small crustacean is probably responsible for the brief disruption as it builds a home in the sand. The seven-inch-long sand perch (*Parapercis hexophthalma*) is another burrower in the sea bottom, though it may also find shelter beneath the chunks of coral that litter the desert seafloor.



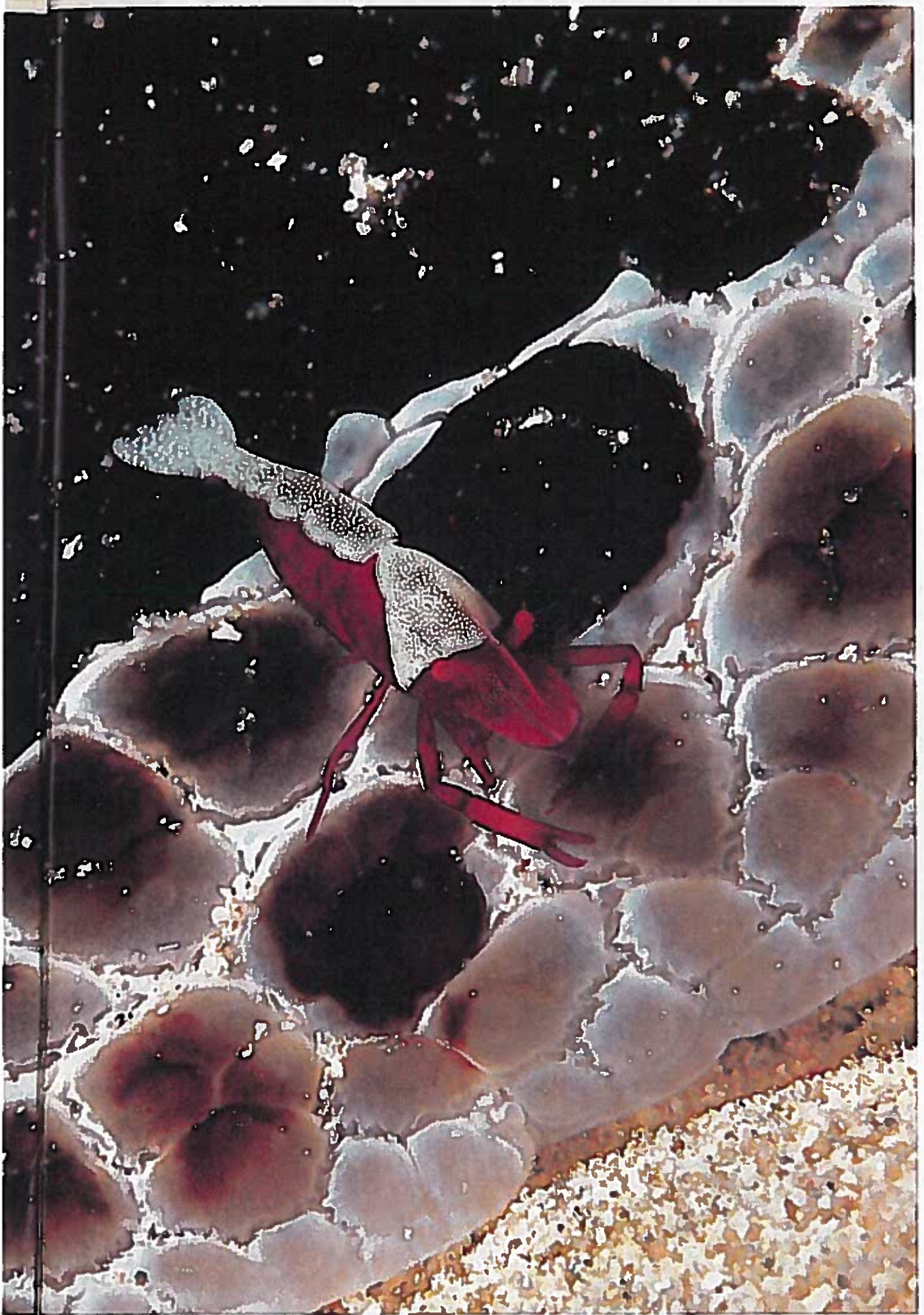




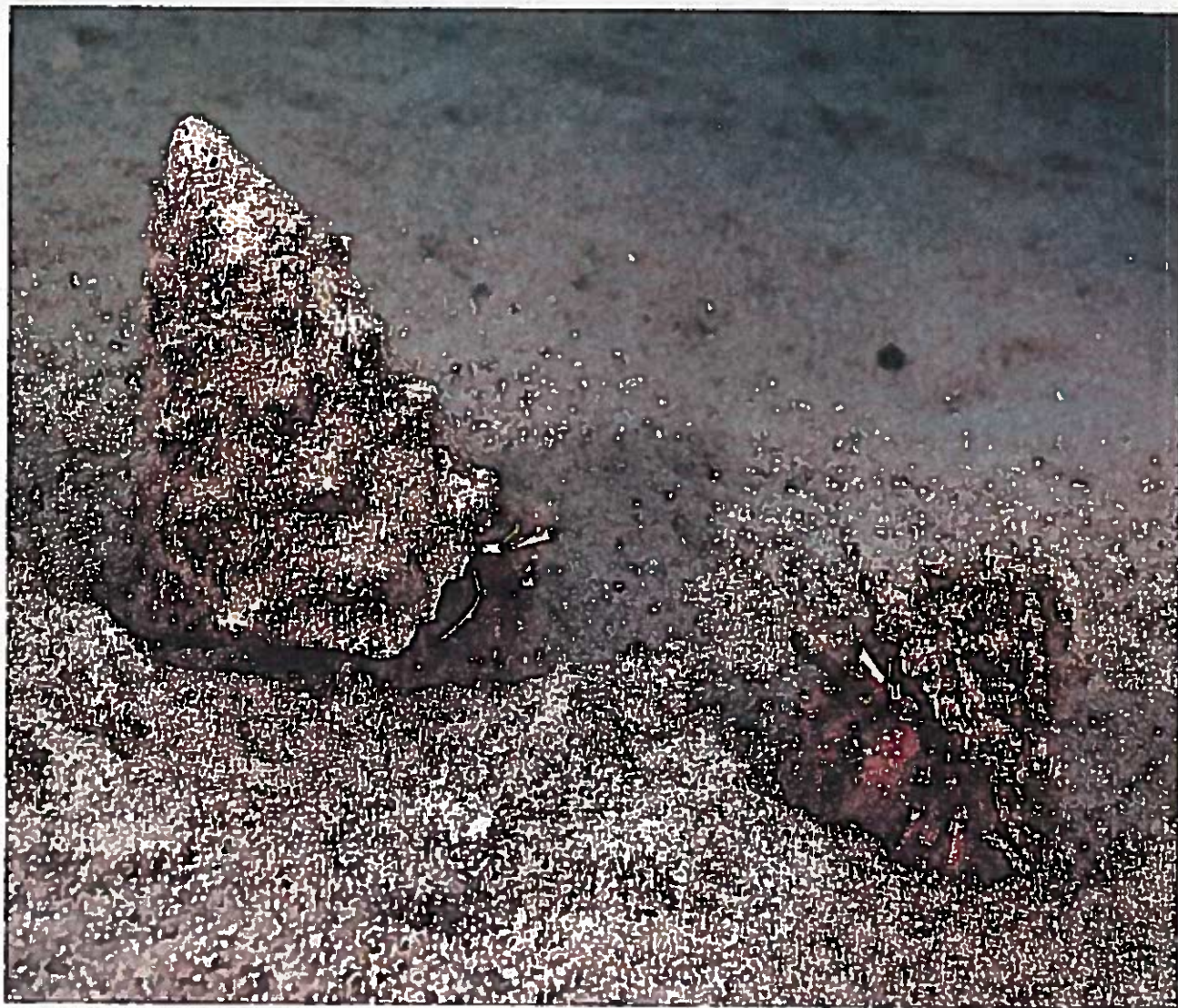
**B**ITTER SURPRISE for the fish that tries to swallow it, *Pleurobranchus* (above) secretes a film of acids nasty enough to make any predator spit it out again. A member of the snail family, the six-inch-long mollusk grazes on sponges, crawling along the bottom on its broad foot. A small shrimp (*Periclimenes imperator*, right) comes along for the ride, possibly to feed in the water around the pleurobranch—but perhaps for some other reason. Too little is yet known about the inhabitants of this undersea desert to explain all its puzzles.











**M**UTT AND JEFF of the seafloor, a pair of wandering hermit crabs size each other up with their stalked, beady eyes. These four-inch-long crustaceans explain a minor mystery of the sandy bottom: the case of the shells that get up and walk away. The rear part of the crab's body, unprotected by any hard covering, is so soft and flexible that it can change shape to fit the whorls of almost any shell the crab chooses. In some parts of the world, hermit crabs have also

taken shelter in coconut shells, soup cans, pieces of bamboo, and chimneys from broken lamps. As the crab grows in size, it must search for larger quarters. When it finds a likely new home, it wriggles deep inside. Then, if satisfied with its choice, it fits its pincers into the opening as if to close the front door.

Things are seldom what they seem in this desert beneath the waves, a magical world of marine Houdinis where survival can hinge on a knack for deception. □

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