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KEY LARGO CORAL REEF

America's First Undersea Park

By CHARLES M. BROOKFIELD

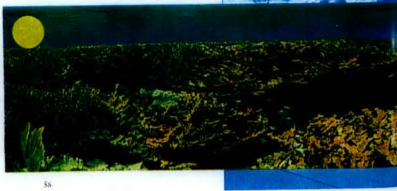
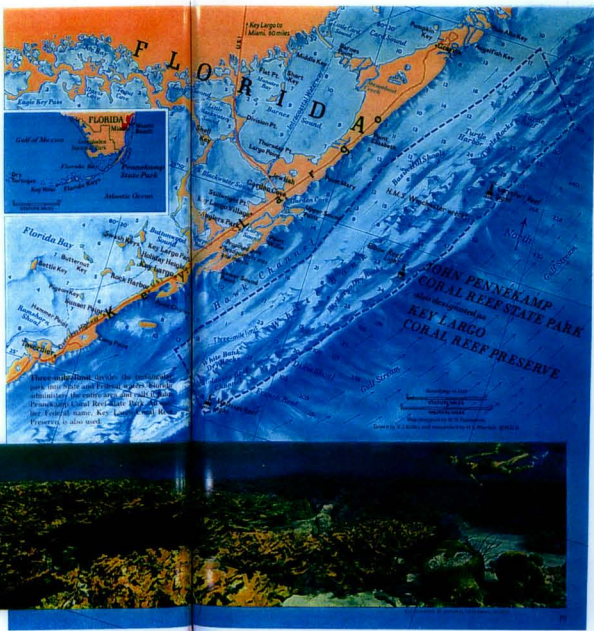
Photographs by JERRY GREENBERG

ALTHOUGH within sight of the ocean-side palaces of Miami Beach, a penicillin chain of islands begins its 211-mile sweep southwest to the Dry Tortugas.

Just offshore, paralleling the semicircular curve of these Florida Keys, lies an undersea coral reef, the only one of its kind in United States continental waters. Brilliant tropical fish dart about its multicolored coral gardens. Part of the magnificent reef, a segment roughly 70 nautical miles long by a wide, off Key Largo, has been dedicated as America's first undersea park.

I know this reef intimately. For more than 30 years, I have sailed its warm, clear waters and probed its shifting sands and bizarre formations in space of sunken ships and their treasure of artifacts.

Snorkel diver opposite, right) glides above brain coral into a fantastic undersea park of elkhorn and staghorn in the new preserve off Key Largo, Florida.



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Here is a graveyard of countless brassy sailing ships, Spanish galleons, English merchant, pirate vessels, and privateers founded on the reef's hidden lagoon. In the 19th century alone, several hundred vessels met death here, and the wrecking masters of Key West glommed close to ten million dollars from salvage operations.

In today's salt-water preserve the foundaries are marked by bones, and visitors eventually will ride glass-bottomed boats above the lovely coral gardens. Even now the more active visitors fasten on masks and snorkel and bob face-down in gentle swells for a closer look at gaudy reef fish. The most adventurous strap on leaching units and descend to the beautiful coral world that underwater photographer Jerry Greenberg describes vividly on pages 70 to 89.

Author Found Wreck of the Winchester

Heavy sea loaled directly on the outer coral barrier, where the seaward edge of the reef comes up abruptly from the deeper water of the Gulf Stream. Here, 23 years ago, I found the scattered remains of H.M.S. *Winchester*, which went down off Cayrleton Reef, five miles east of Key Largo, in 1865.

A British ship of the line with 40 guns and a crew of 350, the square-rigged *Winchester* fought with the West India Squadron in the war with France, harrying parts of the French islands. Mission accomplished, she refueled at Jamaica, then set sail for England and home. But security—that age-old plague of the sea—began to lay her crew low. I did not

uncover this interesting fact until two years ago, when I learned that the *Winchester's* log had been saved. Writing to the Public Record Office in London, I obtained photographic copies of the last few pages.

On September 14, 1865, the ship's captain recorded that "... we had not above 7 men Well our Ship increasing upon us by the water she made in the hole & we Left Indistinct of all ability to pump it out our people being all dead and Sick."

Ten days later a vicious gale struck the ship off the Florida Keys. With their crew helpless, only a few men able to stand, the *Winchester* broke her back on the reef.

Key Largo, the nearest land, was inhabited only by fierce Cuban Indians, notorious for practicing human sacrifice and keeping slaves. There was no thought of seeking refuge there. An accompanying vessel rescued eight men—the only survivors.

For 244 years *Winchester's* guns, some weighing more than two tons, lay five fathoms deep, while shipworms made a sieve of her outer hull. By 1939, when we located the wreck and raised the cannon, the ship had disintegrated.

Eighteen months ago I paid a return visit to *Winchester's* grave. With an air lift and free-diving gear, I hoped to recover objects overlooked by previous expeditions. Fortune favored us. We raised coral-encrusted cannon-

*A description of *Winchester's* log voyage and the discovery of its wreck, in Florida Current below history of battle in the December, 1944, NATIONAL GEOGRAPHIC.

Cliant sea whips, or pergamons, reach for the sun like apparitions in a cactus forest. Blue-striped grapt (*Halimeda setacea*) peep just the outer branches below.

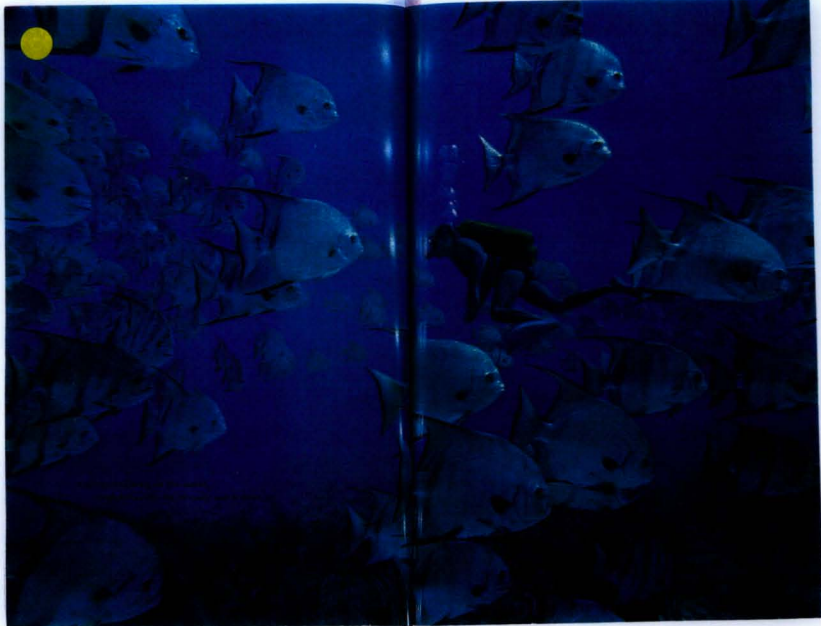
Gold watch raised from H.M.S. *Winchester*, which went down off Cayrleton Reef in 1865, shows the hours in Roman numerals and the minute in Arabic. Here a kump of rock bears the imprint of the dial's face in black iron oxide. For 264 years the watch lay on the bottom, sandwiched between an iron fitting and rock ballast.

When I discovered the *Winchester's* grave in 1939, the amber salvaged cannon, cast-iron shells, wrought-iron fittings, and a brass sundial, as recounted in the December, 1944, NATIONAL GEOGRAPHIC. On a return visit 20 years later, the remarkable watch and a universal ring sundial were recovered.



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2 EASH



ball, hinges, spikes, and fittings wrought by 17th-century craftsmen.

One day young Charles H. Baker III peeped to the surface with an object wreathed in lumps of the ship's hull-rot. A hammer blow revealed a gold watch within the black mass. The watch's crystal was broken and its works were filled with grit and sand. Just miraculously, one of the brass wheels still turned on the pivot.

It seemed fitting that young Baker made the discovery. His father was with me when

The Author: Florida representative of the National Audubon Society, Charles M. Brockfield also heads the State Park Board's Advisory Commission on Florida Key Sites. A veteran explorer of Key Largo reef, he found the remains of H.M.S. *Birkenhead* in 1939 (page 64). During World War II he saw action in several theaters on an LST-46per

we raised *Birkenhead's* cannon, and the Baker ship, *State Hater*, served as the mother ship of the latest expedition.

A second treasure raised from *Birkenhead's* remains was a universal ring symbol, used by marines in the 17th century.

Museums Will Exhibit Relics

Both watch and sundial will be exhibited in a museum which will be constructed in park headquarters on Largo Sound.

Genevieve citizens have donated 7 1/2 acres for exhibit buildings, docks, and launching ramp, and the Florida Legislature has appropriated \$150,000 for the center's development. From the marina, glass-bottomed boats will cruise out to the reef.

Here soft-bodied coral polyps—like anemone-like creatures that build protective cups of lime—flourish in the warm waters of the

Gulf Stream. Billions of their limestone skeletons form the foundations of the reef; vast colonies of the living coral animals grow on the dead, fashioning a fantasyland of strange forms.

Tourists who buy coral at roadside curio shops see only the bleached white skeletons of the once-living colony. But a visitor to the reef may feast his eye on living corals—the green, brown, and gold of stony corals; the blue, purple, and yellow of coral fans and plumes that sway with the current; the pastel tints of covering sea fans and graceful coral whip (page 66). Altogether, they form one of nature's grandest shows, a submergent landscape of awesome beauty.

A preserve to safeguard this unique underwater world was discussed at a meeting of Florida conservationists in 1957. Dr. Gilbert L. Voss, of the University of Miami's Institute

of Marine Science, warned that the gorgeous Florida reef might soon become a watery desert if steps were not taken to protect it.

His statement raised many an eyebrow. What could destroy a reef? he was asked.

"Man," Dr. Voss replied.

Coral From Reef Sold to Materials

Curio vendors were tearing the reef apart, using dynamite and crowbars. Bargains of corals, sponges, and the imposing open-couch shell were piled along the roadides for sale to motorists. Fish collectors raked the waters, and spearfishermen established everything that swam or crawled.

Decapitation of the reef would have other consequences, Dr. Voss predicted. The coral gardens served as a haven for small tropical fish and a nursery ground for game fish. Without small fish to feed upon, the game fish



Water-loving Manatees, members of a Miami diving club, leap into the Atlantic's arctic north above Madison Reef to explore the sea floor with snorkels, masks, and fins.

Head in Air, Body in the Water, a Diver Prepares for an Inspection Tour of Coral Gardens

Charles H. Baker III shows face mask and breathing tube near Carysfort Light. Reflection of light by water magnifies his body about 25 percent. In this unusual photograph, the camera eye simultaneously is in air and water, like the four-eyed fish of Central America which has lateral vision.



Bird white giant (*Harodon phasianus*) respects a slice of sea as his bed by July. Mounds above a huge brain coral. They flourish where *Thalassia filices* have never set their roots. Many reef fish show little fear of humans.

Mountain and Valley
Carriacou, British Guiana

Nono gale (*Utricularia*) scapes start over the mace, approximately three-quarter life-size, at center right. Living forest ventral line shaped like a scorpion, this tiny fish perches on coral stumps. Nono gales plant parasites the mounds and bodies of sponges and other porous fish.

would go elsewhere. In Florida, where one out of four visitors comes for salt-water angling, such a shift could be of grave concern.

Dr. Voss's plea spurred conservationists into action. The Florida Board of Conservation, Historic Memorials approved a 77-square-mile section—10 percent of the entire reef—as a permanent preserve. The National Audubon Society's staff in Miami encouraged Floridians to write in the governor and the United States Secretary of the Interior.

Because the park's suggested boundaries straddled the three-mile line that divides State and Federal waters, approval by both governments was needed.

Complications delayed the park's birth for three years, but in March, 1969, President Eisenhower proclaimed the Key Largo Coral Reef Preserve. At dedication ceremonies the preserve's name of John D. Pennekamp, associate editor of the *Miami Herald* and an ardent conservationist. This protective area is known by two names, one chosen by the Federal Government, the other by Florida.

"His pen has struck down the despoiler and created those who would conserve," Governor Collins said of the editor who, in the press and in person, has fought more than 20 years to preserve Florida's natural beauty.

Today the 31-mile stretch of sea in the preserve is dotted with clustered fishing boats trailing the surface and smaller craft of free divers floating at anchor. Fleets of flat-bottomed

clanks sail the horizon. Now and again one breaks away from the armada and scurries across the sky, darkening the sea with its shadow.

Fish-hunting commuters ride the waves, and porpoises play leopards with whitecap-turtle pops up for air. Frums bobbing on the surface mark the lobster traps of commercial fishermen seeking the salty lobster.

Park rules prohibit spearfishing, but sanctioned rod-and-reef fishing and lobstering, prohibited the ocean floor suffers no damage.

Reef's Center for Marine Research

Marine biologists from all parts of the world work above and below the reef's waters. Dr. Voss and his associates at the University of Miami's Institute of Marine Science are carrying on a three-year research project to determine how fast corals grow and the past 11 years by the National Geographic Society, through its Committee for Research and Exploration, they are also studying the food-chain relationship between living plants, food chains, and the movements of fish populations.

Other scientists are shedding new light on one of nature's most remarkable associations—the relationship between the coral polyps and herds of tiny planktonic cells that live within them.

Other scientists are shedding new light on the relationship between living plants, food chains, and the movements of fish populations.



America's First Undersea Park

coral green.* Others lend a golden-brown color to their hosts. These cells benefit from the carbon dioxide and other wastes given off by coral tissues. In turn, they supply the polyps with oxygen. Symbols, as their mutually beneficial relationship is known, stems from a Greek word meaning "living together."

Close relatives of the true corals, millepores, or stinging corals, also flourish on the reef. Their stinging cells, touching human flesh, cause a burning sensation. Many of their colonies have distinctive shapes: branching, flat, or blade-like (page 64).

Altogether, more than 30 different species of coral have been found in this unique underwater preserve.

Other recreations in the West Indies and Florida include undersea areas, but the new preserve off Key Largo lies totally under water. Lighthouses and tide-exposed rocks alone break the surface. The three lighthouses standing the seaward side of the reef—Caryfort (page 64), Ellow, and Melissa—all perch on iron piles.

Caryfort, only habitable structure within the preserve, is manned by United States Coast Guard men. When I first visited it 15 years ago, the Lighthouse Service was in charge. Keepers, then spent two months on the light for every 29 days on "honey moon," their term for shore leave.

"I shall never forget my first night on Caryfort. I had gone out with two friends in my cabin cutter. Menace, with meat and vegetables for the keeper and his two assistants.

Captain Johnson's Chum Cousins

At bedtime any companions and I settled on the lower deck of the light's dwelling, but I could not sleep. As I lay restless, a groan echoed through the lower deck.

"Did you hear that?" I asked.

"My friends snored loudly. I had just almost convinced myself that my imagination was playing tricks when the moan was repeated, as if from a nest in darkness.

Jumping up, I climbed the steps to the upper deck and circled the dark stars to the tower, where Harry Baldwin, one of the

assistants, was standing watch at the lantern.

"Harry," I pointed, "have you ever heard any funny noises down below?"

"Oh, sure," he said, "but we don't pay attention to 'em any more. It's only Captain Johnson, and he just comes around to see if all's well. He died out here on the light, you know. Must have been a great swimmer, he grows so. Sometimes he rattles his chains."

"This resumed—I use the word loosely— I went below and slept, groans or no groans. Next morning I solved the mystery of the moans. I believe. Under the hot sun, the tower's iron walls expand; in the cool of darkness, they contract. Shrinking, they make sounds startlingly human. My theory may not be true, but I have clung to it ever since.

Seminole Ambush Lightship Crew

Orbit of the reef lighthouses, Caryfort was first lighted in 1852. But for more than a quarter of a century before that, a lightship had been stationed within the reef. Since the main source of supply for the crew was Key West, about 100 miles away, they cultivated vegetables in a little harbor they called Garden Cove, on nearby Key Largo.

One fine day in 1871, Capt. John Whalton and three of his crew lowered boats and headed for Key Largo to gather lumber. The Seminole Indians had been on the warpath in southern Florida for some time, but there had been no recent attacks on the keys. It seemed safe enough to go ashore for a few hours.

But dark, hostile eyes watched from ambush as the boats beached. Without warning the Indians attacked, and the captain and one of his crew were killed. The two other men escaped with the boats.

In that earlier tragedy, when the warship *Winchester's* keel struck Key Largo's coral barrier, the crew thought only of coral reefs and sailing seas. Crushing timbers were falling all about them, and the sea was rushing in through gaping holes in the ship's bottom. Soon the swirling waters brought merciful death.

No man aboard the ill-fated vessel could have dreamed that the treacherous reef possessed a rare beauty which man would one day deem worthy of preservation.

Mixed Battalions of Purkfish and Counts Maneuver in Chase-order Drill

Distinguished by its yellow stripes and black bars, the purkfish (*Atractosteomys virginicus*) often swims with its relative, the white grout. Like many reef fish, the white grout feeds by night. This school will disband when the members go foraging for food.



Florida's Coral City

Beneath the Sea

Article and photographs
by JERRY GREENBERG

Exploring the wonders of the reef,
a diver finds another world
and photographs its denizens in color

"BUT THE SHARKS... aren't you afraid of the sharks?" This is a familiar question. My answer is "No," with some reservation.

When working under water, I regard sharks as the man in the jungle does the tiger, or the mountain hoboist does the reckless driver. I know they are there; sometimes I see them. But I go out of my way to avoid them.

For more than 30 years I have been diving

—Lemon shark, 30 feet of malvolence, seizes

for pictures of fish and coral reefs off the Florida Keys. I have spent thousands of hours in the depths, and I have seen countless sharks—hammerhead, blacktip, lemon, nurse, bull, tiger—but not one of them has ever attacked or even threatened me. I photographed the lemon shark below from a distance of only seven feet.

A shark is cautious; he doesn't bother it. But a shark

is unpredictable; no one can say what it will do on any given encounter. "Don't provoke the animals." The admonition to non-violence also applies to an underwater reef.

Recently I spent two months roaming beneath the waters of the new John Pennekamp Coral Reef State Park (see preceding article). Here some fifty thousand acres—about 75 square miles—make up America's first park totally under water. This unique preserve

—a stopper in razor teeth. Hitchhiking remoras looses suction disks and rush for scraps

PHOTOGRAPHS BY JERRY GREENBERG • ILLUSTRATION BY GUY WATSON



Silhouetted against blazing sun, a diver glides to the floor of the coral reef preserve.

Scandalized Filefish With Puckered Mouth Seems Asking for a Kiss

Actually, *Stenopus crispus* is making a grunting sound as he swims. Other brilliant reef fish share John Pennekamp Coral Reef State Park with artist-diver Joby Meale. Wake-eyed French grunt (*Haemulon flavolineatum*) inspects her fingers, usually somewhat major (*Amphiprion* satellite) darts between her flippers' feet. Blackhead wrasses and yellowtail snappers (*Oxytrichus chrysopterus*) swim past leisurely. Stinging coral at upper right resembles a basket of flowers. Labeled star coral decorates the reef at lower right.

welcomes the free diver, the red-and-reef fisherman, and the fish watcher. But to the spearfisherman, it is forbidden territory.

While exploring this magnificent marine realm, I encountered only three or four sharks. They did not molest me or any member of my diving party, and we interrupted their privacy only long enough to capture their portraits (pages 71 and 80).

My crew members, who doubled as models, included Joby Meale, a commercial artist; Carl Gutz; Paul Danmams; and young Van Calenhead. Van learned to use an Aqua-Lung three years ago, when he was 10 years old. Now he swims and dives with the best.

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Florida's Coral City Beneath the Sea

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where a tank of air can last an experienced diver about an hour and a half.

And what wonders we saw! Let me show you this world beneath the waves that I find so intriguing and that claims so much of my life. Slip a mask over your face, clench the Aqua-Lung's rubber mouthpiece between your teeth, and deep down with me into the sea.

Awe'd Diver Feels Like Trespasser

As you sink slowly, you experience an exhilarating sense of buoyancy. The air tank felt heavy above the surface; now you are scarcely aware of it on your back. Freed from the demands of gravity, you move like a bird,

free to dive or soar with no other power but your arms and flippers' feet.

Just below the surface, jellyfish pump past as you submerge. Living parachutes, they range in size from a dime to a dinner plate. At 20 feet you touch down on the reef. What had seemed a blurred tapestry of color at the surface now assumes dimensions and patterns.

Deep, winding gullies carpeted with sand slice pliations of coral seemingly as soft, so unobscure you feel they may fade away before your eyes. Such primitive beauty and solitude make a man feel he is trespassing on forbidden ground.

The silence is awesome. Only the sound of breathing through the mouthpiece and



PHOTOGRAPHS BY JERRY GREENBERG • ILLUSTRATION BY GUY WATSON



As a Diver Plants a Warning Flag, His Boat Appears in Flats on Air

"Watch out for five divers," the reef and shore banner tells swimmers coming the water around Molokai Reef, America's first underwater park. The project welcomes divers and real-land reef anglers to its fifty thousand-acre, but prohibits spearfishing. From a marina to be constructed on Laysan Island (page 56), visitors will ride glass-bottomed boats above the coral gardens. Sunlight filtering through the indistinct water differs against coral of thirty or more varieties and tropical fish of two or three hundred different species. In this kaleidoscopic world, swimmers stare at the rock, and the fish struggle back.

Species pictured opposite are queen angelfish (*Hemirhamphys elburina*), barracuda (*Sphyraena barracuda*), hawkfish (*Amphiprion*), parrot, and snapper (*Lutjanus*).

Spotted money lurks in coral ambush



Queen angelfish glides past elkhorn coral



Beard-toothed barracuda awaits prey



Hawkfish rests on pectoral fins

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Diver and dog snapper play follow-the-leader among stands of elkhorn coral. Dog snapper (*Lutjanus griseus*), a popular sport fish, swims 50 pounds.

Sea Fan and Butter Hammer Blend Their Beauty as a Japanese Print

Members of the grouper family, butter hammers (*Hypophthalmus*) wear coats of various colors: blue, pink, yellow, and orange. This six-inch specimen floats above a hawkfish-like colony of star coral and branching fingers of pink coral bottom left. Filigree sea fan at upper right contrasts with skeletal branches of gorgonians at left.

exhaled air bubbling up from the regulator break the quiet. Later, when you have become more acclimated, you may hear the squaking of shrimp, the crumpling of the parrotfish as he feeds, and the grunting noises that many fish make.

Reef Fish Escort Divers on Tour

You wince an air of subdued expectancy. The reef waits in hushed judgment until you make clear your intentions, and it is certain that friends have come to call.

Graciled gorgonians raise arched branches like uplifted arms. These dense stands of horn coral sometimes grow as tall as a man. Patch-based sea fans spread their face to the eddy currents opposite.

Ferocious of staghorn coral, amazingly like

anklers, crown the crest of the reef. Boulder-shaped brain coral exhibits patterns of twisted grooves that bear remarkable resemblance to the surface of the human brain. Star coral, crinoid coral, and leaf coral suggest decorations in a potentate's palace. At least 30 species of coral and 25 kinds of gorgonians adorn the reef (pages 58, 60, and 62).

Three queen angelfish in blue and gold lose their sense of caution, emerge from hiding, and swim toward you. A diverly school of spanglefish shimmers into view and floats high above, below, and beside you, as though providing a path for your swimming pleasure (page 62).

You accept the welcome and begin the tour of a coral metropolis where every square inch teems with life. A red squirrelfish (page 75),



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Feather-duster worms, their feathery plumes expanded, feed on microscopic plankton. Their coloring closely matches that of the reef being sponged to which they cling. These organisms secrete an acid that etches rock and shells.

Fish trailing, a spotted fish darts toward a crevice in the rocks. When disturbed, the creature makes a fluttering noise. Light-colored star coral appears at upper and lower left. Purple sponges appear above lattice coral behind the fish.

Its dorsal fin spread like a fan, peers at you from its rock crevice. Black groupers rest in shadows at the base of an elkhorn coral. In the dark recesses of a coral cavern, a massive jewfish harks to grab the next passing neighbor. Driftless in this underwater housing development convert every hole, crack, and crevice into a biological fish that you have seen nowhere only in aquarium or pet shop tank: serratus major in yellow with black bands; queen trigger, gray with two prominent blue stripes on the face; parrotfish arrayed in green, blue, purple, and even polka dots; blue tangs; and other various fish ranging from yellow to purple; spadefish in silver with black stripes; snappers thick-skinned in olive brown with black-and-white markings; horned cowfish; and others whose vivid colors combine all the hues of rainbow and sunset.

All look larger than anticipated, an illusion caused by magnification. Refraction of light by the water magnifies all objects and makes them appear about 25 to 30 percent larger. Flickering shadows darken the reef as a huge school of parrotfish darts by, yellow tails glinting like ornaments of gold (page 65). Slowly the cloud passes as the fish swim elegantly on, follow the turns.

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DEVELOPMENT BY MICHAEL GOODMAN/ARTIST

Hammerhead shark (top), a remora riding its flank, travels with a covey of yellowtail. Eye and mouth of this shark (bottom) lie at the tip of the hammer.

Papeyed squid, common on the reef, moves by jet propulsion. Its *Sepioteuthis ophiocarpa* swims, its 10 suckers bearing arms press together in the shape of a hook.

White grunts hold a meeting beneath a ledge; one fish member seems to voice his opinion. "Grin and grin" fed the Combs, pioneer settlers on the Keys.

of a coral canyon, and disappear in the distant gloaming. A pancake-thin sting ray flaps limber wings, waves a bumpy-white tail, and skims the sand. An evil-looking barracuda bares razor teeth and swims just arrow-straight (page 75). You have heard that barracuda seldom attack man, but you have a sight of relief when he is gone. A vicious moray eel keeps vigil in a rock cave. Any unwary fish that swims too close will find quick death in the moray's curved teeth (page 75). He is no menace to you, however, unless you try to dislodge him from his lair.

Now a bright green-and-yellow fish attracts your attention. Swimming closer, you watch a parrotfish hovering like a billy above a brain coral. With parrotlike beak and small sharp teeth, it nibbles on the living coral.

You approach a sea whip, or gorgonian, and one of the

many thin "branches" appears to fall off, silt away, and wriggle into a narrow opening. The branch is a trumpetfish—an elongated species that finds perfect camouflage for itself among the gorgonians, whose branches it so deceptively resembles.

You wave your fin gently and slide along the bottom. Beneath you a small pale-blue fish disappears into the sand. At the spot where it vanished, you see a patch of coral with a hole at the top. Close examination reveals a mound of fragments built up around the entrance of the burrow in which the fish

is hiding. The yellowish jawfish has excavated this retreat, then built up the entrance by picking up coral fragments in its mouth and piling one on another. The crater on top of the mound serves as a door into which the fish backs, tail first, to escape pursuit.

Survival of the fittest is the rule of the hierarchy. The shark devours the grouper, which feeds on the snapper, which preys on the snail, which eats the plankton.

Subtly a flacker of gray cuts through

(Continued on page 82)

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Flash and Camera Capture

Subtle Colors of Reef Life

For underwater close-ups, the photographer uses a ring-shaped flash reflector around the lens to eliminate harsh shadows. Here, wrasse devour bits of sea urchin above a huge brain coral.

Lavender branches of a sea fan release spores in a molting process. Giant gummy coral floats in the water above a reef. These animals retract at a touch. Gray lettuce coral floats in the water above a reef. Dark hiding place of a worm. Clipping tube sponge and a red sponge float on microscope glass.



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Star coral uses its delicate green beauty to the shape that live within the polyps and help them extract lime from the ocean. The coral that forms living reefs needs some sunlight for survival. Flourishing within 90 feet of the surface, it usually does not grow below 150 feet, where light is too weak.

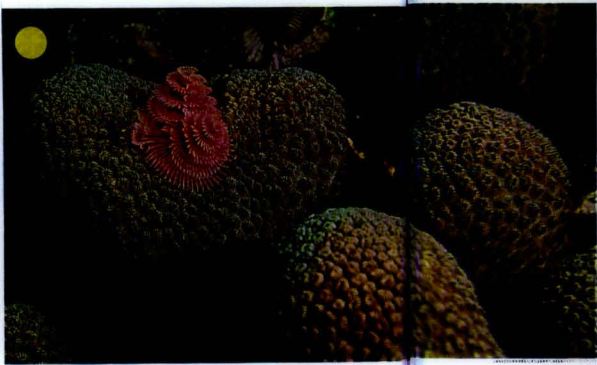


Spiral-shaped (barber) sponges warm, living in a star coral (silver) skeleton swept past by the current.

Hiding a snippet of stinging coral, a hermit worm reaches the end of the line.

Among the amazing variety of living creatures that inhabit the reef are many equipped with stinging cells or irritating spines. Fishers should not touch hermit worms, which are also called fireworms. Still, few believe in the worm's ability to penetrate the skin on contact, producing inflammation and pain. Living on the rocks or dead coral branch, the hermit worm comes out at night to feed.

Stinging corals (transparent) grow on the heavy skeletons of dead sea fans and sea whips. Divers avoid them now, for their stinging tentacles irritate flesh and cause a long-lasting rash.



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...orse may reel at lower light levels almost invisible in a crevice in plaster-like millipore as thinning mud. They wrasse close by kindly swarms in a blur of speed. Yellowhead black rock beauty flits past the waxy wall of millipore and the shudlike gorgonian beyond.



the distant blue haze: A 12-foot tiger shark is rocketing in. You stand motionless, frightened and fascinated as the streamlined giant sweeps through the water, careful fin twitching. On and on comes the monster. When only 10 feet separate you, he turns away. But relief is short-lived as he shoots upward and traces two fast circles above your head. He leaves as abruptly as he arrived.

Breathing becomes more difficult; your compressed air is running low. You pull the air reserve root on the breathing unit and earn a brief reprieve before you start a reluctant return to the surface.

As you rise toward the roof of the liquid world, you try to recall the bewildering variety of life on the reef. How jumbled the impressions are in your memory! Many more tenses will be required before the mind's eyes set on all the reef's living beauties.

Tips on Safety for Beginners

For visitors planning to explore the Key Largo preserve, I offer a few simple but vital tips. First, and most important, the beginner who wants to use self-contained diving apparatus should take lessons from a qualified instructor. Before each dive he should make a thorough check of his equipment.

Never dive alone or stray far from the boat on a first tank of air. Always stay upstream of your boat; in case of emergency, the current will carry you toward it. If you spend

more than two hours in water cooler than 78°, wear a rubber suit. After you've been down for a while, the water begins to feel chilly at 30 feet.

Coral is sharp; watch your step. Be careful, too, where you place your hand. Beware of treading on long-spined sea urchins or brushing against stinging coral.

First Dive an Incomparable Thrill

I remind the amateur photographer that he needs no special magic. If he can take reasonable, decent surface photographs, he should be able to get good underwater shots. Obey the basic rules of surface photography; and you will see the quality improve as you practice and experiment under the sea.

Underwater lighting conditions, of course, will vary with the water, the depth, and the time of day. But if you can see your subject you can photograph it—provided your film gets the proper exposure.

Despite my thousands of dives on the reef, I envy the man who is going below for the first time. It is an incomparable thrill.

James McInerlin, an Australian writer and veteran diver, has expressed it well:

"You are in another world—absolutely—the moment you put your head under the water. This thought will occur again and again, and you will never become tired of saying this little thing to yourself. *It's another world, it's another world.*"

Author-photographer Jerry Greenberg has spent more than three thousand hours, roaming the warm blue off Florida's east coast. He himself designed the Seahawk housing for his camera and flash. His formula for underwater pictures: patience, practice, and proper equipment.

Adjusting his electronic flash unit, Mr. Greenberg stands on the ladder of his 20-foot, twin-engine runabout.

False Eyes and Look-alike Fish Save Butterfly Fish From Hunters

Inhabited by a stripe that partly obscures the true eye, attackers often hang for the big dot near the tail. With a burst of speed, the fish (see text) (C. G. Gardner—Opa/Smith—Eye Spectacular)

