



Pearl rings  
in oyster shells.  
Maui Divers

# Gifts from the Sea

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PICTURE this: You've just learned how to scuba dive and you are about to make your first open-water plunge. As you stand on the deck of the boat, you press the purge valve of your regulator, and it answers with a noisy hiss. You jump over the side and begin the long float down through bright shallow water, through the green mid-depths, down into the deep blue. You hear the loud gurgle of your air bubbles, the mechanical breathing of the regulator, and you strain to see the bottom—a rock, a ledge, anything. You continue down, becoming heavier and heavier with every inch of descent, and finally you see the faint outline of a reef. You settle on the bottom, adjust your

Sound too good to be true? Probably, but it's not as far from fact as it may seem. The oceans of the world contain such a wealth of gems and precious jewels that such a treasure chest would be but a drop in the bucket. In real life, however, such gems are not found so easily; they are retrieved through hard work that is sometimes death-defying. Ocean gems—pearls, corals and shells—are being retrieved in increasing quantities be-

cause they are becoming more and more popular with men and women everywhere, in the form of rings, necklaces, pins, cuff links and tie pins.

buoyancy and then set out to explore. The fish herald your arrival with curious looks, and they tag along as you kick and glide through the silent world of water. Suddenly, something bright catches your eye—a metallic flash that lasts but a moment. The flash seems to have come from a hole in the reef, so you swim over that way. The hole is actually a shallow cave, and just inside that shallow cave you see it: a big brass chest, the kind that pirates carried around on galleons. Your heart skips a beat or two as you open the lid—slowly, carefully. The chest is filled to the top with pearls, valuable shells, precious coral. You begin to stuff them into your goody bag . . .

## Corals

CORALS, when seen underwater, look like unlovely, scraggly tumbleweeds. Brought to the surface, pro-

cessed and polished, those scraggly tumbleweeds become valuable, shining black, pink, red or gold "gems." Precious coral jewelry has come into such demand that the industry is worth, worldwide, an estimated \$500 million a year. The major area for coral harvesting is Hawaii, and black coral is also abundant in the Caribbean and the Bahamas. In Hawaii, there are extensive black coral beds off Lahaina, and black coral is also har-

vested from the southern coast of Kauai; from Sandy Beach, Oahu; and from South Point and Majukona on the big island of Hawaii. The largest pink coral harvest in the islands comes from the Makapuu bed off Oahu, in the Molokai Channel.

In the Caribbean there are black coral beds deep along the Lucaya Ledge off Freeport, Bahamas. Enormous eleven-foot coral trees have been taken from the sea off Andros Island. At Palancar Reef, Cozumel, a nine-foot piece of black coral was brought up from the deep and presented to the president of Mexico.

There are other countries in the world with healthy coral industries, too. Japan does a fair amount of exporting, and in the Mediterranean the red coral industry keeps several picturesque Italian towns busy carving, cutting and polishing.

While the precious coral business has enjoyed a recent boom, coral has been part of the story of man for some time. Red coral was a symbol of immortality to the ancient Greeks, and they believed it would protect its owner from all sorts of ills. The Mayans carved lucky charms from black corals, and because European kings carried scepters of black coral, it has been called "king's coral."

As with any other gem that is hard to locate and obtain, the value of precious corals seems to be proportionate to their elusiveness. Only the varieties of coral that come from deep water are valued for jewelry making. While shallow-water corals are common in every ocean of the world, most, if not all, are too soft and porous to be used in jewelry. In Hawaii, the valuable species of black coral (*Antipathes dichotoma* and *A. grandis*) are found only at depths of between 100 and 350 feet. Pink coral (*Corallium secundum*) and gold corals (genus *Parazoanthus*) are found at depths of from 1,150 feet to 1,600 feet. In the Pacific, pink and red corals are found only below 300 feet, and the famous red coral of the Mediterranean occurs at depths of up to 900 feet.

The problems of harvesting from such depths are directly borne by the men who do the harvesting. In Hawaii and Mexico there are divers in wheelchairs, divers who limp, divers with collapsed muscles. Many other divers have died—victims of nitrogen narcosis, the bends, or sharks.



(Left, top) The golden cowry of the Indo-Pacific is one shell that commands a high price. (Center) The pink lip of the queen conch is used in the making of cameos. (Bottom) A display "tree" of pink coral.

The most obvious problem associated with harvesting corals from such extreme depths is the bends, the dreaded diver's disease caused by staying too deep too long. There are about fifteen commercial divers in Hawaii who regularly dive 150 to 250 feet deep, and each one knows he can't dive like that indefinitely.

For a while the world's major coral harvester, Maui Divers, used a deep-sea submersible to collect coral trees from the Makapuu bed off Oahu, and this device was the answer to a diver's prayer. While the sub dived to depths of 1,500 feet and more, the men inside remained at surface pressure, which meant no risk of the bends. Mechanical clippers snipped the corals, which simply fell into a front-loading basket. Such submarine dives, however, were expensive—about \$2,400 a dive—and Maui Divers finally discontinued the use of the sub. If new beds of coral are discovered, such harvesting expense would again be justified.

During the good times in the Makapuu coral beds, a good haul was a hundred pounds, an average haul fifty to seventy pounds. In the raw state, pink and gold corals are worth about \$50 a pound. After they are cured, cut, carved, polished and made into jewelry, however, these corals are worth about \$500 a pound. At that rate, a hundred pounds of coral would more than pay for the cost of a submarine dive, but coral beds are protected by law (and by reputable harvesters) from overexploitation. Old coral beds are treated with respect, and new beds are not always where you think.

Coral is actually a colony of very slow-growing animals, a fact which surprises a lot of people, who think of coral as some kind of plant. (Coral is often referred to as "trees," which doesn't help clarify matters.) The "tree" part of the coral, that part which is used in the jewelry-making process, is actually the skeletal home of millions of tiny animal polyps. These animals extend their feathery feelers to feed on the plankton currents of the ocean, and each animal secretes a limy substance around itself that is similar to the bones of humans.

When seen underwater, a coral tree



has a fuzzy appearance, created by the microscopic feelers of the animals. If the coral is touched, the feelers withdraw and the fuzzy appearance vanishes.

It takes a long time for coral animals to build a commercially harvestable "tree." Precious coral growth rates range from two and a half inches per year for the black species to about one-third inch per year for the pink. Corals have a life span of about seventy years.

Once a coral tree is brought to the surface by divers, the outer layers of living coral polyps are removed. Then the tree is shipped to a plant for sorting. Workers, who wear masks to protect themselves from dust and the strong smell of dead polyps, then begin the sawing, sanding, polishing and buffing.

Pink coral is so dense that it has to be cut under a fine spray of water to reduce the heat generated by friction. Gold coral is cut dry so that flaws can be detected. Black coral is sanded with water, because friction can cause reddish-brown spots to appear.

The base of the coral tree can be cut across and made into rings, or it can be cut into smaller pieces for use as pendants. Tiny branches are cut into nuggets for earrings and beads, and forked limbs are put aside to be set with pearls or other stones and made into pins.

The value of the coral depends upon its color and size. Top-quality gems are free from spots and flaws. A fine black coral is a deep, rich, opaque, obsidian-like black. Gold coral is valued for its chatoyance, the cat's-eye effect that makes the immovable stone seem liquid. Pink coral has the most variations; there are at least a hundred shades of pink, ranging from salmon red to almost white. The most desirable color is a translucent pink called angel skin.

The coral industry boom can probably be measured best by Maui Divers, the world's largest precious coral jewelry manufacturer. This company, which started as a combination dive shop and curio store, began diving for black coral in 1962 with a work force of three. Today the company employs over five hundred workers. Maui Divers spokesmen claim that they can trace a gem from where it was harvested in the sea to the store where it is placed on display, and in that sense they consider their coral jewelry "pedigreed." Maui Divers now has outlets



Model displays a pink coral ring and earrings which enhance her dark good looks. Maui Divers/Jeanne Long

in the Caribbean, South America, Asia and Europe —most recently in Dusseldorf and the United Kingdom.

## Pearls

PEARLS are actually an accident of nature. When an oyster or other mollusc feels the intrusion of a grain of sand, a piece of seaweed, a bit of shell or a parasite worm, the animal either tries to reject it or else begins to coat the irritant with a limy substance called nacre. Nacre is the iridescent mother-of-pearl that lines the insides of such shells, and a concentration of this nacre results in a pearl.

Before the development of pearl culture, the pearl industry depended

upon harvesting oysters in the wild, and as many as fifty thousand shells had to be collected to find one decent pearl. Pearl divers used hard hats and air hoses, and death was their constant companion. At King Sound on Australia's northwest coast, 145 helmet divers died between 1909 and 1917 while collecting oysters. In one year, thirty-four pearl divers perished. In those early years, nothing was known about the bends or nitrogen narcosis, the drunken effect produced by breathing nitrogen at depth.

Today, in Mexico, in the South Pacific's Tuamotu Archipelago, and in Japan, divers who simply hold their breath still make repeated dives every day to depths of over a hundred feet. The best divers can gather as many as a hundred and fifty or two hundred shells in a day, but the price they pay is

taravana—oxygen starvation or anoxia, which is the result of repeated breath-hold dives. The Ama divers of Japan, primarily women divers who learned their trade from their mothers and their mother's mothers, have long been known for their remarkable skill at repeated breath-hold dives to depths of a hundred feet and more. They too risk the physical perils of overexposure to depth, oxygen starvation and shallow-water blackout, but they consider their profession honorable and regard it almost with reverence.

Even with the advent of pearl culture, such hazardous diving operations are still considered necessary, because oysters are needed to "host" the pearl. A cultured pearl is essentially the same as a natural pearl, but the intrusion of an irritant is planned, not accidental. Oysters are implanted with a nucleus, which is usually a grain of sand. That might seem enough to get the pearl started, but it isn't. It's not just the presence of a foreign body in the interior of an oyster that makes a pearl; it's the epithelial cells in the sub-epidermal tissues of the mantle. (Simply put, it's the part of the oyster that's the slimy stuff.) These living epithelial cells are what secrete the nacreous matter, and without a particle of this epithelium, a grain of sand will not become a pearl.

Pearl culturists usually do it this way: First they make an incision in the host animal's flesh. Then they take a bit of the soft, slimy mantle from another pearl oyster shell and put that into the incision. Then the nucleus, or grain of sand, goes in on top of the piece of mantle. A good culturist can do an average of a hundred and fifty of these operations a day, or thirty thousand seedings a season.

After the operation, the oysters go back into the ocean, sit around on oyster rafts or on partitioned ocean bottoms, and do what normal oysters do. If all goes well, the small grain of sand will become a large pearl in a few years. Periodically the seeded oysters are X-rayed to see if the nucleus is being coated with nacre or if it has been rejected. (Fifteen to twenty percent of the oysters reject the nucleus.) If the pearl becomes attached to the shell itself, it will become irregular or baroque in shape. The optimum situation is for the pearl to remain free-floating in the soft, delicate tissues of the animal. The cultured pearls which



(Top) Dr. Richard Grigg of the U. of Hawaii, one of the world's foremost authorities on corals, surfaces with a black coral tree collected during a deep dive in Hawaiian waters. (Bottom) Dr. Grigg makes notes on a black coral tree.

grow in the ideal fashion will, in most cases, be rounder, smoother and more regular than natural pearls.

## Shells

SHELLS are jewels in and of themselves, needing no cutting, sanding, grinding or polishing. They are the protective homes of soft mollusks, snail-like animals which extract calcium from seawater to produce their hard, calcium-carbonate encasements. The colors and patterns of seashells are so decorative, so varied, that it is hard to imagine nature displaying any greater originality than this.

Throughout time, shells have been used as jewelry, fertility charms, money,

and symbols of royalty. As with any ocean gem, the rarer the shell, the more valuable it is. The golden cowry of the Indo-Pacific is one such shell that commands a high price. At one time in the Fiji Islands, only high chiefs could wear or own the golden cowry, and today a good specimen of the shell sells for several hundred dollars.

Divers in the Caribbean often see the giant queen conch crawling along the sandy bottom, leaving its long, serpentine trail behind it. The outside of the conch shell may not appear beautiful, but the lip of the shell is a gorgeous flaming pink, and this portion of the shell is used in the making of cameos.

Cones, murexes, cowries, whelks—there are thousands of species, all different, some common, some rare, some traded, some sold for thousands of dollars. (One rare cone, *Conus bengalensis*, has sold for as much as \$2,500.) Shells are collected commercially and recreationally, and they are sold in curio shops and specialized shell stores. Most people, even if they have only a marginal interest in the sea, have a shell they like sitting on a shelf somewhere.

Corals, pearls, shells—these gifts from the sea are all given to us by living animals, and therein lies the rub: Should we be taking vast quantities of living animals for purposes solely of profit, ownership and fashion? Or is it enough to know that these treasures are there, at the bottom of the sea, without seeing them?

Fortunately, while we've learned to salvage the treasures of Davy Jones's locker with the tools of modern technology, we've also managed to salvage a scientific knowledge of the deep. The same technology that has made collecting at extreme depths possible has taught us the growth rates of coral. It is with this knowledge that the state of Hawaii and the governments of Mexico and the Bahamas have initiated management programs to keep coral beds healthy and productive.

When we buy or wear a lustrous string of pearls, a beautiful black V-shaped branch of coral or a pink angel-skin coral, let's take the time to recognize how these beautiful gems came to be. In this manner, our gifts from the sea are doubly rich. ①

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