

Problems in Paradise

By MARY and LAURANCE S.
ROCKEFELLER

Photographs by
THOMAS NEBBIA

Setting an example, the King of Tonga officiates at a dedication ceremony for the Polynesian realm's first national parks—a group of four. Holding an abacus, a simple but versatile computer he uses to promote understanding of mathematics in Tongan schools, the monarch briefs conservationist-author Laurance Rockefeller.



The late Charles A. Lindbergh joins the Rockefeller (right) to witness the power of an ocean blowhole on Tongatapu. A dedicated conservationist, the "Lone Eagle" of aviation history felt deep concern for the future of the South Pacific, where pockets of pollution already serve notice that the onrush of technology needs careful control.

SMOG PRESENTS NO PROBLEM for a kingdom of Polynesian farmers who own only 300 motorcars. "Besides," adds the king, "this island is so flat that sea breezes blow right through from any direction."

Thus it seemed to us all the more remarkable that His Majesty Taufa'ahau Tupou IV, King of Tonga, was setting a wise example of environmental conservation for the South Pacific islands. We stood beside him as he proclaimed the first four national parks in the history of his realm: a beach area, an archeological site, and two parks on offshore reefs. We hoped that this heartening act would serve as an example in other remote Pacific areas we saw on a recent 28,000-mile trip.

The editors of NATIONAL GEOGRAPHIC proposed this environmental survey at a fortunate moment. Mary was already planning to inspect Pacific projects of the Young Women's Christian Association. We soon found our separate missions fused, for the values of humanity and nature are merging worldwide into a single new concern.

Our good friend, the late Charles A. Lindbergh, who also attended the dedication of the Tonga parks, saw great promise in the Pacific. He remarked during our meeting with the king: "The Pacific area is still open to the degree that our American West was years ago. Thousands of square miles can be set aside and protected and used for the benefit of people. Here is a great opportunity." We shall certainly miss this far-seeing and dedicated conservationist.

Beauty Survives, But Problems Lie Ahead

Like General Lindbergh, we found the South Pacific still a paradise. We explored islands with a true Garden of Eden quality. We met hundreds of friendly people. And we swam in lagoons where brilliantly hued fish showed no fear of man.

A Fiji photographer told us of the ease of making photographs in the South Pacific with an underwater camera; the visibility often exceeds 150 feet. And looking at the teeming fish in those serene and crystal-clear lagoons, we pondered the future of aquaculture—farming the sea. Someday, much more of man's essential protein supply could come from such places.

But we also found some danger signs. Many Tahitian residents were deeply worried about nuclear tests in the atmosphere of French Polynesia. So were people farther west, as

Mary saw in Fiji, where YWCA girls were lettering placards for antitest demonstrations. And in their social center in Suva a popular local composer of rock music strummed a chorus with this refrain: "Polluting and poisoning an ocean means destruction of humanity."

French Scientists Defend Nuclear Tests

French officials, of course, differ sharply with such sentiments, as we learned at the Laboratory of Radiological Surveillance on Tahiti. Here French scientists test specimens collected in at least 15 island locations.

"Since 1966 we have tested everything," said Dr. P. Guillermin, then deputy chief of the laboratory: "Seawater, soil, fish, plant life. We conclude definitely that people here have not been exposed to radiation that would be dangerous to health. Actually, the radioactivity in certain parts of France—in our native rocks—is greater than one can find here. And in South America's Andes—ah! They have ten times the radiation of the earth here."

Still we found many people worried about the tests. A New Zealander wondered if "anyone knows the danger of flying a supersonic

jet through that high-altitude fallout?" The Prime Minister of Fiji, Ratu Sir Kamisese Mara, smiled wryly when the subject came up. "If nuclear testing is so safe," he said, "why don't they test in the Mediterranean?"

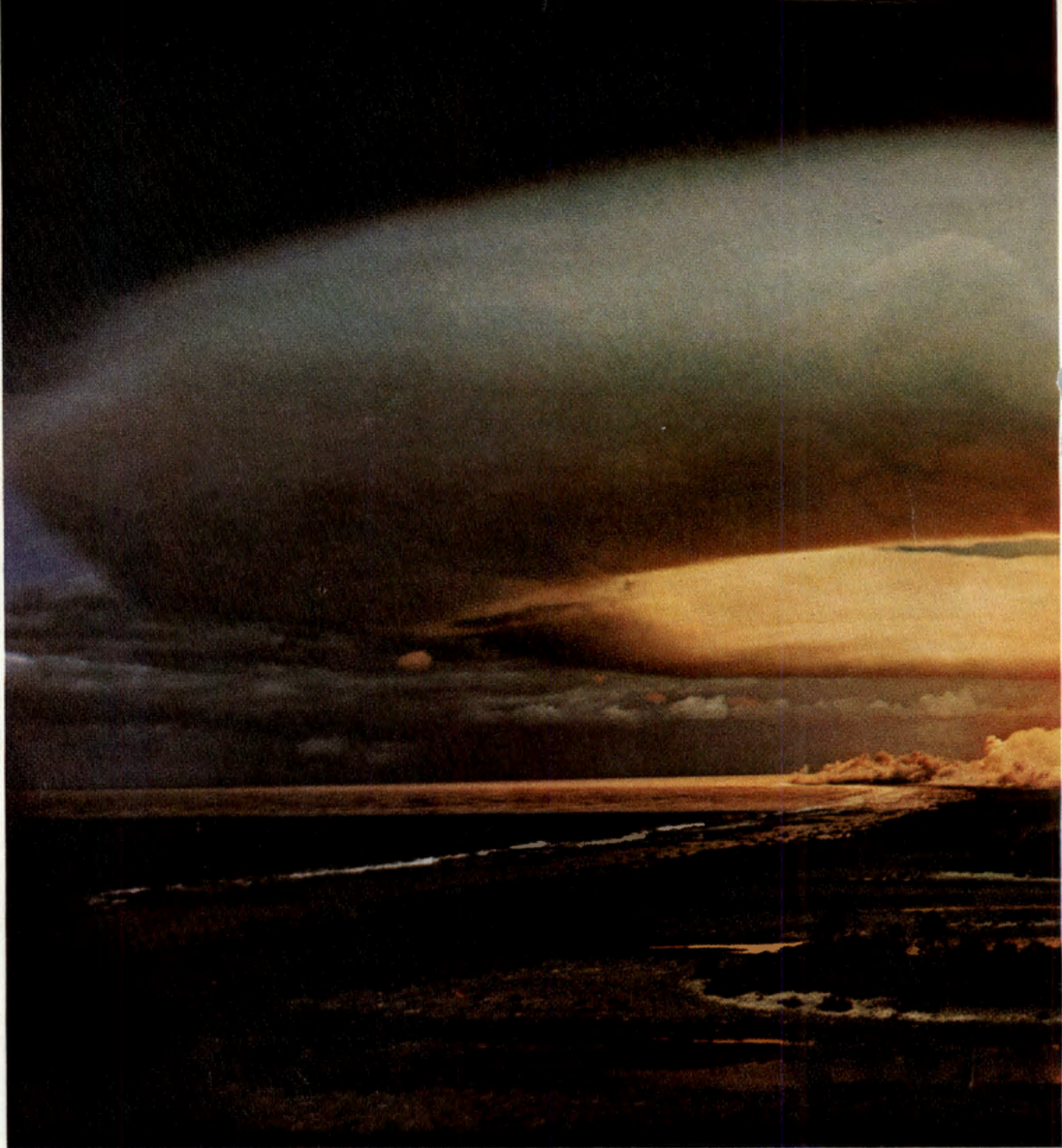
Such thoughts were voiced at the fifth South Pacific Forum, when area leaders met on Rarotonga in the Cook Islands. And though disapproval failed to halt the 1974 French atmospheric nuclear tests, President Valéry Giscard d'Estaing has now acknowledged the power of world opinion; as of 1975 all French tests will be underground.

Other environmental problems seem less dramatic than the explosion of nuclear bombs, but solutions may be more complex. Consider, for example, the pollution of ocean waters.

At the Aquarium de Nouméa, in New Caledonia, we asked distinguished marine biologists Dr. and Mme René Catala-Stucki about underwater life on the reef.

"In this shallow water," Mme Catala-Stucki said, "if one minute organism dies, so do others. Life on the reefs off Nouméa was damaged seriously. But now, to our great satisfaction, marine life is reappearing."





Ominous mushroom blazes over France's atomic testing ground at Mururuva atoll, 800 miles from Tahiti. French authorities insist that fallout poses no danger to humans, despite the skepticism of islanders and the protests of nations on the Pacific rim. Wages and employment in nearby Tahiti have escalated with the influx of French scientists and military personnel, but island culture continues to erode.

They cite the oil dumped by ships entering Nouméa's harbor: "Oil comes onto the reef, there is not enough oxygen, then the minute algae die—and that's only the beginning."

We wondered about the vast strip mines on New Caledonia, cutting away at a third of the world's proven nickel reserves. What about mining silt that drains onto Pacific reefs?

"Here, oil is worse," said Mme Catala-Stucki.

Similar oil-pollution problems face the fisherfolk living around the harbor of Apia in Western Samoa. But in neighboring American Samoa, Governor John M. Haydon showed us a new sewer line being installed to ring Pago Pago Harbor. And harbor police there now levy about \$4,000 in fines each month, enforcing an antipollution law.

Flying over the eastern part of American



COMMISSARIAT ENERGIE ATOMIQUE (FRANCE)

Samoa, we made a brief aerial inspection of Rose Atoll, an obscure yet fascinating scrap of land. Through a few random clouds we saw an almost-square, uninhabited atoll some two miles across (pages 788-9). Its reef supported two islets, one a mere sandspit and the other some 350 yards long and "well wooded, which gives it a very pleasant look of freshness." So wrote a French observer in 1819.

"Untamed" Atoll May Succeed for Science

Later visitors tried unsuccessfully to tame Rose by planting coconuts. But, like many atolls, it has a porous soil structure that lets rainwater percolate straight through, and there is no freshwater source there other than rainfall. The coconut palms died, and no people ever settled permanently. To this day no one knows the amount of that rainfall.

And yet this inhospitable, remote little wildlife refuge is gathering international importance. A young Peace Corps zoologist running a turtle hatchery some 200 miles to the west, on the island of Upolu, told us that Rose is an important nesting ground of the shy, rare green sea turtle. And a research bulletin of the Pacific Science Board went even further: "Conceivably, Rose may soon be the only refuge left for breeding of the seabird and turtle faunas of the Central Pacific."

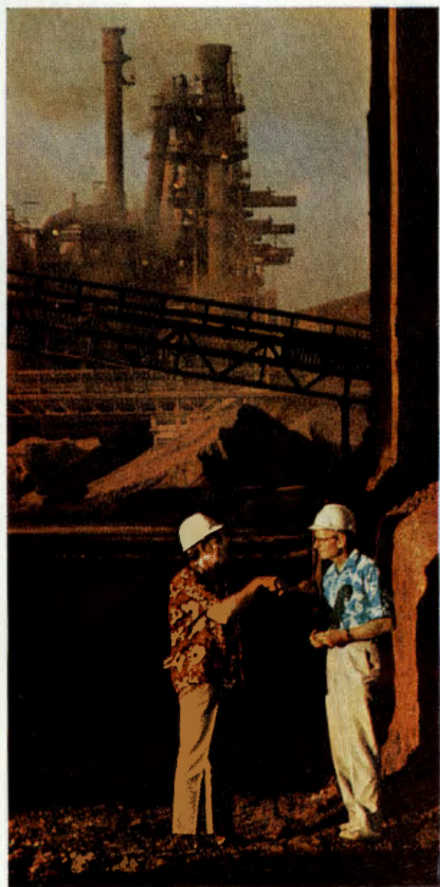
For such reasons, Rose Atoll has been proposed by numerous ecologists as a U. S. contribution to an international project: Islands for Science. Under this plan, a number of islands around the world would be set aside permanently and exclusively for scientific study. Lawyers are now drafting a treaty to make it possible. We wish them success.



Raw wounds of strip mining deface the nickel-rich mountains of New Caledonia (left); silt flows downriver to soil coastal waters. The Melanesian island started booming economically in 1970, when prices and demand for nickel rose sharply.

A smelter churns out air-polluting smoke (below) as Mr. Rockefeller confers with an official of Société Le Nickel. Aware of environmental hazards, the company plans an extensive clean-up program.

A cosmopolitan city whose heart is reminiscent of Paris, New Caledonia's capital of Nouméa sprawls into a suburb (right). Private homes renting for \$400 to \$600 a month jostle new shops, and the odors of Gallic cooking mingle with the smell of freshly poured concrete.



DAVID L. ARNOLD, NATIONAL GEOGRAPHIC STAFF (ABOVE)

The study of marine life in these areas is coming none too soon. In recent years fishing fleets have gone to sea with the most expensive equipment in history. Yet, even as worldwide need for food increases, the catch of world fisheries has faltered and in some recent years even declined.

The evidence is troubling; intensive, indiscriminate fishing and abuse of our fishing waters have begun to impinge upon this worldwide source of protein. Eventually, uncontrolled marine harvests and factors such as pollution could upset the biological balance of all the oceans. Many edible species of marine life could be seriously depleted. So, just as primitive man abandoned the nomadic life of the hunter for farming and animal husbandry, modern man is turning toward the old dream of large-scale aquaculture.

The Japanese began intensive aquaculture

in the 19th century, and now operate more than 160 major marine and oceanographic research institutes, some of them comparable to U. S. agricultural experiment stations. Across southern Asia, from the Philippines to India, commercial aquaculturists have begun to raise milkfish, a food species that subsists on plant life. In other places the oyster, salmon, and shrimp industries are moving toward mass-production aquaculture.

True aquaculture eventually will develop its own brood stock. Today's fish farmer raises his fry from larvae or from eggs taken from female fish. But recently Dr. Ziad Shehadeh, using the facilities of the Oceanic Institute in Hawaii, has been working with mullet. He has succeeded, under laboratory conditions, in hatching mullet from eggs laid by captive fish. The long-range prospects are exciting: 12 adult mullet used as brood stock could



theoretically provide up to three million fry.

Unfortunately, aquaculture and clean water—with its dearth of food organisms—are incompatible. A decision will have to be made to determine which is more important: the clarity of coastal waters, or the wealth of precious protein which they could offer.

Misguided Imports Damage Islands

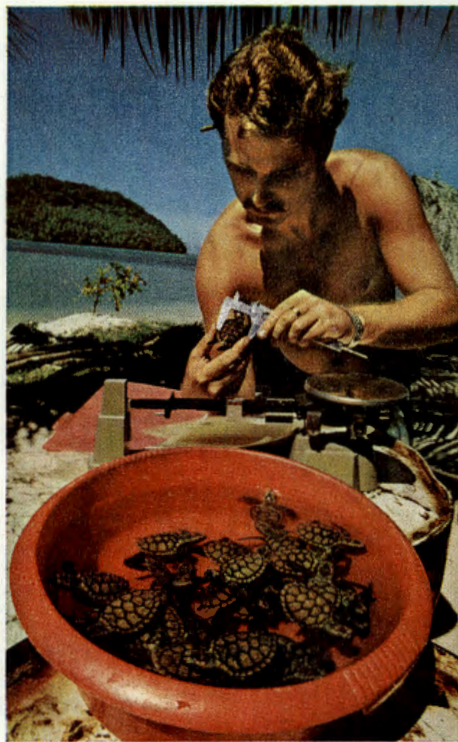
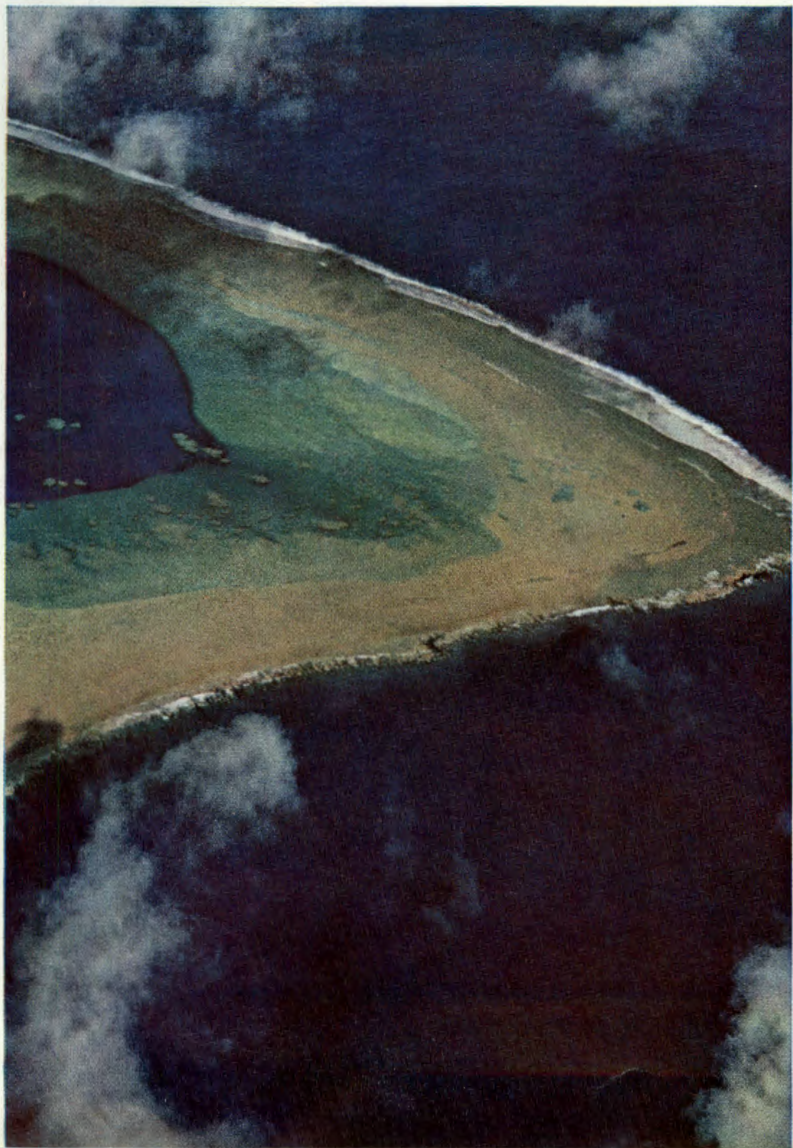
Our friend Gene Setzer, Vice President of the National Audubon Society, observes that the well-being of birds is “significant for all forms of life—like the miner’s canary.” In such terms, our Pacific augury is not entirely encouraging. On Tahiti we saw many noisy mynas, a species introduced from India to control Tahitian wasps. The wasp still thrives, and the myna has proved an aggressive competitor of indigenous birds.

Beneath Mount Vaea in Western Samoa,

where birdsong once reminded Robert Louis Stevenson of “the hails of merry, scattered children,” we saw only the energetic bulbul, another alien from India.

Yet on neighboring Savai’i, we were pleasantly surprised. We had heard that loggers had destroyed the forest habitat of many birds. One species found only on Savai’i and Upolu islands, the tooth-billed pigeon, had seldom been reported in recent years; some ornithologists feared for its survival. So it was with excitement that, during our brief inspection of Savai’i, Gene Setzer found a tooth-billed pigeon, and officially reported the fact. But when he told a Samoan woman about his sighting of this rare bird, her reaction took him aback. “Yes, a marvelous bird!” she agreed. “Simply *delicious!*”

In the South Pacific, man has a long history of biological meddling. “Our mistakes were



Sand specks of Rose Atoll National Wildlife Refuge (left), each a few hundred yards long, are important nesting grounds for the green turtle. In nearby Western Samoa, biologist Wayne Witzell measures hawkbill turtles (above) in a hatchery program.



made early," said P. H. C. Lucas, Director of National Parks and Reserves in New Zealand. Indeed, he sketched a textbook case of ecological calamity.

"Before the Polynesians came," Mr. Lucas told us, "New Zealand had no mammals except bats. The birds had no real enemies, so unique species evolved—like the kiwi and certain rails—without functional wings. The vegetation had never known a browsing mammal. Well, the Polynesians brought rats and dogs. Then European sailors brought pigs that went wild. British settlers wanted deer hunting, so we had a whole rash of deer—red deer, Rusa, Virginia white-tail, you name it. Your Mr. Theodore Roosevelt even gave us the start of an elk herd."

Sports-minded citizens even set up acclimatization societies to introduce new animals to New Zealand. They imported some 220 species, of which about 70 became established in the wild.

"The forest floor was soon overgrazed," said Mr. Lucas. "At Egmont National Park, for example, we had goats eating trees from the ground up and Australian possums eating from the top down. Heavy rains brought accelerated runoff and erosion—and a whole series of floods throughout New Zealand in the 1920's and 1930's.

"It was a near disaster. So in the mid 1930's government policy changed. Instead of protecting these introduced species, we established a bounty system to encourage hunting.

Now New Zealand exports about 5½ million dollars' worth of venison a year to markets around the world. Our basic policy is working. At Egmont, for example, the old vegetation is now returning."

New Zealand today enjoys a good environmental reputation—fine national parks, clean hydroelectric power, and low population.

Other successes can be reported from Australia. "When I was a student at the University of Melbourne," recalled one young woman, "we marched in demonstration to save the kangaroo. I guess we succeeded."

Indeed they did. Mr. D. F. McMichael, now Secretary of the Department of the Environment and Conservation, insists that "we have good reason to believe that Australia has more kangaroos than ever before." Population estimates run into the millions. The reason is improved habitat plus government protection. Sheep raisers need permission to cull kangaroos on their land.

Australian environmentalists are alert. Although they complain that "we're lagging

behind the U.S.A. and Europe in our auto-emission controls," they have made a good start with laws and agencies working to combat all forms of pollution.

Neither the problems nor solutions seem surprising in developed communities. But consider this story, told us by our friend Charles Lindbergh. Visiting a few years ago on Tutuila in American Samoa, the pioneer aviator was entertained by the chief of a fishing village.

"As part of their feast," said General Lindbergh, "the people brought out corned beef and canned herring from New Zealand.

"I said, 'Chief, don't you have any native fish from the reef?'

"The chief said, 'No. We no longer do any reef fishing. All the men work in a canning factory at Pago Pago. No time to fish. The boys go to school. They can't fish.'

"So then I asked, 'How do you feel about the effect of civilization on your village?'

"The chief pointed to a palm tree covered with a strange growth, and he said, 'Civilization is like that weed on our palm trees. You cannot get it off, and it always kills the tree.'

"How do you like civilization?' I asked.

"Oh," said the chief, 'I like civilization.'

That chief, I fear, spoke for all mankind.

Soon after we had pushed our way through the Tahitian traffic in Papeete, a friend showed us a book with this description by a French visitor: "It was Europe . . . under the aggravating circumstances of colonial snobbism, and the imitation . . . of our customs, fashions,

Flush with wages from a U. S.-financed tuna cannery in Pago Pago, an American Samoan draws himself a beer from the tap on his dashboard (left), which also boasts a stereophonic radio. A portable TV lets him watch mainland football games, taped for local broadcast.

In Tahiti (below), an acculturated couple pampers the mechanical fruit of their new affluence.

BOTH BY DAVID L. ARNOLD



vices, and absurdities of civilization. Was I to have made this far journey, only to find the very thing which I had fled?"

Those words of artist Paul Gauguin were first published in 1901. Whatever Papeete's problems today, they are not new. But growing populations—and growing cities—endanger the ease of island life.

Western Samoa has one of the highest birthrates in the Pacific—a fact that puts a premium on land available for food production. Thus when loggers cut down forests, pressures arise to oppose the replanting of trees. This leads to a questionable exchange: present and future timber harvests for larger crops to feed a growing population but, in the long run, the specter of dangerous erosion.

Fijians Flock to the Big City

In Fiji the birthrate has declined, but the population has been moving to the capital, Suva, creating new social dislocations. "In about five years we've gone through fifty years of cultural change," said Ruth E. Lechte, the observant YWCA executive there. "I know one girl who has a master's degree from the Australian National University at Canberra; her parents are simple villagers. She says, 'I love them, but in two hours we've said everything we can say.'

"And about 70 percent of all Fijians are under 30 years of age. In his village a young man has never been anonymous since he was a day old. He always has a fulfilling place in society. Then he comes to Suva and no one knows him. He feels lonely, so he goes to a pub and gets drunk." Miss Lechte and the YWCA are fighting such problems with social centers, counseling, and leadership courses.

A psychiatrist who has long observed the Pacific island peoples offers them this advice for mental health:

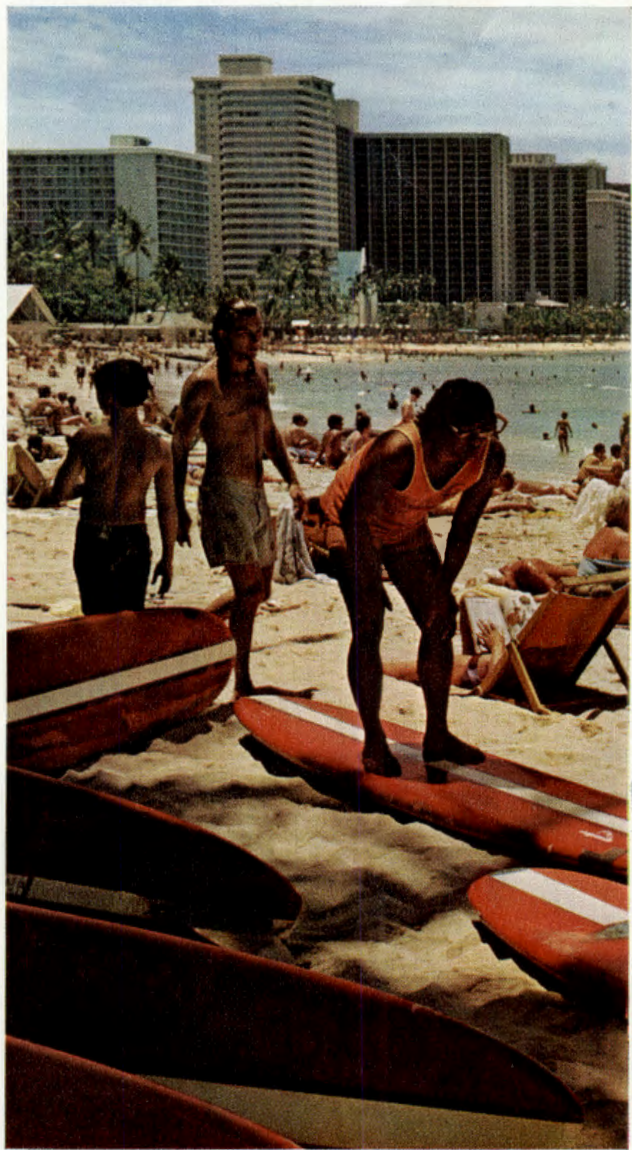
"Live your own culture," he suggests. "Recover it where lost. Enrich it where possible. Acquire as much of foreign technology as you can without identifying with the culture from which it stems. Add . . . the rediscovered

Surf's up, along with high-rise hotels and the cost of living in tourist-packed Honolulu. Here on Waikiki Beach, mainlanders practice their surfing stance. Tourism poses bittersweet problems for the Pacific, where opportunity remains for wise development.

truth that, 'Life is a lifelong learning process.'" Such is the prescription of Dr. Karl Schmidt, formerly of the South Pacific Commission, an eight-nation organization that itself provides much cause for hope.

From its Nouméa, New Caledonia, headquarters, commission specialists review the ecological problems of four and a half million people scattered over more than seven million square miles of ocean. One problem is the rhinoceros beetle, scourge of all islanders whose economies depend on coconuts.

Insect pathologist Karl J. Marschall gave us the background: "In 1909 Western Samoa imported rubber plants from Ceylon—shrubs to use as a windbreak. The larvae came in the



straw packed around the roots. In two years, the beetle spread like wildfire through Western Samoa."

And beyond: It reached American Samoa about 1912, the Wallis Islands in 1931, Fiji in 1953, and Tongatapu in 1961. Named for its rhinolike horn, the beetle behaves more like a rodent than an insect, devouring that most delicious of salads, heart of palm. Lately research has brought success: Scientists have found two enemies of the rhinoceros beetle—a virus and a fungus—that show great promise in controlling this pest.

In such ways modern man makes restitution for his past mistakes. We can take some comfort in the words of Capt. James Cook,

probably written on the last of his three voyages to the islands around Tahiti: "I own . . . it would have been far better for these poor people, never to have known our superiority in the . . . arts that make life comfortable. . . it may be too late to go back to their old less perfect contrivances. . . For, by the time that the iron tools of which they are now possessed, are worn out, they will have almost lost the knowledge of their own. A stone hatchet is, at present, as rare a thing amongst them, as an iron one was eight years ago. . ."

Cook was right. It is too late to go back. But with wisdom and restraint we can still move forward. In the serene South Pacific, man's opportunity endures. □



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NATIONAL GEOGRAPHIC



**A FOUR-PART LOOK AT
THE ISLES OF THE
PACIFIC**
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HERMAN MELVILLE once described the relationship between human genius and man's perception of it as a "shock of recognition." I like to think that Melville, who wrote so eloquently of the Pacific and its peoples, would have enjoyed this month's four-part presentation on the Pacific Islands—for it all began with just such a shock.

Author David Lewis made a casual inquiry of a Tongan about sailing directions through a reef-studded archipelago. "I was flabbergasted by his reply," he recalls, "for it meant that the age-old lore of the sea by which the Polynesians had populated the Pacific was still known—by a few, but known."

David devoted three years to the search for that ancient knowledge, and found it, an achievement that helped earn him the Gold Medal of the Royal Institute of Navigation and the Superior Achievement Award of the Institute of Navigation of the United States, a rare double, richly deserved.

To bring this epic tale to our members, our editors, photographers, and writers logged a combined 200,000 miles of Pacific travel—though not without hazard. Photographer William Curtsinger was attacked and twice slashed by a shark while swimming in the lagoon of a remote and uninhabited island. The fact that David Lewis is a physician and had a supply of antibiotics probably saved Bill's life.

His colleague, Nicholas DeVore III, found himself just in time to join a Micronesian crew for an extraordinary canoe voyage of 550 miles across the open ocean. Nick suffered from intestinal flu the whole way: "Nine days on a wet roller coaster." He was alert enough to notice, however, that the crew had added a new element to the ancient navigational repertoire of wind, wave, star, and bird—jet contrails, marking the Pacific sky and pointing the way to land.

Artist Herb Kawainui Kane, who grew up in the steep Waipi'o Valley on the "Big Island" of Hawaii, combines the talents of artist, sailor, and amateur anthropologist. "All Polynesian culture relates to the canoe," claims Herb. He and his friends in the Polynesian Voyaging Society hope to underline that point when they sail a 60-foot double-hulled canoe to Tahiti and back in 1976, using navigational techniques that the world thought were long forgotten.

Several times this past year we had the pleasure of "pulling out all the stops" for an article we thought deserved it—the world-ranging and timely story on gold, the survey of American wilderness at a crossroads moment, the achievement of our frontier in space, Skylab, our account of the glory of the Phoenicians, and that mind-dazzling summary of our new knowledge of the universe itself.

At the moment, our writers and photographers are sailing in the wakes of Columbus and Drake, ranging the new Alaska, exploring the remains of Maya and Celtic civilizations, probing the archives of the American Revolution—but we will let their work speak for itself in forthcoming issues.

It seems a shame that our popular associate in geographic adventure, the award-winning National Geographic Society television series, will be represented by no new programs this year. Word that we had been unable to obtain a commitment from the networks for prime viewing time reached my desk just before the news that one of last season's documentaries had won two coveted Emmy awards. In this case, the shock preceded the recognition.

Silbert Browner

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December 1974

ISLES OF THE PACIFIC

I—Coming of the Polynesians 732

Recent research, says famed anthropologist Kenneth P. Emory, finally allows us to reconstruct one of the great explorations of all time—the discovery of the Pacific Islands.

II—Wind, Wave, Star, and Bird 747

Putting away his compass and charts, veteran voyager David Lewis rediscovers the "lost" arts of the Polynesian navigators. Photographs by Nicholas DeVore III.

III—The Pathfinders 756

Two thousand years of Pacific seafaring spring to life in the paintings of Hawaiian artist Herb Kawainui Kane.

IV—Problems in Paradise 782

Even the idyllic South Seas face growing environmental hazards, conservationists Mary and Laurance Rockefeller learn. Photographs by Thomas Nebbia.

SUPPLEMENT: *Islands of the Pacific and Their Discoverers, distributed with this issue.*

The Enduring Pyrenees 794

Robert Laxalt, himself of Basque descent, and photographer Edwin Stuart Grosvenor travel through the sequestered mountain domain of the French-Spanish border.

The Columbia River 821

Writer-photographer David S. Boyer traces the river that, more than any other in North America, has been tamed to work for man.

China's Newest Treasures 848

A shroud of jade and a flying horse highlight the trove of Asian art now touring the Western World. Photographs by Robert W. Madden.

Caribou: Hardy Nomads of the North 858

Jim Rearden tells of Alaska's still-immense herds of barren-ground caribou—the "buffalo" of the last U. S. frontier.

COVER: "Eyes full and sparkling," wrote Bounty mutineer James Morrison of Polynesia's women. Photographer H. Edward Kim confirms the observation in this portrait of a girl of Bora Bora.