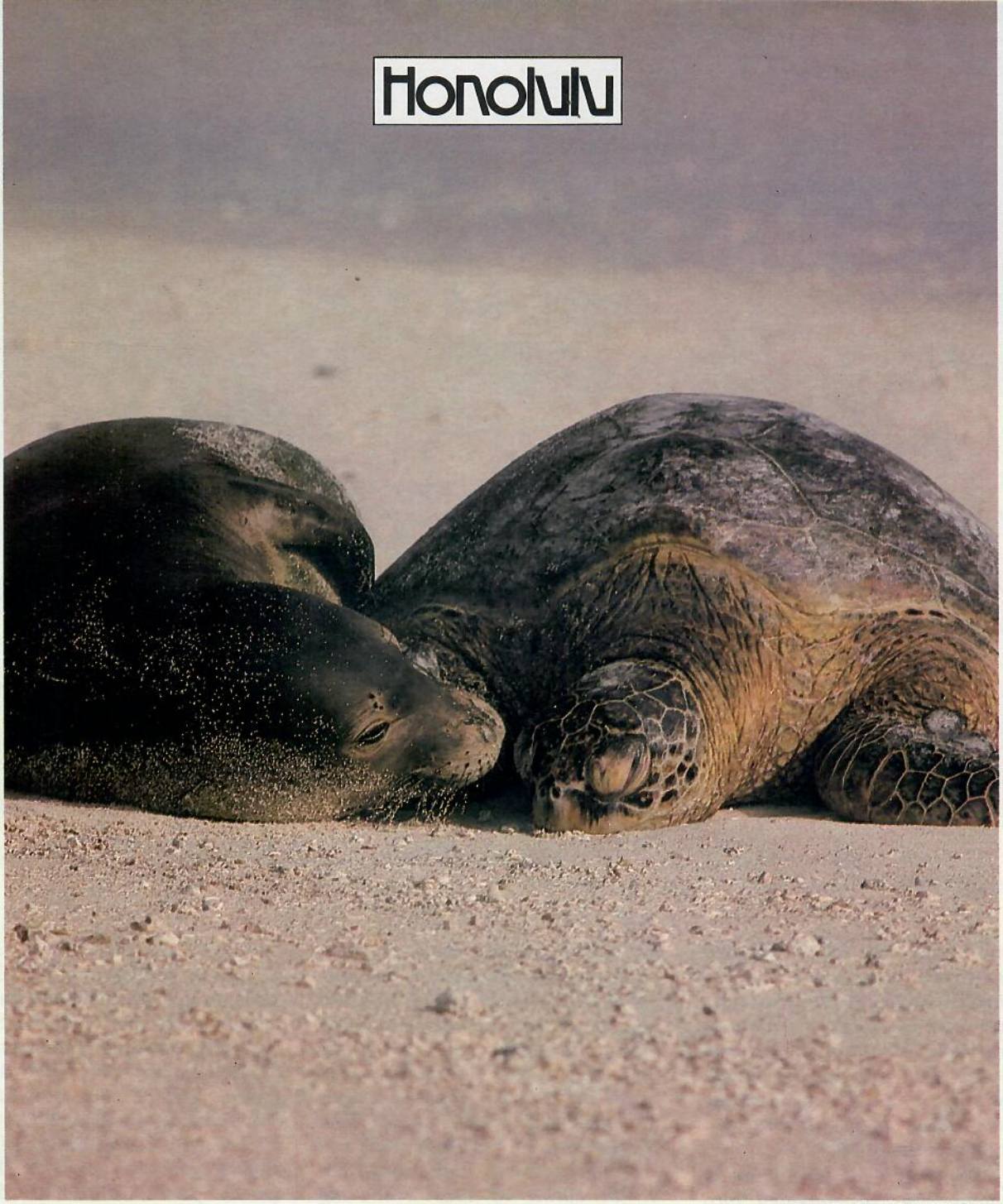


Photos by George H. Balazs

Hawaii's Endangered Wildlife

What Chances for Survival?

By Victor Lipman

A Laysan albatross and Hawaiian monk seal: "Charles Darwin would have loved Hawaii."

Laysan Island, a speck of land covering two square miles in the northwest reaches of the Hawaiian Archipelago, was once an ornithologist's dream. Among its inhabitants were three bird species—the Laysan millerbird, the Laysan rail, and the Laysan honeycreeper—found nowhere else in the world.

In 1890, men came to Laysan to dig guano, the accumulated bird droppings of centuries, rich in nitrates and valued as fertilizer. In 1903, Captain Max Schlemmer, manager of the North Pacific Phosphate and Fertilizer Company, introduced rabbits to the island. Just why remains unclear. Some say he simply wanted to vary the diet of his workers. Others contend that Schlemmer, an entrepeneurial sort, planned to can or smoke the rabbits and later sell them in Honolulu.

Whatever the reasons, the results were disastrous. In the absence of natural enemies, the rabbits rapidly multiplied, roaming the island, ravaging the vegetation, and ruining the habitats of Laysan's rare birds. Within two decades, having exhausted their food supply and turned the island into a desert, the rabbits began to die off. But for Laysan's unique bird species it was already too late. By the early 1920s, the Laysan rail and millerbird were both extinct, and in the spring of 1923 a swirling sandstorm finished the job. With members of the Tanager Expedition on hand to witness and document the occasion, the last three Laysan honeycreepers passed quietly out of existence.

Victor Lipman is a freelance writer.

It would be comforting to think the case of Laysan Island was merely an isolated incident, a freak disaster in the middle of nowhere, but it isn't. In the past two centuries, more than 20 species of Hawaiian birds have gone the way of the Laysan honeycreepers.

Today, Hawaiian wildlife is in trouble. The national endangered species list reads like a *Who's Who in Hawaiian Wildlife.* Of the 97* animals found in the U.S. that the federal Fish and Wildlife Service currently considers endangered, 33 are found only in Hawaii. Birds, both famous and obscure, dominate the list, but seals, turtles and bats appear as well. "Hawaii's flora and fauna," says Eugene Kridler, U.S. Endangered Species Coordinator for the Pacific, "have been screwed up more than the other 49 states' combined."

According to Andrew Berger, University of Hawaii professor of zoology and author of *Hawaiian Birdlife,* Hawaii's ecological disruption began "in earnest" with the arrival of European sailors in the late 18th century. Though earlier Polynesian settlers undoubtedly destroyed some lowland vegetation in order to plant taro, bananas, and sweet potatoes, it is difficult to assess, with no written records, their impact on land and wildlife. "We can only guess at it,"

**This figure (97) does not include endangered fishes, clams, mussels and insects.*

says Berger.

But with the white men came rapid change. To insure they would not go hungry on future voyages to the islands, the Europeans brought with them and released cattle, horses, sheep, goats and pigs. In 1794, Captain George Vancouver even persuaded King Kamehameha to declare a 10-year *kapu* on the killing of these animals, a ban that lasted until 1818. At the time, it seemed like an intelligent, even far-thinking idea.

Literally given a royal welcome to Hawaii, the new animals prospered. The climate was hospitable and they found no natural enemies. They ate their way from the lowlands into the mountains, munching and trampling an inviting selection of plants, turning lush forests into pastures, and decimating in the process thousands of square miles of prime bird habitat. "If you destroy the forest," says Berger simply, "the birds go, too."

"It was done in ignorance," he explains. "Ecology didn't become a discipline until 50 years or so ago. They just didn't think in terms of ecosystems or the interrelations of plants and animals. It was all there to harvest."

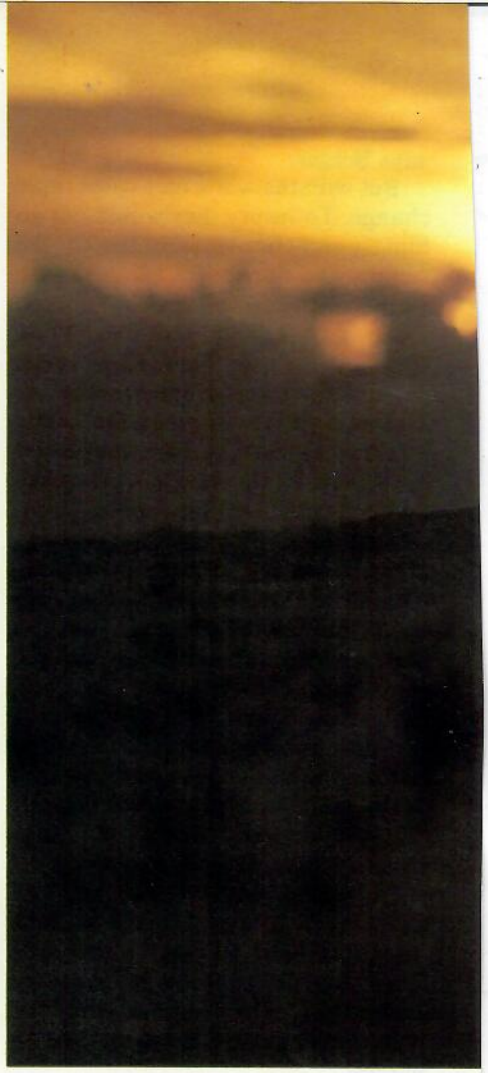
Charles Darwin would have loved Hawaii. Isolated by 2,500 miles of ocean from the nearest land mass, it would have made for him an ideal natural laboratory. And one of its bird families, the honeycreepers, is considered every bit as fascinating as the finches Darwin studied in the Galapagos Islands.

Hawaiian honeycreepers are striking examples of what is called "adaptive radiation." Though presumably descended from a common ancestor, honeycreepers have evolved in different ways to suit different environments. There are over 20 species of Hawaiian honeycreepers, and even more subspecies, with remarkably varying bill shapes displaying evolution's handiwork. The bills of Nihoa finches, for example, are short, stout, and suited for cracking open hard seeds, while the bills of iiwi are long, delicately curved, and perfect for sipping nectar from flowers. Today, nearly half of all honeycreeper species are endan-

U.S. Fish and Wildlife Service

The nene: Tagged for observation.

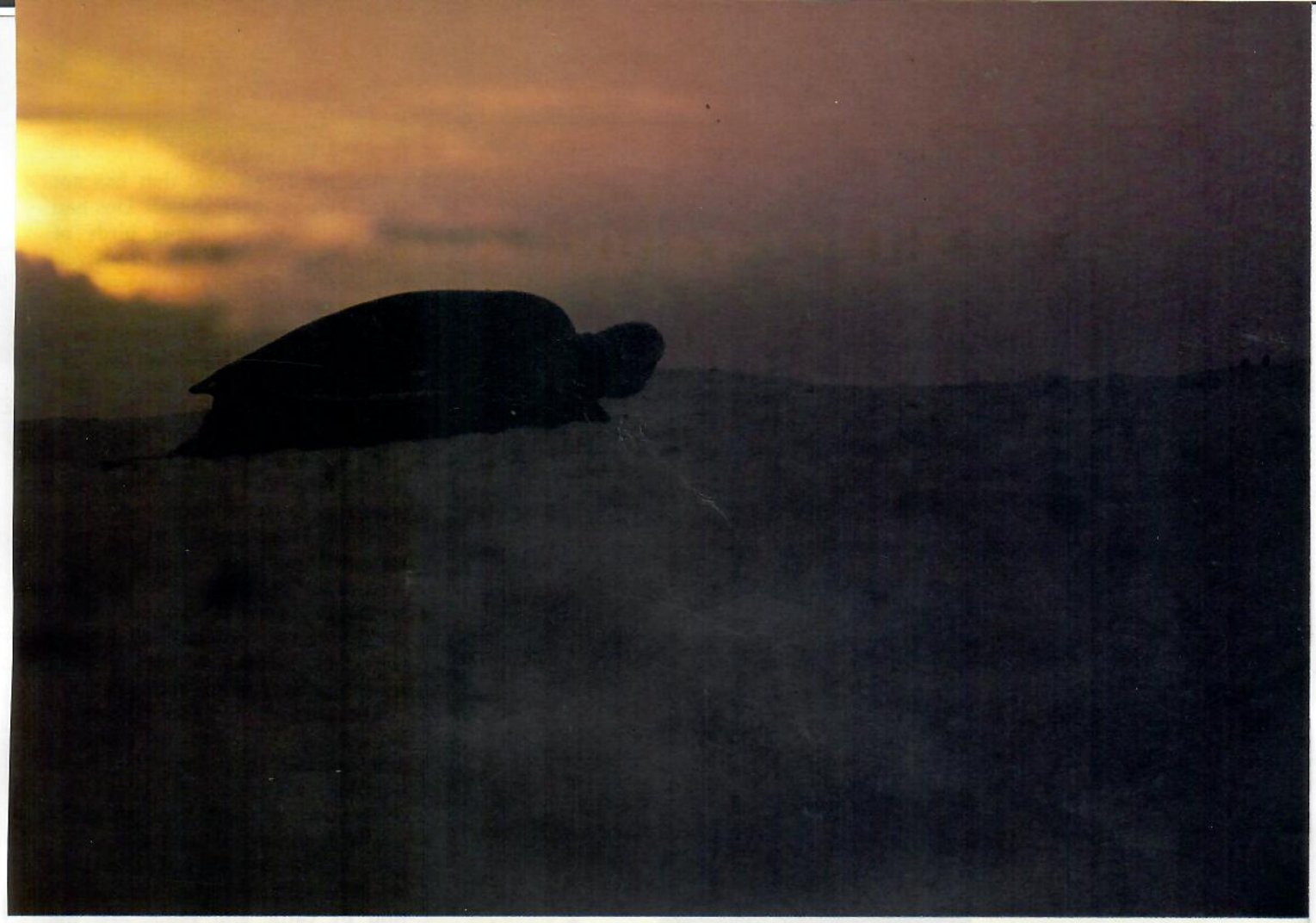
U.S. Fish and Wildlife Service

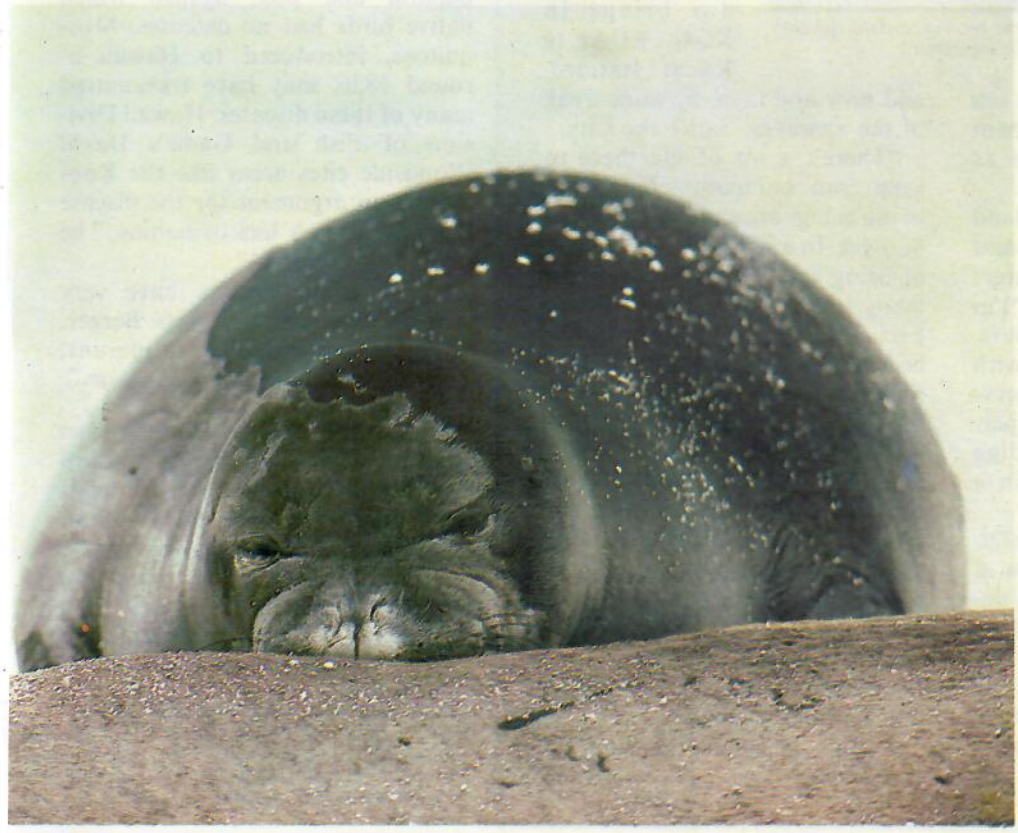


The Nihoa finch (above left): "Displaying evolution's handiwork."

The Hawaiian stilt (left): "Without wetlands, Hawaii's waterbirds have no place to live."

The Hawaiian green sea turtle (above): "Shy, gentle creatures long a source of mystery and fascination to man."



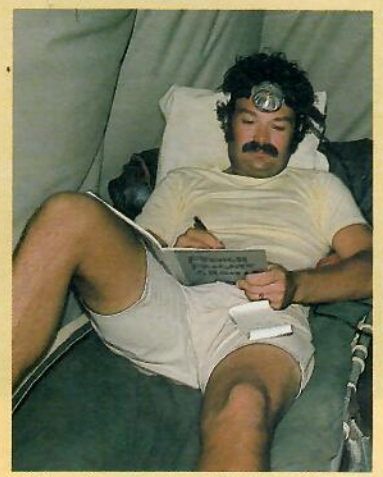


The Hawaiian monk seal: A recently weaned pup.

Life in the Field

Endangered Species Coordinator Eugene Kridler calls it "a young man's game."

He is speaking of fieldwork, the nuts and bolts work of wildlife management, where researchers study animals in native habitats, often contending with miserable weather, primitive living conditions, and solitude, where researchers encounter pigs so wild they are tame, since they know no fear of man.



Balazs in tent recording data (photographed with self-timer).

One such worker is George Balazs, 34, of the Hawaii Institute of Marine Biology. His laboratory, though, is no university facility. It is French Frigate Shoals and other remote islands. His specialty is green sea turtles, and his interest in them has taken him into the field for as long as 3½ weeks at a time.

What is it like, sharing an island with none but seals, turtles and seabirds, the wind and the water?

"I enjoy it," says Balazs. "I'm rarely bored." His waking hours, he explains, are crammed with data-gathering activities, observing turtles basking, nesting, perhaps tagging them, and recording his myriad of observations in a scientific diary.

A recent expedition in collaboration with Causey Whittow of the university's physiology department, was devoted to finding "What happens thermally to turtles. How hot does the shell get? How much of this heat is transferred internally? How do they orient to the sun?" Though this may sound a bit esoteric, admits Balazs, it has very real management implications, since it can help determine just what sort of beaches are necessary for the threatened green sea turtle to survive.

To work effectively, a researcher must learn to co-exist with animals. "Turtles fear the presence of man," says Balazs. "We want to study what they're doing naturally. If we impose influences that alter behavior, we're studying something abnormal."

The loneliness "comes in surges," says Balazs, but a transistor radio brings in KGU, KUAI (a Kauai station), and now and then, by some freak of the airwaves, Salt Lake City.

"There's a lot of life there to keep you company. There are living beings around you, and a lot of them. In a sense I have a feeling of being very privileged. There're many times now I've been to French Frigate Shoals during the breeding season and known that they (the turtles) will be right over that rise. As many times as I've walked up and come over that rise, and have seen for the first time for that particular year, the site with all those old girls lying there, snoozing away . . ."—he searches for the right words—"it's just fantastic. This is one place in the world where those turtles can lie on the beach and no one is going to bother them."

Softly, he adds, "I hope it continues." **—V.L.**

gered. Another one-third are believed to be extinct.*

Another forest bird that has not fared well has been the oo. Oos had the misfortune of being birds of brilliant plumage, with lustrous yellow feathers pleasing to the eye, like richest velvet to the touch. Cloaks and headdresses made of oo feathers were a favorite of Hawaiian *alii*. The feathers of 80,000 birds were used, it is estimated, to fashion Kamehameha's cloak.

A curious bird that responds readily to imitations of its calls, oos were once fairly common on Hawaii, Molokai, Oahu and Kauai. All species were thought to be extinct by the turn of the century, but in 1960 the birdwatching world was shocked by the discovery of a Kauai oo deep in the Alakai Swamp. At best, a handful of oos may be left today.

The reasons for the decline of Hawaii's forest birds are complex and difficult to pinpoint. Though hunting is always a conspicuous and convenient scapegoat, and probably was a factor in the oos' disappearance, most knowledgeable observers assign a larger role to habitat destruction by cattle and goats, and the introduction of avian diseases, like malaria and pox, against which native birds had no defenses. Mosquitoes, introduced to Hawaii around 1826, may have transmitted many of these diseases. Hawaii Division of Fish and Game's David Woodside cites areas like the Koolaus as an argument for the disease theory. "There's lots of habitat," he says, "but no birds!"

"Most island species have very narrow requirements," says Berger. "They're ecologically intolerant. They're not like the house sparrow."

The story of the mongoose in Hawaii would be rather comical were not its consequences serious. If the earlier importation of land mammals was an unwitting mistake, the introduction of the mongoose was a triumph of hasty bad judgment. Hoping to eradicate the

**Note the word "believed." Since many bird species survive in small numbers and are found only in inaccessible areas like dense rainforests, data is necessarily imprecise. Occasionally, as with the Kauai oo, a species long thought to be extinct will be rediscovered!*

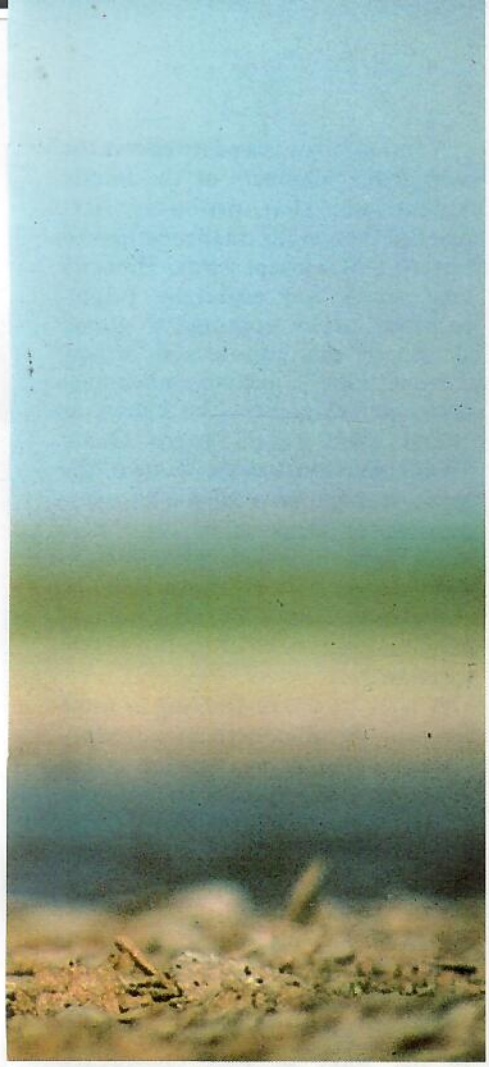
rats plaguing their cane fields, sugar growers shipped in crateloads of mongooses from the Caribbean in 1883. The only problem with this inspired plan was that the growers were woefully ignorant of the ways of mongooses. Mongooses are diurnal animals but rats are nocturnal, so their paths seldom crossed. Instead of curbing the rat problem, mongooses and rats joined forces (in a matter of speaking) for a concentrated attach on the eggs and young of several species of ground-nesting birds like the koloa, or Hawaiian duck, and the nene, or Hawaiian goose.

Over the years, the much-loved nene—Hawaii's State Bird—has had to contend with more than just mongooses. Though flocks of nene once inhabited the Big Island's grasslands and high lava country, predation by feral dogs and cats and hunting by man have taken a heavy toll. Hunting was particularly destructive, since the winter hunting season coincided with the nene's breeding period. Hunting was banned in 1911, but 40 years later, in 1951, only 33 nene were left.

Then came one of the most encouraging chapters of Hawaii's recent ecological history—the Nene Restoration Project. Funded first by the Territorial Government and later by U.S. Fish and Wildlife Service, a program to rear nene in captivity for release in the wild was begun at Pohakuloa on the Big Island. The project marked man's first attempt to save a species by raising it in captivity. Taking special precautions to control predators and protect young nene until they are old enough to fly, the state has slowly replenished the nene population. The important question, of course, is how do pen-raised nene fare in the wild?

Fish and Game's David Woodside says statistical data seems to indicate the population is increasing. Though the nene's position remains a precarious one, roughly 700 nene live on the Big Island today, another 100 to 150 live on Maui, and the state has established a similar program, also at Pohakuloa, to save the Hawaiian crow, whose population has dwindled to about 50.

Whale-Skate Islet, French Frigate Shoals, site of several of the accompanying photographs.



The Laysan Duck (above): Once hunted for feathers.

While a female green sea turtle basks (above right), a brown noddy tern rests on her back.

Right: "For the green sea turtle, experts express wary optimism. For the monk seal, they are worried."

Monk seals taking a snooze: "They cannot tolerate outside influences."

A Bird Goes to Court

On January 27, 1978, with a little help from its friends, the six-inch-long palila filed a federal suit against the state of Hawaii, asking that feral sheep and goats be removed from its habitat in the mamane-naio forest on Mauna Kea.

The plaintiff in this still-pending case is one of the few remaining finch-billed Hawaiian honeycreepers in a state which ranks first in the nation in both extinct and endangered birds. The palila received federal recognition as an endangered species in 1966, when its total population was estimated to be in the low hundreds. (That figure has since been raised to approximately 1,500.)

Charles van Riper

The Palila: "Habitat degradation has been extensive."

Dr. Charles van Riper, who has spent years studying the palila, says the major factor working against the bird's survival is the reduction of habitat. "Habitat degradation has been extensive, primarily because of overbrowsing by introduced feral sheep," his study reports.

But Lester Wong, the deputy attorney-general handling the case for the state, maintains that removal of the sheep and goats would not necessarily insure the restoration of the forest and the palila population. "More study is needed," he says, "since there might be any number of other factors involved. Plant disease, climate, bird disease, insects . . ." In the meantime, the state's antagonists say that what *is* known is that the sheep and goats are wreaking havoc on the forest.

Earl Pacheco, one of 10 children in a Big Island family that hunted pigs, goats and sheep on Mauna Kea in order to put meat on the table, has a different worry: urbanization.

Pacheco has long fought further development of Mauna Kea, recruiting birdwatchers and others to help him fight against paved roads to the summit, reckless proliferation of astronomical observatories and support facilities, motorcycle race tracks, permanent ski facilities and other tourist attractions.

He also is an outspoken proponent of maintaining a sheep population on Mauna Kea for recreational hunting. But if the state has any notion that its maintenance of sheep on the mountain has earned it the goodwill of this hunter, it is grossly mistaken.

Pacheco is not particularly upset by the palila suit, and he does not dispute that the sheep are eating both the trees and the ground cover which holds the soil from the ravages of wind erosion. But he is outraged at what he perceives to be the state's mismanagement of Mauna Kea and its inability to protect the mountain's native wildlife and provide for hunters' recreation as well. With over 80,000 acres to work with, he believes, the state should be able to handle at least that much.

—Jack Warner

A less familiar island dweller is the land snail. Members of the family Amastridae that probably first reached the islands on the feathers or feet of storm-swept birds, Hawaii's land snails are especially bright-colored, often coming in glossy shades of red, yellow and brown. Around 1900, a peculiar phenomenon that has come to be known as "Land Shell Fever" seized Oahu. Snail collection was the name of the game. It might have been a harmless pastime in moderation since land snails then abounded, but collectors soon turned it into a disaster. Some enthusiasts reportedly accumulated personal collections of up to 100,000 specimens.

A later fiasco, resembling in some respects the ill-conceived introduction of mongooses, occurred in the 1950s when the Hawaii Department of Agriculture imported a large breed of carnivorous snail from Florida to control Giant African snails. Unfortunately, Florida snails did not turn out to be very discriminating eaters. They devoured not only unwanted Giant African snails, but also countless native land snails as well. In the wake of such onslaughts, Endangered Species Coordinator Eugene Kridler concludes, with just a trace of nervousness in his voice, "I don't think we need feel secure about our little land snails at all." As he says this, he is wearing a shirt patterned, appropriately enough, with attractive prints of the extinct Hawaii oo.

In Hawaiian mythology, the gallinule flew to the home of the gods and brought back to the people the gift of fire. On the return flight from the heavens, so the story goes, flames from the blazing torch singed the gallant gallinule, thus explaining why its forehead is bright red. Legends, however, have been far kinder to the Hawaiian gallinule than has the course of modernization.

Like the Hawaiian stilt, coot, and koloa, the gallinule is a waterbird. Unlike forest birds, whose fates are often shrouded in miles of impenetrable rainforest, the predicament of Hawaii's waterbirds is right out in the open. The story of land development in Hawaii is one of utilizing wetlands, filling marshes, and draining swamps. Examples surround us. Ala Moana

Center was once a duck pond. Waikiki had vast swampy areas. Parts of Hawaii Kai and Enchanted Lakes were once teeming with marsh life. "Lands have been converted to other uses," says Kridler. "They've been urbanized, especially on Oahu. They've been converted to cane fields, to pineapple." And without wetlands, Hawaii's waterbirds, quite simply, have no place to live.

Most conservationist energies in Hawaii, explains Kridler, are now being directed toward saving waterbird habitat. Gallinule, stilt, koloa and coot are all officially classified as endangered. Though excellent wetlands still exist on several islands, they are by no means secure. Effluent from a sewage disposal plant poses a potential hazard to Kanaha Pond on Maui, the state's best waterbird area. "We weren't able to prohibit construction of the plant," says Woodside, "but we were assured they will be monitoring it and do have alternatives if pond waters are affected."

The U.S. Fish and Wildlife Service recently purchased large tracts of land—917 acres on Kauai and 42 acres on Molokai—which will be preserved for waterbirds.

To the northwest of the eight major islands stretches the rest of the archipelago, a broken chain of tiny islands and atolls virtually uninhabited by man but a haven for native and migratory seabirds. In response to a public furor over Japanese feather hunters who were ransacking seabird populations to supply the millinery trade ("Women were in big for feathers," notes Woodside dryly), President Theodore Roosevelt, by a 1909 Executive Order, established the Leeward Islands as a bird reservation. Later the name was changed to Hawaiian Islands National Wildlife Refuge. Though Roosevelt's action did not prevent the Laysan tragedy, whose forces had been set in motion six years earlier, it has likely saved numerous species from a similar fate. In addition to four types of endangered birds (the Nihoa finch, Nihoa millerbird, Laysan finch and Laysan duck), these distant islands and their surrounding waters provide a home for two of Hawaii's most popular rare species—the monk seal and green sea turtle.

Technically, because of what Hawaii Institute of Marine Biology's George Balazs refers to as "bureau-

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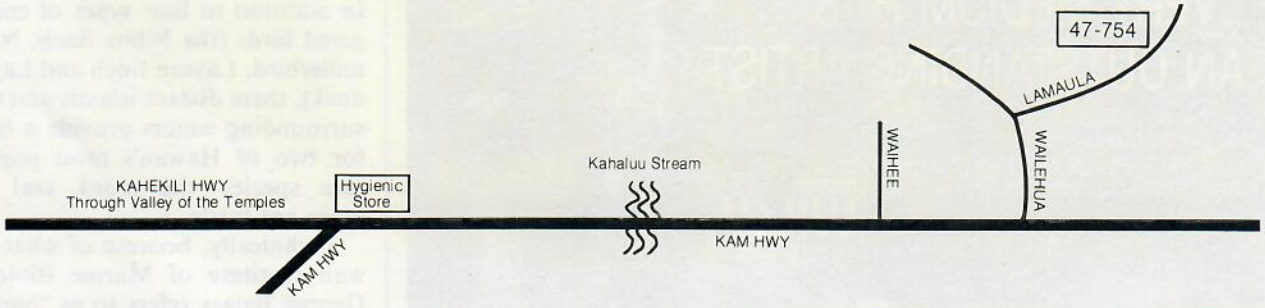

cratic foot-dragging," the Hawaiian green sea turtle is not yet listed as "endangered" by the U.S. Fish and Wildlife Service. Whatever their official status, however, green sea turtles are less plentiful than they once were. In 1859, a visitor to French Frigate Shoals' East Island reported seeing hundreds of turtles basking in the sun.

Maybe he was exaggerating," says Balazs, who has spent many months in the field studying Hawaii's turtles (see related story), "but even if he saw 100, that's still five times more than you'd see in the middle of any breeding season right now."

Shy, gentle creatures, long a source of mystery and fascination to man, green sea turtles live most of their lives in the ocean, but return to land to nest. Evidence suggests they lay their eggs on the same beaches they themselves were hatched out upon. Hawaii's only colonial nesting site is at French Frigate Shoals and nesting occurs between May and August. While this makes it convenient for researchers to study them, it also makes them an easy mark for those with less benevolent intentions. Until a few years ago, the local restaurant industry was steadily depleting Hawaii's sea turtles by making steak and soup out of them. But in 1974, a state regulation was passed prohibiting the taking of turtles for commercial purposes. Though the law does permit some limited home consumption, and Balazs admits poaching can be a problem, he is encouraged by the events of recent years. "I'm optimistic," he says, "the situation has improved considerably. We have a very turtle-conscious public in Hawaii right now." The total breeding population today is around 1,500.*

Unlike the green sea turtle, which regularly journeys to the major islands, the Hawaiian monk seal ranges only among the Leewards, secluded by vast sweeps of sea from the disturbances of man. Their coats turn brownish as adults, but pups are jet black and famous for their sad, intelligent eyes. In the 1800s, monk seals were hunted for their blubber, used in making lamp oil, but their nature is such that man could easily cause their extinction without ever lifting a finger against them. They cannot tolerate outside influences.

**Another turtle species, the hawksbill, so named because of its pointed beak, is present but extremely rare in Hawaiian waters. Only five nestings have ever been reported.*


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The mere presence of boats or fishermen can cause them to abandon their habitat. This has already happened in the Atlantic, where a Caribbean species was driven into extinction in the 1950s. Between 500 and 1,500 monk seals are probably left in Hawaiian waters.

In the last decade, increased public awareness has resulted in a blizzard of legislation protecting endangered species and requiring of developers environmental impact statements. "Hawaii has an excellent endangered species law," notes Berger. But words on a piece of paper cannot guarantee survival. They are no defense for turtles against poachers, for birds against mongooses or accidents like shipwrecks that could foul the water or bring rats to outer islands.

What does the future hold? For some of the more publicized species, like the green sea turtle or the nene, experts express wary optimism. But for others, like the forest birds or the monk seal—that cling to a fragile existence in a shrinking habitat—they are worried. Berger, who has spent decades studying, observing and writing about Hawaiian wildlife, speaks in the subdued, measured tones of a man prepared for the worst. "Money is too important," he says. "It's a matter of perspective, of what you think is important. This is the problem you face in discussing this with bankers, lawyers or politicians. . . . They don't see the need for it. What difference does it make if we lose a bird species or a turtle?"

"The last word in ignorance," once wrote famed naturalist Aldo Leopold, "is the man who says of an animal or plant: 'What good is it?' "

• • •

Extinction is a normal life process. Animals live, like the dinosaurs, and they die. Indeed, there are no assurances that man as a species will survive. But here in Hawaii, by bringing in strange animals, by changing the face of the land, by hunting indiscriminately, man has upset natural balances. Much of it was done unintentionally, to be sure, but this seems lame consolation. For far from the bustle of Honolulu, in the wilderness of the Alakai Swamp or on a sandy atoll in the mid-Pacific, more than a few of God's creatures may well be slipping unnoticed, but for a concerned few, through the twilight of their days.

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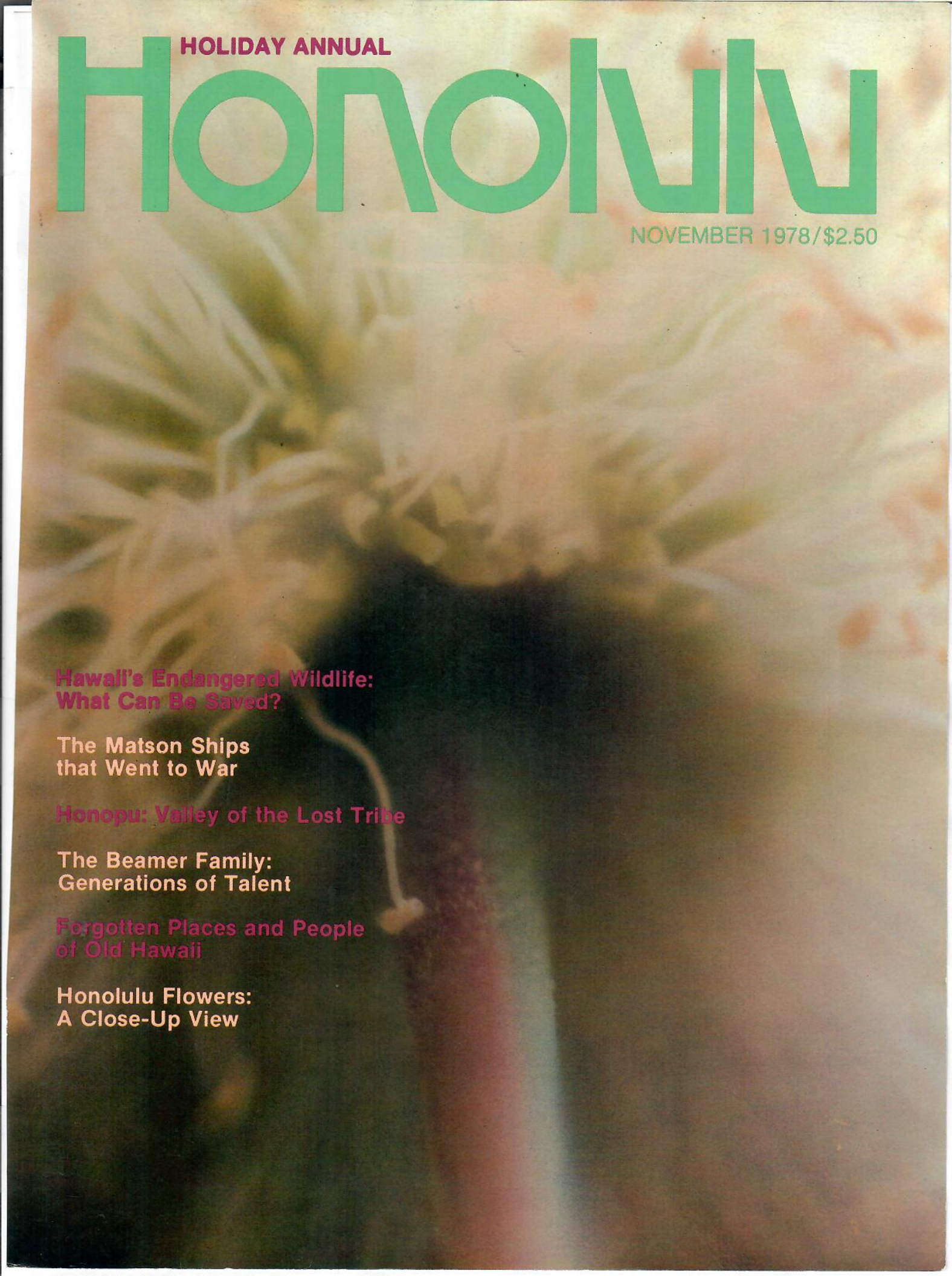

Hawaii's Endangered Wildlife: What Can Be Saved?

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