

'ELEPAIO

*Journal of the
Hawaii Audubon Society*



*For the Protection of
Hawaii's Native Wildlife*

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MAY 1978

NATIONAL AUDUBON REGIONAL CONFERENCE

Every two years the Western Region of National Audubon convenes leaders and members at Asilomar, a scenic and well organized conference center near Monterey, California. The theme of this year's meetings, March 18-21, was "Alaska and Hawaii -- a Question of Stewardship". It is encouraging to have our national society give such prominence to the wildlife and conservation issues of our state. The good attendance at these meetings, over 1000 people, shows that Mainlanders do want to know about Hawaii.

Thanks to various Hawaii Audubon members, those who attended the conference learned quite a bit about Hawaii's wildlife and its problems. Dr. Niklos Udvardy, the well-known biogeographer, provided a perspective of island biotas. Dr. C.J. Ralph gave an introduction to our forest birds, their evolution, and the possible causes of their extinctions or decreasing populations. In a second lecture he outlined the programs of the various government agencies, especially the U.S. Forest Service, in trying to help Hawaiian forest birds and ecosystems. Dr. Robert Shallenberger similarly covered waterbirds, their problems and solutions. William Mull wowed the audience with his extraordinary pictures of our special invertebrates, and filled in the audience on some of our more pressing conservation problems. Dr. A.J. Berger told the story of the Nēnē, including its successful captive propagation and introduction into the wild. Eugene Kridler told about the U.S. Fish and Wildlife Service's programs in Hawaii and the Pacific. At an evening program State Senator Jean King presented an eloquent overview of some of Hawaii's history and current problems and gave us some political insights into these matters. On other evenings James Hudnall showed his film of Humpbacked Whales taken underwater off the island of Maui, and Rob Shallenberger showed his film of the nesting seabirds on Manana Island.

Abridged versions of Bill Mull's and Jean King's talks appear elsewhere in this issue.

Other lecture sessions of the conference dealt with Alaskan wildlife and conservation. One afternoon was devoted to workshops, small, informal discussion groups on four topics: increasing chapter effectiveness, fund raising, education, and membership promotion. Through meetings such as these, Hawaii Audubon can learn from experiences of other chapters and find out about the expertise National Audubon can offer its chapters.

-- C.P. Ralph

MAY MEETING -- A SPECIAL EVENT

Dr. Elvis J. Stahr, National Audubon Society President, will be at the May meeting to present a chapter charter to the Hawaii Audubon Society. The program will feature Dr. Charles van Riper III, who will present a lively, illustrated lecture on the current status of the Palila, the endangered honeycreeper that has filed suit against the State of Hawaii. It should be an informative, as well as momentous evening.

NOTE: THE MAY GENERAL MEETING WILL BE HELD
AT A DIFFERENT LOCATION

St. John Plant Science Bldg.
University of Hawaii
Room 011 (ground floor)

May 15, 1978, 7:30 p.m.

St. John Bldg. is located on the corner of Maile Way and East-West Road, Manoa Campus. Access is by Maile Way from University Ave., or by East-West Road from Dole St. There is parking behind the building or on nearby road and lots. A 75¢ fee is charged for parking on campus during the evening.

HAWAII'S WILDLIFE

- - LEGACY AND STEWARDSHIP *

by State Senator Jean King

Just two hundred years ago Captain James Cook, leading the Admiralty's expedition in search of the Northwest passage, was anchored in Kealahakua Bay on the Big Island of Hawaii.

Behind the Bay, the gentle slopes of Mauna Loa were green with forest, covered with herbs and shrubs. Close to the shore, sweet potatoes grew in such abundance that Cook had seen fit to establish his land quarters in the middle of a flourishing patch. Not much further up the slope the breadfruit trees began. One of his crew, on a two day expedition up the mountain, reported that he had never seen breadfruit as large as these on this new island. Far up the mountain they spread, giving way at about 1500 feet elevation to two trees the Old World visitors had never seen before -- the Koa and the 'Ohi'a-lehua. These trees were large too, the Koa sometimes spreading wide to form a huge umbrella over the forest floor, the 'Ohi'a-lehua towering up to one hundred feet above the forest understory. Tree ferns up to four times as tall as a man shouldered each other for space in this endless, cool, wet forest.

The going was rough, and Cook's men returned to the shore long before they had reached their goal -- the top of snow-covered Mauna Loa.

They would have much easier going of it today, for this same landscape bears no resemblance to those long ago visitors' descriptions. This is despite the fact that we are a state whose motto reflects our reverence for the land: "Ua mau ke ea o ka aina i ka pono," "The Life of the Land is Perpetuated in Righteousness." Our Board of Water Supply motto also speaks of the land with reverence: "Uwe ka lani o la ka honua." It means, "When the heavens weep, the earth prospers."

Today the lands behind Kealahakua Bay are semi-desert. We can only find a few Kiawe trees (the mesquite of the mainland West) and acres of the scrub Koa Haole (no relative of

the Koa tree that once grew here, but a small, tough tree whose reproductive capabilities make rabbits look like the founders of zero population growth). There is reason to believe that rainfall patterns have changed on this mountainside as a result of introduced animals and plants, so that even the Kiawe and Koa Haole have a hard time of it and look dead most of the year.

Higher up, search, and you will find a Koa tree occasionally, an old, bearded veteran that through some miracle has survived the trampling of cattle. Unable to leave any surviving progeny, it will eventually die, a sad remnant of the once extensive stands of beautiful Koa that cloaked the slopes, shimmering green, moving with the wind, attracting the rain, and nurturing life. The 'Ohi'a-lehua is up there too, in places where ranchers have not cleared it away to make more grazing land.

It is impossible to provide authentic "before and after" views of the kind of changes I'm speaking of, as the "before" is lost forever. But we can see what the area looks like now and contrast that with the "after" that resulted when some exclosures were erected to prevent the grazing of wild goats at Hilina Pali, some thirty miles down the coast from Kealahakua. Outside the exclosure are only very old and large tree trunks and an occasional Lama tree, but very little else. Inside the fence, within six months, native plants flourished. This leads us to suspect that Park biologists were right in suspecting that vegetation was abundant here before the goats. That is exciting enough, but even more remarkable, a bean plant never before known to man sprouted. Apparently, the seeds had been waiting around for over a hundred years for the goats to go away.

On Mauna Kea now exists the sad remnant of a once-rich ecosystem, the Mamane forest. This was at one time the home of some of Hawaii's extinct forest birds. An exclosure was built by the State Division of Fish and Game 14 years ago at the 9500 foot level. When constructed, this exclosure was built at the upper level of tree line. The tree line is there no more, but the trees have remained in full vigor within the exclosure. The contrast with the bleached trunks nearby is a lesson in itself.

* Taken from a talk given before the Western Regional Conference of the National Audubon Society on March 18, 1978. The theme of the conference was "Alaska and Hawaii -- a Question of Stewardship".



Goats, liberated in 1778 on Niihau by Cook have spread so much that they cause severe damage to native eco-systems.

--Ahuimanu
Photo by
Greg Vaughn

Hawaii has distinguished itself by having lost more native birds during the 200 years after Cook arrived than the entire continental

United States has lost in the almost 500 years since Columbus landed. Less than half a dozen mainland U.S. species have become extinct, while twenty-four types of our native Hawaiian birds are gone, and twenty-nine of our 44 remaining native birds (and approximately half of the 1729 species of native seed plants) are listed as endangered.

There is some disagreement about whether or not the old Hawaiian practice of fashioning regal garments out of bird feathers was responsible for the depletion of some species. The generally held belief today is that the Hawaiians did not kill the birds to pluck the feathers. King Kalakaua is reported to have proclaimed that "the feathers belong to me, but the birds belong to my heirs," but there is no doubt birds were collected in great numbers for plucking. It is said that the Hawaiians caught the desired species, plucked the feathers they wanted, then set the bird free. We know next to nothing about their trapping methods, so we cannot be sure whether or not this practice menaced the bird populations.

The people of Hawaii were affected or afflicted almost as much as the wildlife. Captain Cook, then Vancouver, and the others after them, brought not only cattle and

goats, which forever altered the landscape, but human disease as well. Syphilis and measles devastated the Hawaiian population. So great was the devastation that farming practices and ancient methods of land stewardship were abandoned for all time. Taro lands, once attractive to marsh birds, for example, practically disappeared. When Captain Cook arrived, it is estimated that the population of the islands was 250,000. Some estimates run as high as 400,000, but even the lower figure makes a startling contrast to the population of 56,897 in 1872, less than 100 years later. And we must remember that no small part of the 1872 population was foreign newcomers, missionaries and their families, whalers, and the like.

Within this same one hundred year span, plants and animals were introduced with abandon, some deliberately, some accidentally, some carrying with them plant and animal diseases. Native forests were rapidly decimated, particularly on the drier, leeward slopes and the alpine peaks of Hawaii and Maui islands.

Newly arrived missionaries and seafarers acquired enormous areas of land which were eventually cleared for more profitable use. A cliché in Hawaii is that the missionaries came to do good and did very well indeed.

The rapid rise of the sugar industry and the resultant development of thousands of acres of sugar plantations spelled the end of many of the native lowland ecosystems. These areas were easy to irrigate and otherwise ideal for raising sugar cane. Pineapple marched up the slopes above the cane fields, destroying one more tier of native habitat. The goats and sheep marched ahead of the pineapple and continue their encroachment on all but the highest rainforests today.

It is said that a few casks of water dumped on Hawaii's shores by a ship travelling from Mexico contained the larvae of the mosquito which carries bird malaria and pox. This particular mosquito survives usually only below 3,000 feet elevation and may explain at least partly why many of our native birds, many of which are susceptible to these diseases, have become extinct in those same elevations. But since the forests they once lived in are gone too, it's hard to say. Dr. Berger tells us that while bird malaria has been suspected of wiping out many of our native birds, the disease has been diagnosed in only three Hawaiian birds as of 1974.

Not long after the sugar plantations were established, it became clear that all those rats who regularly jumped ship at Honolulu Harbor had developed a sweet tooth.

They chewed the stalks of cane in the fields so voraciously that harvest yields were seriously diminished. An early experiment in biological control began with the importation of the mongoose to eradicate the rat. Time has blurred the facts, but sometime between 1863 and 1883, word has it that some plantation manager paid good money for several cages of mongooses. He brought enough for each island to have a small breeding stock. They spread on all the islands except Kauai. When Kauai's quota arrived, story has it that a dock worker took one look at the rat-like, long-toothed animals, the likes of which he had never seen before, picked up the cage and threw it in Nawiliwili Harbor.

However Kauai originally avoided the mongoose, it was, while it lasted, a fortunate thing. For although the idea of biological control is a good one, and this trial was ahead of its time, apparently no one bothered to find out that rats are usually night feeders, while mongooses feed during the day. Furthermore, the mongoose loves to eat all small, living creatures and eggs. It feasted on the eggs of Hawaii's ground nesting birds, enjoyed countless meals of flightless birds that had evolved in our islands in the absence of natural enemies, and capitalized on the propensity of young honeycreepers to jump from their nest to the ground when frightened. It may be no coincidence that Kauai, free from the mongoose until only recently,



The Small Indian Mongoose imported in 1870's from Jamaica, has been implicated in the decimation of native birds.

--Ahuimanu Photo by Robert J. Shallenberger

has more species of native birds remaining than any other island.

While we do not know the specific destructive agent for each lost plant and animal, we do know that the destruction still goes on. Efforts to conserve and restore are not only late in coming; they are still abysmally slow. Sometimes it is hard not to lose patience with our lack of progress in some areas.



Clidemia hirata, a native of tropical America, has spread widely in Hawaii. A particularly dense stand on Oahu is shown above, and a close-up of the species' leaves to the right.



--Ahuimanu Photos by Robert Shallenberger and Greg Vaughn

Efforts to control the noxious weed known as *Clidemia* have been particularly frustrating. This shrubby, extremely prolific plant has established itself with alarming speed on four of our major islands, where it displaces native understory and reduces habitat for native fauna. In 1975 the legislature mandated studies to learn the best means of control, and in 1977 I put \$25,000 into the State budget for control measures. At budget hearings in January before our Committee I raised again the question of what had been done and triggered a number of correspondences. Just a week ago I received another letter indicating the two State departments with jurisdiction over this matter are still trying to work out who will do what and how much it will cost. The money available must be spent, or at least encumbered, by this July 1st. Time keeps ticking by, and only the typewriters click while the weed keeps spreading.

What we call the Banana Poka is another good example, or perhaps I should say, bad example. This vine is threatening thousands of acres of forests (mostly on public lands) on the Big Island and on Kauai. Yet the Department of Agriculture does not include this pest in its definition of "noxious weed." In Hawaii a weed seems to be considered noxious only if it is injurious to an industry. There are several species of butterfly which possibly could control the poka, but the entire genus is prohibited entry into the State even for a controlled experiment because it is believed to be a threat to the Lilikoi - our commercial passion-fruit industry - an excellent industry I would certainly like to see flourish. The research to establish the true threat should not be too costly, yet it hasn't been done, and the Banana Poka, a rampant grower, continues to choke our native species.

One of the most stubborn barriers to conservation and preservation in our state is this lack of knowledge. Hawaii is a small state and often sits at the bottom of the federal funding totem pole. Little state money has been spent on wildlife or botanical research. We know relatively little about our lavish and often unique natural endowment. What we do know, we have found out primarily because we had economic concerns, and as far as we know, the native plants and birds and mammals and snails of Hawaii have no commercial value. If they did, we might now have a fascinating storehouse of additional information to astound and delight us and to lift our spirits at the endless wonders of the world we inhabit - as well as give us a hard data base to use in our efforts to save what we have left.

We might know, for example, much more about the habits and habitat of some of our endangered birds. Even when we know, however, it sometimes doesn't seem to help. All studies on what is necessary to save the Palila -- that yellow bird in the forests of Mauna Kea -- have recommended that the feral sheep, which feed on the Palila's food tree, the Mamane, be eliminated from the Palila's sole habitat. This includes the State's own Department of Land and Natural Resources study, as well as the Federal Recovery Team study.

But all that has been said has been to no avail. Finally, a month or so ago, suit was filed charging the State with violation of the Federal Endangered Species Act. A depressing instance, not only of the continuing need for people to keep a watchful eye on their government, but to be willing to spend time

and money to get it to do what it should. It is obvious the Department of Land and Natural Resources would rather face the courts than the sheep hunters.

The language of the suit is poignant: "Plaintiff Palila has no voice of its own, it therefore brings this action by its next friends, plaintiffs Sierra Club, National Audubon Society, Hawaii Audubon Society...and Alan C. Ziegler." So you're all part of our fight now to save the Palila. Let's hope we prevail.

I might just mention in passing that management of our forest lands has had its bad moments from the very start. Fifty years ago, C.S. Judd, Superintendent of Forestry in 1918, wrote that "the destruction of the Hawaiian forests in the past was deplorable, but that it should continue in the present for one reason or another seems inexcusable." Yet since 1957, thousands of acres of near-virgin forests have been bulldozed. In 1969 and 1970, 400 acres of state-owned Mamane-Naio forest on the island of Hawaii were put to the blade by the State to make more pheasant habitat. We're now talking of a major effort to go into the timber business. This is fine because we need to expand our economic base so as not to rely so heavily on tourism. But the real question will be: "Where?", and into that answer we may have to feed intangible values.

In the past such non-dollar values have more often than not been not so much overlooked as invisible. I do believe, however, that the number is growing of those of us who believe, with John Muir, that when we try to pick out anything by itself, we find it hitched to everything else, who believe that the reason man is perhaps an endangered species has been our lack of respect for the intricate complexity and relatedness of all things.

I guess what I'm saying is that more and more of the rest are catching up with the Audubon Society. We all owe you a resounding vote of appreciation for your early recognition of, and help in spreading the truth of, William Beebe's quiet statement:

"When the last individual or a last of living thing breathes no more, then another heaven and another earth must pass before such a one can be again."

It is indeed - a question of stewardship.

*Hawaii State Capitol
Honolulu, Hawaii*

HIDDEN HAWAII, BIOLOGICAL TREASURE HOUSE *

by William P. Mull

Current convention allows that it's cool to love a bird, or maybe even to pet a whale -- but we're all still squashing "bugs." And yet, the "ecosystems" and "diversity of life" we speak of now as responsibilities of our stewardship embrace all life -- even the little stuff we squash.

Hawaii offers us an object lesson in biological values and stewardship responsibilities. Biologists call these islands a "living laboratory," where life evolved in unique ways -- where plants and animals expressed themselves with radical departures from world norms for their kind.

Ornithologists are fascinated by Hawaii's honeycreeper family (Drepanididae), which evolved the most diverse spectrum of bill forms known within any family of birds -- eclipsing the classic example of Darwin's Galapagos finches, which inspired the "theory that shook the world" and launched modern biology. Botanists marvel at Hawaii's native lobelias (Lobeliaceae), which evolved over 130 unique species (250+ described kinds) -- including an amazing tree-like form over 40 feet tall. But some of the most spectacular expressions of nature, among Hawaii's remarkable native biota, occur in the invertebrate fauna -- the little stuff that's hard to see and that we tend to squash or ignore.

When Big Mama Nature set up her natural laboratory in the Hawaiian Islands, she put a lot of effort into creative experimentation with snails, spiders and insects. The results are astonishing. But in order to see them, we have to look close. We have to step "through the looking glass" to see the wealth of tiny biological novelties in this wonderland -- and to comprehend their singular illuminations of life's processes and parameters.

In the 20 million years, or so, since Big Mama teamed up with volcano goddess Madame Pele to build her special Hawaiian lab, incredible evolutionary events have occurred among the native mini-wildlife on the world's most isolated archipelago. The living results have

challenged the minds of continental naturalists and scientists ever since Captain Cook shattered that natural isolation 200 years ago.

Hawaiian green lacewings (Chrysopidae) with shameless free-form wing venation and tree snails (Achatinellidae) with outrageously care-free shell decor have tried the patience of taxonomists. Reptile-less, amphibian-less, mammal-less (but for one bat) native Hawaiian land ecosystems -- with invertebrates as their faunal backbone -- have produced biological "anomalies" galore, as measured by world standards modeled on vertebrate-infested continental ecosystems.

Discoveries just since 1970 bespeak Big Mama's sparkly-eyed experimentation with basic life among Hawaii's arthropods and reveal a dazzling array of world records in organic evolution. Previously unknown ecosystems in the dark zones of Hawaiian lava tubes have nurtured unprecedented adaptations among several orders of animals, including the world's first-known small-eyed and no-eyed "big-eyed hunting spiders" (Lycosidae). New-found carnivorous inchworms (Geometridae) of several species lurk in ambush in Hawaiian forests, deftly plucking up flies, crickets, spiders and other active mini-prey -- a predatory lifestyle unheard of among caterpillars elsewhere in the world. And under leaves in these same forests, we've found a sprinkling of tiny comb-footed spiders (Theridiidae) with an astonishing assortment of red and black patterns on their backs -- including shocking "happy-face" designs with disarming smiles that puzzle and delight the field biologists who are finding them.

"What on earth is Big Mama's message here?" we might ask. One team of perceptive biologists have spent the past decade looking for part of the answer among endemic Hawaiian pomace flies (Drosophilidae), which have evolved maybe 800 species from perhaps one original ancestor on these few small, isolated islands in a short period of geologic time. The variety achieved by this native fly-clan -- in physical form, behavior and ecological adaptation -- is impressive in the extreme.

By recognizing this unique opportunity to get a peek at some of Big Mama's best kept secrets elsewhere -- the basic ingredients in her recipe for life on earth -- the team is making valuable use of one of Hawaii's many singular biological resources. By prying into the most intimate facets of the lives of these

* Taken from a talk given before the Western Regional Conference of the National Audubon Society on March 21, 1978. The theme of the conference was "Alaska and Hawaii -- a Question of Stewardship".

far-out little Hawaiian flies -- their biotic environment food habits, bodily adornment, courtship devices, genetic structure and general survival strategies -- the team is producing new insights into how those adventurous flies got that way, and how we and our whole living environment got this way.

Those flies are small, obscure Hawaiian animals, but their life lessons are big news to us. As stewards in our own behalf, it's in our interest to scrutinize and perpetuate all nature, big and little, in its present form -- the form that spawned us and sustains us as a species. When we forget the distinction between gods and stewards -- when we undertake to "manage" and manipulate nature in heavy favor of some biotic groups over others -- we risk effectiveness in our stewardship over our whole biological resource, our whole living environment. We need all of it to teach us and sustain us over the long haul.

Despite our unprecedented power as a species, we should recognize the limits of that power. The plain truth is that nature doesn't need us but that we need nature. We're no help to Big Mama -- but her works are vital to our species. She's fully in charge of nature; we're barely in charge of ourselves. Actually, our job as stewards isn't to manage nature but to manage ourselves in our relationship with nature -- to be careful about what we squash, from insects to ecosystems.

As a result of our stewardship during the past two centuries, Hawaii has more endangered species of birds (30) than the other 49 states combined (26) -- and almost four times as many extinctions (23) as the other states (6). But those figures are a mere symptom. The complete picture of Hawaii today includes thousands of threatened species of unique land snails, insects, spiders, plants -- a major segment of the singular life resource we've inherited in this "living laboratory." By imposing on this hyper-insular Hawaiian environment our big-continent life styles and a flood of imported continental plants and animals, we've imperiled this biological treasure house.

We didn't know better before -- but we do now. The care and wisdom with which we exercise our stewardship now, in rare places like Hawaii, may well be the yardstick that measures the lifespan of our own species -- ultimately.

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HAWAII AUDUBON SCIENCE FAIR WINNERS

The 21st Hawaiian Science and Engineering Fair was held on April 6-8 at the Blaisdell Center. Sponsored by the Hawaii Academy of Science, the Fair promotes student creativity and research skills in problems or principles of science. It is wholly supported by contributions from the community. This was the third year that the Hawaii Audubon Society contributed awards. Students of all schools in the state may compete in this event.

The HAS award recognizes student work in conservation, specifically projects dealing with the preservation of Hawaii's native wildlife. This year Linda M. Ogata judged for the Society. One award was given to each division, Senior and Junior High Schools. This year's Senior Division winner was Mr. Clayton Young of McKinley High School. Mr. Young's project dealt with finding optimal methods for breaking dormancy of the Mamane (*Sophora chrysophylla*). His ultimate aim was to promote reforestation of Mamane forests, a crucial habitat for the Palila (*Psittirostra bailleui*), an endangered bird.

Our Junior Division winner was Ms. Susan Schanz of St. Francis Convent. Ms. Schanz studied the succession of Hawaiian plants along Sandy Beach shoreline. In her study she related soil type to root systems and discovered what conditions are favorable to such native plants as the 'Ilima.

Our awardees each received a trophy, a copy of *Hawaii's Birds*, and a gift joint membership in National and Hawaii Audubon Societies. Congratulations to them both! We hope they continue their good work with our Hawaiian wildlife.

April 10, 1978

Dear Hawaii Audubon Society,

Wow!!! I just can't thank you enough for awarding me with the "Hawaii's Birds" book, plaque, and a joint membership with the Nat'l and Hawaii Audubon Societies! It was a surprise for me to win this award but now it is an honor!!! Winning this award has encouraged me to work more with Hawaii's birds (esp. endangered ones such as the Palila) and try to preserve them in all ways possible!

Again I thank you, for I am very appreciative and honored!

Sincerely yours,

Clayton Young
McKinley High School - Gr.12

A HAWKSBILL TURTLE IN KANEHOE BAY, OAHU

by George H. Balazs

The hawksbill turtle, *Eretmochelys imbricata*, occurs in Hawaiian waters in small numbers exclusively around the large volcanic islands in the southeastern portion of the 1600 mile long archipelago. Few data have been presented for this indigenous species, in contrast to the more abundant, widely distributed, and colonial nesting Hawaiian green turtle, *Chelonia mydas*. Populations of the hawksbills at other geographical locations have also received comparatively less research attention, undoubtedly due to the more solitary nesting habits of the species, and hence their reduced accessibility.

Although not a central focus of research, *Eretmochelys* has nevertheless attracted considerable attention in many areas as the object of commercial exploitation. The principal product utilized is the thick translucent laminae (keratinized plates) of the carapace, known historically as tortoiseshell. Carr (1972) has described the array of survival problems which internationally confront the hawksbill, thereby suggesting that this may be the world's most endangered marine turtle.

Although the hawksbill turtle in Hawaii has probably not been directly exploited in recent times, it has on occasion been taken incidental to harvesting efforts aimed at green turtles. Ancient Hawaiians, however, are known to have specifically sought out hawksbills for laminae, which were used both for medicinal purposes and to fashion fish-hooks and other implements.

Except for hatchlings (P. Kawamoto, quoted in Ernst and Barbour (1972), and my own unpublished data), specimens of the Hawaiian hawksbill have not been previously examined for the purpose of documenting biological and ecological information. The recent recovery of a dead specimen from Kaneohe Bay afforded me the opportunity to conduct such an examination. Additional information I have collected over the past five years on various natural history aspects of the Hawaiian hawksbill will be presented in a later paper.

FINDINGS

On 14 August 1977 a dead turtle entangled in a monofilament gill net was observed floating at the surface in Kaneohe Bay. Both the turtle and the net were retrieved and transported to facilities of the Hawaii Institute of Marine Biology on Coconut Island for inspection. The net was found to

consist of two joined sections, each measuring approximately 300 feet by 20 feet, with 2½ inch mesh. From the type of net, we know that the entire 600 foot length had originally been set on or near the bottom at a depth of approximately 45 feet. Buoyancy of the turtle resulting from gas formation of decomposition brought a portion of the net to the surface. Barnacles growing on the float line indicated that the net could not have been under water for longer than two weeks, while the stage of decomposition of the turtle suggested that entanglement and drowning took place not more than five days prior to recovery. Decomposing fishes consisting of papio (*Caranx*), opelu (*Decapterus*), and small hammerhead sharks (*Sphyrna*) were also present in the net. The net was subsequently returned to the owner, who indicated that after setting the gear, he had been unable to relocate it.

The turtle, shown in Figure 1, was identified as a hawksbill with measurements of 29 3/4 inches (75.6 cm) straight carapace length, 22 1/4 inches (56.5 cm) straight carapace width, 22 1/2 inches (57.0 cm) plastron length, and 3 3/4 inches (9.5 cm) head width. The presence of a short tail for the size of the turtle suggested that the specimen was a female.

Several large barnacles (*Chelonibia testudinaria*) and a mat of epizoid algae (see Cribb 1969) were present on the carapace laminae that had not been lost from decomposition. All of the laminae of the plastron were still attached, with a total encrustation of 52 *C. testudinaria*. Dorsal and ventral surfaces of all four of the turtle's limbs hosted a low incidence of the burrowing barnacle, *Stephanolepas muricata*, embedded to an average depth of eight millimeters. This genus of cirriped is only known to occur on the hawksbill, with previous records confined to the South China Sea (Gruvel 1905) and Ceylon (Nilsson-Cantell 1930). These interesting Hawaiian specimens have been submitted to the Bernice P. Bishop Museum and the Smithsonian Institution for inclusion in their permanent reference collections.

Close examination of each carapace lamina revealed at least five relatively distinct bands which may be representative of annual growth. Such bands are not normally present in marine turtles, and their occurrence has not been reported in the literature.

Dissection and removal of the plastron exposed a thick layer of orange fat, which

surrounded the body cavity and was present in particularly large quantities over the pelvic musculature. In contrast, few fat deposits were found internally associated with the various mesenteries. Probably due to the degree of tissue degeneration that had taken place, neither gonads nor ova could be located. The stomach and intestines were completely filled with food, consisting of three kinds of unidentifiable sponges. In analyses of stomach contents from 29 Caribbean hawksbills, Carr and Stancyk (1975) also found a predominance of benthic invertebrates, with the sponge, *Geodia*, and ascidean, *Styela*, comprising the major portion of food material.

Eight carapace laminae (two centrals, six laterals), the skull, mandible, humeri, and femurs were excised from the turtle, cleaned and retained as permanent reference material.

DISCUSSION

The documentation of this turtle from Kaneohe Bay suggests that the area may serve as feeding habitat for Hawaiian hawksbills. To my knowledge, previous sightings of hawksbills have not been made in Kaneohe Bay. However, this could be due to the inability of most people to distinguish the hawksbill from the more common green turtle. Kaneohe Bay is already recognized as an important resident feeding pasture for an aggregation of both juvenile and adult green turtles. If hawksbills do regularly occur at this location, the two species would not be in direct competition for food, since the Hawaiian green turtle is primarily herbivorous, feeding on certain benthic algae (e.g. *Codium*, *Ulva*, *Pterocladia*) and a marine spermatophyte,



Fig. 1. Dorsal view of dead hawksbill. Numerous laminae of the carapace were lost as a result of decomposition. The distinguishing characteristics of this species include an elongated beak and, in young specimens, serrated edges of the carapace and overlapping laminae.

Halophila. Competition could exist, however, for safe and acceptable shelter, such as caves and the undersides of coral ledges, which are regularly used by both turtles during periods of quiescence.

Fishing nets pose a serious threat to marine turtles in areas where substantial feeding and breeding take place. Shrimp trawl nets, in particular, are of international concern at the present time due to the number of turtles that drown incidental to the fishing effort (IUCN, 1975). Although the hazard of gill nets to turtles has not yet attracted major attention, the problem can be expected to intensify with increasing human populations and the concomitant use of nearshore areas for commercial and recreational fisheries.

ACKNOWLEDGMENTS

I express my appreciation to Bill Cooke, who originally found the turtle in Kaneohe Bay, and to Dr. John Stimson and Tom Polacheck, who retrieved the turtle and net and transported them to Coconut Island. Bill Cooke also carried out identification of the barnacles.

This work was conducted in conjunction with grants received from the State of Hawaii (Office of the Marine Affairs Coordinator) and the University of Hawaii's Sea Grant College Program.

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COOTS PROSPER AT KAKAHAIA REFUGE

by Richard A. Coleman

Hawaiian Coots, 'Alae Ke'oke'o, have dramatically increased in population at Kakahaia Pond, Molokai, since it became a national wildlife refuge in early 1976 (Fig. 1). Monthly census data since February 1976 by C.F. Zeille-maker and the author indicate a nearly doubled coot population in the last two years (Fig. 2). The highest recorded coot population, 62, was observed on 7 December 1977. Earlier records for 1970 through 1972 showed 20 to 30 coots on the pond (USF&WS, unpublished). (Several Hawaiian Stilts, *Ae'o*, were also noted on these early counts at Kakahaia; however, none have been recorded since.) This population growth could be in part from inter-island movements; however, the number of fledged chicks (estimated to be 12-16 in 1977) would account for most of this population increase.

Coot nesting activity has been recorded (USF&WS, unpublished) nearly year-round. Peak periods of active nesting behavior over the past two years were November 1976-February 1977 and June-October 1977. An average of five nest sites (range 3-6 nests) have been maintained throughout these periods in the acre-sized pond. Since nests have remained at the same five sites for the last two years, it appears that with the present pond conditions, nesting coots are at or near the carrying capacity. This pond is surrounded by a 75 to 200 foot wide border of bulrush (*Scirpus* spp.), a nest-

ing cover heavily used by coots in North America (Fredrickson 1970, Kiel 1955). Additional openings into this bulrush border probably would increase the number of possible nest sites. We are presently considering such a habitat improvement.

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Honolulu, Hawaii*

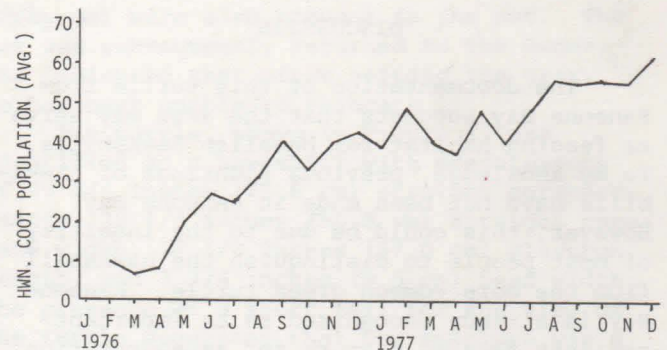


Fig. 1. The populations of Hawaiian Coot, 1976-1977, at Kakahaia National Wildlife Refuge, Molokai. Each data point represents one or two censuses in each month



Fig. 2.

Aerial view of Kakahaia Pond, Molokai, showing the dense growth of Bulrush around the edge.

--Ahuimanu
Photo by
Greg Vaughn

TO A CRIMSON APAPANE

by Elizabeth Seymour

I saw you first,
 You crimson flash of color,
 When you were darting in and out
 Among the green ohia leaves.
 I know your mate was hiding there --
 Somewhere --
 Perhaps your nest was hidden there --
 Somewhere -- in branches of the tree.
 Your sharp, curved bill was made to
 press
 The honey from lehua blossoms
 On sturdy trees whose roots grasp sides
 of cliff.

You are indeed quite safe
 To claim the bold ohia for your home.
 It clings to lava precipice
 That makes a steep descent
 Into the great Caldera
 With steaming depths around the sides
 Of those much greater depths
 In Halemaumau.

You gorgeous, flying honey-creeper,
 You do not fear the wild volcano,
 the unknown force in Kilauea.

I wonder, little Apapane,
 What do your feathers tell?
 Do crimson feathers tell
 Of fiery rock
 In Pele's hot domain?
 Or do they speak of honeyed crimson
 flowers,
 The blooming loveliness
 Upon ohia trees?
 Or do they tell
 Of both the lava and the flowers?
 And what do your black feathers mean?
 (They are so dark beside the crimson
 ones).
 Do these black feathers growing on your
 body
 Make mention of black lava tubes
 Where fiery rock once flowed
 Within those empty, blacked-out tubes?
 Or does the blackness speak
 Of shining, black kukui seeds --
 Old and well-polished now to make
 The cherished beads
 For people in Hawaii?
 And you have whitish feathers too
 Upon your lower tail,
 And others on the lower side
 Of your abdomen.
 What do these whitish feathers tell?
 Do they bring thoughts of puffing
 steam

Ascending from the heat
 Inside mysterious Kilauea?
 Or do you have the whitish feathers
 To make us think
 Of whitish buds
 Upon ohia trees --
 The growing buds that rain will beat
 upon
 And cause the beauty of red blossoms
 to appear?

What are these secrets in your gorgeous
 feathers,
 You brilliant little bird --
 You wing-bourne Apapane?

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NEWELL SHEARWATER IN THE KOHALA
MOUNTAINS, ISLAND OF HAWAII

by John B. Hall

Early in August, 1977, Dr. Fred Dodge, his teenage children, Charles and Tootsie, and I were hiking in the Kohala Mountains on the north end of the island of Hawaii. On August 7 we reached the cabin labeled "New USGS Camp" on the Honokane quadrangle of the 7.5 minute series USGS topographic maps. This cabin is a little below the 3000 foot contour. The country in this area is boggy with the dominant vegetation being a sparse and stunted 'ohia-olapa (*Metrosideros-Cheirodendron*) scrub. The slope of the mountain is frequently dissected by deep ravines, often hundreds of feet in depth, with steep sides clothed with a dense mat of uluhe, or false staghorn fern. It had been drizzling steadily for three days, and the frequent low clouds and mists added an eerie, if lonely, splendor to this wild and rugged land. We went to bed shortly after dark. An hour or so later we began to hear some strange and rather loud calls that seemed to come from the bogs near the cabin. I thought that they must have been produced by some kind of water fowl, possibly the Koloa, although they seemed too loud and too anguished in tone to be duck calls. Since it was cold, pitch dark, foggy, and still raining, I did not attempt to leave my snug sleeping bag to make what I was sure would be a futile effort to see the birds. There seemed to be quite a few of them. The calls lasted for

quite a long time, probably for one or two hours or more, and were essentially continuous during this time. If the birds were circling repeatedly, I suppose there might have been as few as half a dozen, but if they were passing more or less directly overhead, there must have been a much larger number. After this time I either fell into a deeper sleep or the birds stopped calling. The sky may have cleared, as the weather was clear and sunny after the mists had lifted the next morning. Towards morning there was a second period of calling, but it stopped before it was light enough to see anything.

The next day we descended into Waimanu Valley, where we saw a number of Black-crowned Night Heron. In the evening we heard the strange calls once or twice again, with the herons in view, and I felt that perhaps we had heard a flock of these birds feeding in the bog on the previous night. Being very much a novice as a birder, I thought that perhaps the "night" in night heron referred to the nocturnal noise and antics of this animal.

A few weeks ago I described our adventures to Dick Davis, and he suggested that we might have actually heard the calls of a flock of Newell Shearwater (*Puffinus p. newelli*) flying to nests in the area. He imitated the call of this bird, and, as nearly as my fading memory could judge, it did sound very much like the music we had heard on the mountain. I think that it is entirely possible, therefore, that there is a colony of these birds nesting in this area. At the present time there is no known breeding colony of this endangered species on the Island of Hawaii.

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CORRECTIONS AND ADDITIONS

CORRECTIONS.

'Akepa were not a new high in the 1977 Volcano Christmas Count. This was the second highest year (Vol. 38:112). 'O'u were seen only in the Olaa Tract on the Volcano count (Vol. 38:113). 'Akiapola'au were seen at 3800 ft., one mile north of the Olaa Tract, near Puu Makaala (Vol. 38:105).

ADDITION.

The excellent drawing of the Hawaii 'Akepa in the last issue of the 'Elepaio was done by H. Douglas Pratt.

KAPIOLANI PARK AND NA LAU TRAIL FIELD TRIP

The Kapoailani Park and Na Laau Trail hike on Sunday, March the 12th began at the Waikiki Aquarium Auditorium at 7:30 a.m. The first sighting of a parrot and parakeet in a tree Ewa way from the Aquarium. As these green birds, one with a long tail, took off, all of us saw them clearly.

We crossed the road, and our next sighting was part way across the park, where there was a fence by a golf driving range. Ordinarily if people notice small brown birds on a fence or on the ground, they casually remark, "Oh, a bunch of Sparrows", but the Auduboners were aware of differences among the sparrows. In this group there were about two dozen Java Sparrows, some House Finches, and an adult and two immature Saffron Finches. Further along, in a tree overhead, were several Yellow-fronted Canaries, which posed for us.

We next walked along the south side of the park at the south side of the escarpment toward Diamond Head Road. Birds were scarcer here. We went up Diamond Head Road, Makaki Place Road, and up the Na Laau Trail, which was steep at first. A Mockingbird was heard up on the crater edge. A Northern Cardinal was seen and heard by our Minnesota visitor. There were flocks of white birds flying about, both white Doves, and White Terns. The wing beats of the doves were rapid, up and down; whereas the seven terns had a slower, front to back, sweeping motion.

We came to another steep slope in the trail, and most of the hikers turned back. The few that persisted were rewarded by the sight of several greyish birds with saucy red tails sitting on a fence. Mike Ord, who drew our attention to these Lavender Fire Finches, counted 11 of them.

Besides the birds already mentioned we saw many of the common birds; the common Myna, Barred Dove, Spotted Dove, American Golden Plover, Japanese White-eye, Spotted Munia, and Red-crested Cardinal were plentiful. Other sightings by members of the group included a Frigatebird, four Red-vented Bulbuls, and one Cordon-bleu. There was one last unpleasant sighting. Six parking tickets were on the car windshields of those hikers who had inadvisedly parked in the Waikiki Aquarium visitor's parking area

John Mitchell

TYPIST NEEDED - - HELP!!

Haven't you always wanted to dance your nimble fingers on the keyboard of an IBM Selectric typewriter? Here's your chance to type fascinating material, have a preview of the next 'Elepaio, and save your Society money, all at the same time! What's more, your mistakes can be easily corrected with the handy correction key on this machine.

HAS now has its own brand new typewriter, kept at the editor's home in Manoa. If you have an hour or so a month and would like to help type up the 'Elepaio, please contact C.J. Ralph at 988-6921. We need you!

AUDUBON RESEARCH GRANTS

The Hawaii Audubon Society will award grants, generally not exceeding \$500, for research in Hawaiian and Pacific natural history. The Scholarship and Grants Committee has established a formal procedure for grant applications. In the future, application deadlines will occur twice annually: March 1 and September 1. However, this year applications for summer funding will be accepted until June 15. For information on application format and procedures, write to the Scholarship and Grants Committee, Hawaii Audubon Society, P.O. Box 22832, Honolulu, HI 96822.

ALOHA TO NEW MEMBERS

We welcome the following new members and encourage them to join in our activities.

Junior: Jaan Lepson, Honolulu.

Regular: Marjorie Benning, V.G.Clark-Wismer, Marcie McInerney, Alan Rice, Suzanne Rowlands, all of Honolulu; Jeremiah Cahill, Naalehu; S.F.Cushman, Kula; Mrs. John Keat, Makaweli; Dennis Miyashiro, Hilo; Gary Nishimoto, Hilo; Greg Vaughn, Kailua.

Regular (Reinstated): Evlyne Johnson, Honolulu; Eugene Kridler, Kailua.

Subscribers: Hubert Farley, Paso Robles, CA; David Freeland, East Amherst, NY; Eugene Miller, Rochester, NY; Gerry Murphy, San Francisco, CA; Kris Ohlenkamp, Van Nuys, CA; Patricia Schumpelt, San Lorenzo, CA; Paul Smythe, Santa Monica, CA; Mary Alice Wright, Scottsdale, AZ.

A special Mahalo to new Life Member, Mrs. Lilly B. Argante-Eizinger, of Sacramento, California.

WETLAND BIRD HABITATS COMPILED

A survey of wetland birds and their habitats in Hawaii, which began in April 1977, was completed in September, and the results of the survey were published in a two volume report in December 1977. Field work was conducted by Robert Shallenberger, Sheila Conant, Philip Bruner, H. Douglas Pratt, and Greg Vaughn. The brochure, inserted in the April 'Elepaio for Oahu members and this issue for others, was adapted from material in the report.

The survey was contracted to Ahuimanu Productions by the U.S. Army Corps of Engineers. As a result of amendments to the Federal Water Pollution Control Act, the Corps was given authority to regulate all dredging and filling in wetlands. In order to implement that authority effectively, the Corps has contracted wetland vegetation studies not only in Hawaii, but also Guam, the Northern Marianas, American Samoa, and the Caroline Islands. In evaluating permit applications for wetland activities, the Corps must consider all wetland values, including their role as wildlife habitat. The ornithological study of Hawaiian wetlands provides the data necessary for this evaluation.

A total of 66 wetlands on five Hawaiian islands was surveyed, although several of these sites actually involved more than one wetland. The sites included fishponds, reservoirs, settling ponds, marshes, mudflats, bogs, and flooded stream valleys. Most were low elevation sites. The report contains data on birds observed on each of two or more trips to the sites, as well as a review of historical information, much of it from the 'Elepaio. In addition, species accounts provide detailed information on each of the resident native wetland birds and briefer information on migratory species. Photographs of the wetland sites and the birds are included in the report. A limited number of copies are available from Ahuimanu Productions, PO Box 1166, Kailua, Hawaii 96734.

DONATIONS

MAHALO NUI LOA to the following members who have generously sent donations, ranging from \$2.00 to \$7.00, to the Society: Jeremiah Cahill, Florence Griffin, Donald Johnson, Mrs. Robert Kepner, George-Ann Maxson, Gerry Murphy, Linda Ogata, Euphie Shields, Lawrence Taylor.

HAWAII AUDUBON EXECUTIVE BOARD

HAWAII AUDUBON SCHEDULE OF EVENTS

May 8. Board Meeting at the home of Rob Shallenberger, 169 Kuulei Rd., Kailua (261-3741) 7 p.m. All members welcome.

May 14. Field trip to Haiku Valley. This popular trip will feature areas that have high densities of introduced forest birds such as the Japanese Bush Warbler and Melodious Laughing-Thrush. Meet at the Hawaii State Library on Punchbowl St. at 7 a.m., or at the mauka side of the intersection of Haiku Rd. and Kahekili Highway in Kaneohe at 7:30 a.m. Leaders: Tim Burr (235-4036) and Maile Stemmermann (235-1693).

May 15. General Meeting, 7:30 p.m., at Room 011, St. John Plant Science Bldg., University of Hawaii, Manoa campus. See front page for details.

NOTE DIFFERENT LOCATION FOR MAY MEETING!

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