THE ELEPAIO

Journal of the Hawaii Audubon Society

For the Better Protection of Wildlife in Hawaii

VOLUME 35, NUMBER 10 APRIL 1975

THE HAWAIIAN HONEYCREEPERS, 1778-1974

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Second and Final Installment

The Causes of Extinction

There are no simple answers to the question of why so many forms of this unique family of birds became extinct in the short period of time since Captain Cook discovered the Hawaiian Islands, nor why so many others are now so rare that they are likely to become extinct within the next two or three decades. It seems unlikely that any single factor was responsible, although, for some species, we cannot be certain of this.

"There is something incredibly naive about the response of Europeans (and Americans) to the realization that they might be doing more harm than good in their random, knockabout programs of exploration and colonization. They are often amazed, sometimes chagrined, that they could have such ill effects upon native populations. Nevertheless they--we--have persisted. Now, with Hawaii's natural history still another chapter in the annals of exploitation, it is in frustration, sometimes in despair, that we try to piece together the historical segment of the native biota's response to 'discovery.' With few exceptions, it is a story of disease and death, a chronicle of extinction" (Richard E. Warner, in Pacific Discovery, 1961).

Destruction of the Forests: The one thing we do know is that all of the available evidence suggests that the honeycreepers are intolerant of sudden changes in their environment. They are, therefore, so delicately attuned to the Hawaiian forests in which they evolved that they cannot adapt to drastic changes in that environment.

In volume 1 of his Insects of Hawaii, Elwood C. Zimmerman chronicled the early rape of the Hawaiian environment. "Before the coming of man, native forest clothed the islands from seashore to timber line as it does today in undisturbed areas of certain other Pacific islands. Isolated lowland pockets of native plants, lowland fossil beds and other evidence support this conclusion. Native animals had a similar distribution. Native drepaniid birds were found at sea level and frequented coconut trees about the native villages when Captain Cook visited the islands, but for probably more than a century these birds have been unable to live at such a low level. After the arrival of the Polynesians, apparently about the twelfth century, the rapid retreat of the forests began. Fires set by the natives, as is still being done all over the Pacific, made great advances through the lowland and dry-land forests. After Captain Cook discovered the islands in 1778 and following the subsequent introduction of cattle, goats, sheep, horses and other domesticated animals (the Hawaiians brought only the fowl, swine, dog and rat with them), and followed in turn by agricultural development by the white man, the forest retreat was alarmingly rapid. The shallow-rooted endemic plants cannot tolerate grazing. When the undergrowth is eaten away, the thin soil dries out rapidly, and, excepting for isolated trees, the forest vanishes."

Let it not be thought, however, that there have been no prophets in Hawaii. There have been several excellent spokesmen--but there have been few listeners.

Scott Wilson, an Englishman, had the following to say in 1890 about Hawaii's birds and forests: "I have gone at some length into this question, as, by so doing, I may draw it to the attention of the Hawaiian Government, as well as that of the large land-owners,

and their combined action cannot be too soon brought into effect if the entire disforestation of the Hawaiian Archipelago is to be prevented. It would be a disgraceful thing if such a Garden of Eden should be bereft of its birds, more especially as I am convinced that these islands have a great future before them as the great health-resort for the inhabitants of San Francisco flying from its unhealthy and treacherous climate, to say nothing of the vast number of tourists who will flock, in yearly-increasing numbers, to see the volcanic wonders of Hawaii, from all quarters of the globe. All these visitors may be expected to take an intelligent interest in the avifauna of the islands they visit or make their home, and on their behalf I appeal to the land-owners and to the Legislature of Hawaii to unite in protecting their country's birds. I would suggest that not only should forest-lands be fenced in so far as practicable, but that no exotic birds should be introduced. Several species of Hawaiian birds, which were to be found in Cook's time, and others which were obtained even so late as 1840, have become extinct, and it would not be rash to say that ere another century has elapsed but few native species will remain." Unfortunately, neither the Hawaiian Government nor the large land owners responded to Wilson's appeal.

Augustus F. Knudsen of Kauai was deeply concerned about the damage being done by feral cattle and goats. He wrote in the Hawaiian Forester and Agriculturist for 1909 that "all that is embodied in the provisions of the government leases against 'waste and bad husbandry,' should be enforced. All it needs is a cool and determined, unbiased official to carry it out. The official must have public opinion back of him, however, and that public opinion must be forcibly expressed. Otherwise the official will be thwarted by the financial power of most of the lessees of large government tracts....

"Go into any struggling forest in the early summer, and even the casual observer will find hundreds of seedlings of even the larger trees springing up. Koa, 'Ohi'a, Kopiko, Kauila, everywhere a few in between the weeds and grasses. In the fall, after the dry weather, when they should be six or eight inches high, they are gone, bitten off or pulled up by the browsing cattle and goats. After the seeds are used up it will be too late to save anything. Cattle and goats are really the only enemies the forests of Hawaii have. Kill them off and prevent their return, and in ten years you cannot recognize the region again; in twenty years the forest is practically restored, though young. Insect pests only seem to follow where natural conditions have been entirely upset by grazing herds."

C. S. Judd, Superintendent of Forestry for the Territory of Hawaii wrote in the Hawaiian Forester and Agriculturist in 1918 that the prime value of the main Hawaiian forest types "lies not in their commercial wood products but in their ability to serve as a protection to watersheds of streams and springs needed for irrigation and domestic purposes and to watersheds tributary to artesian basins and in their beneficial forest influences in regions where the people depend mainly upon the rainfall for their water supply....the industries of the Territory demand that it be managed chiefly as a protection forest. Forestry in Hawaii therefore is chiefly concerned with forest protection....

"The feasibility of treating the native forest on the leeward side of the island of Hawaii, where there are no permanently running streams as a supply of commercial forest has been advocated and attempts have been made to utilize the mature timber in these forests by manufacturing it into ties and lumber and placing it on the market. That these attempts have resulted in failures is in my opinion fortunate, for although the plan of exploiting this forest included a scheme for immediate reforestation after logging so as to keep a forest on the land, I believe that our knowledge of the treatment of this forest so as to insure a second crop either naturally or artificially is as yet so imperfect, that it is far safer to preserve it in its original form."

Judd added that "the destruction of the Hawaiian forest in the past was deplorable, but that it should continue in the present for one reason or another seems inexcusable."

In another paper in the same journal in 1927, Mr. Judd said that it was time to conduct research on "some of the ecological problems" in Hawaii. "Research, far from being an expensive luxury, is a corner stone of the whole enterprise of civilization. The most progressive nations are without exception those which have engaged most extensively in research....We must keep abreast of the times and must now begin research studies to learn more about our subordinate forest vegetation, its influence as a forest cover, and its relationship as a factor in the forest tree environment."

And what was the response of the foresters to Mr. Judd's policy statement on commercial forestry in 1918 and his plea of 1927 for research on "the ecological problems" of the

endemic ecosystems? To be sure, a preliminary research program on koa, one of the most valuable of native trees, was initiated--in late 1970!

In the meantime, L. W. Bryan reported that 1,057 different species of foreign plants were tested in arboreta on the island of Hawaii during the period from 1921 to 1946. In writing of his experiences on Molokai, George P. Cooke said in 1949: "I believe that we were poorly advised by the Board of Agriculture and Forestry in the selection of the varieties of trees for us to plant. They recommended that we use Eucalyptus and Ironwood, thousands of which were planted in many localities on this ranch. From my observations over a number of years, these trees have not satisfied our needs and are injurious to the land. Their leaves poison the soil under and near them. The Eucalyptus is reputed to absorb a huge amount of available moisture from the soil, when used on watershed areas. This moisture is too valuable to be lost in this manner. The varieties recommended to us which we planted have proven useless for lumber, firewood or fence posts...."

In discussing the devastation of the Kauai forests by feral cattle and goats during the early part of this century, Robert Wenkam wrote in his Kauai and the Park Country of Hawaii that "reduction of forest cover had resulted in adverse modification of climatic conditions, and the influence of the forest upon both the amount and the distribution of rainfall became a matter of common knowledge in Hawaii." He added that "the greatest damage to the native forests during this period was not done by loggers or by ranchers, but by foresters in their attempts to rebuild the watersheds. The early foresters, with inadequate academic training and insufficient time for experimental work, had difficulty replanting native trees and concluded that it could not be done. In areas where goats and cattle were controlled, the natural reseeding was abundant and new growth of koa, 'ohi'a, and even sandalwood flourished, but it was easy to replant with exotic species and foresters decided to do so.

"Thousands of trees were planted in a blind haste to replant the land. Recklessly, without regard to the consequences to Hawaii's shrinking native forests, the sugar-financed government program opened what Otto Degener has called a 'Pandora's Box of biological evils,' in order to save the watersheds. Seeds of alien plants were distributed to all islands in great quantities to be planted by plantation workers and volunteers, without plan or program."

In 1957, the State Division of Forestry initiated a cooperative agreement with the U.S. Forestry Service to conduct a forest survey and the necessary research aimed at developing a timber industry in Hawaii. Since that time, the Pacific Islands Forestry Service Institute in Honolulu has given guidance to the State foresters. Over the years, more than 46,000 acres were cleared and planted with exotic trees, many of which did not have even a potential commercial value, but, more importantly, the planting efforts were concentrated on already-forested land. This meant the utter destruction of near-virgin native forests; 1,559 acres were "reforested" within so-called forest reserves during fiscal year 1969-70.

According to the 1969-70 Report to the Governor by the Department of Land and Natural Resources, the income from the sale of nursery and forest products during fiscal year 1969-70 amounted to the grand total of $7,319, but the Division of Forestry also received $123,887 from various Federal assistance programs. Funds always seem to have been available for forest clearing but there was virtually no research on the native Hawaiian plants. As Dr. Charles H. Lamoureux wrote in 1969: "The forestry program in this State, as evidenced by its past and continuing practices, doesn't care about natural ecosystems--if if did we would not be destroying native forests in order to plant Eucalyptus."

The State Department of Land and Natural Resources is noted for its very high standard in coining euphemisms. Buried in section D of the "Honolulu Advertiser" for March 13, 1971 is a short announcement that the State Board of Land and Natural Resources had "approved the experimental harvesting of 'ohi'a and koa trees on 500 acres zoned for conservation at Laupahoehoe on the Big Island." When translated, this means that the Board agreed to let a private individual destroy 500 acres of the Laupahoehoe Forest Reserve in order to get more wood to make bowls and other souvenirs for tourists. Actually, the wood-carving company, without formal permission, had begun to bulldoze the road through the "forest reserve" to the harvest area in 1969. The Laupahoehoe Forest Reserve contains some of the finest near-virgin 'ohi'a-koa-tree fern forest on the island of Hawaii, and few such forests are now found on that island, or elsewhere in the State.

In his paper on "opportunities for marketing Hawaii timber products" (U.S.D.A. Forest

Service Research Paper PSW-61, 1970), George B. Harpole appended maps to show the "major forest types in Hawaii." The areas that he and the U.S. Forestry personnel in Hawaii classify as "suitable for commercial forestry" include essentially every remaining endemic 'ohi'a-koa-tree fern forest on the windward slopes of both Mauna Kea and Mauna Loa, as well as on the Kona slope of Mauna Loa.

According to the "Honolulu Advertiser of April 2, 1971, Senator Hiram L. Fong reported that he and R. Keith Arnold, deputy chief of research of the U.S. Forest Service, would request the U.S. Congress to allocate $250,000 to Hawaii in order to start a southern pine timber industry. Congress was sympathetic, and actually allocated $414,000 to State and Federal foresters in Hawaii. Much of this money, according to the recommendations of Mr. Harpole and the U.S. Forestry Service, would be used to destroy native ecosystems.

Moreover, the 1972-1976, 5-year Forest Planting Plan of the State Division of Forestry proposed to plant 6,092 acres of public lands with 17 species of exotic trees at a cost of 1.3 millions of dollars. The plan did not mention such endemic trees as koa, 'ohi'a, mamane, naio, sandalwood, or tree fern.

And yet, at nearly the same time in 1971, the Department of Land and Natural Resources published a "Forest Conservation Research Plan for the Seventies." Among the revealing statements in this glossy and expensive brochure is the following: "A plywood plant with a 5 million square foot capacity sits idle on the Big Island. Locally-produced craftwood is less and less able to compete with imports. More Christmas trees may soon be produced in Hawaii than can be sold. /In fact, this happened in December 1971, when high-priced locally grown trees did not sell well./ We must determine the standards which Hawaii's products must meet to compete in the marketplace, locally or as exports to Pacific Basin outlets. And the market potential of several timber species now being planted should be evaluated before they reach merchantable size." That last incredible sentence seems to mean that endemic forests on the island of Hawaii that are the result of evolutionary processes spanning hundreds of thousands of years would be bulldozed in order to plant exotic tree species. Then, after some 30 or 40 years, the foresters would see if the trees would, in fact, have any commercial value!

And, indeed, this seems to have been the modus operandi of Hawaiian foresters. Roger G. Skolmen, writing for the U.S. Forest Service in 1971, reported that "Robusta eucalyptus (Eucalyptus robusta Sm.) is the most available timber species in Hawaii. A resource in excess of 150 million board feet on the islands of Hawaii and Maui is being cut at a rate of 3 to 5 million board feet a year.

"Although robusta lumber has been produced in Hawaii for more than 10 years, only in the past year has it been produced by people with a broad knowledge of the American hardwood industry. Most of the robusta lumber has been produced, sold, and used in Hawaii by inexperienced people...."

The Forest Service decided to correct this deficiency by sending logs of this introduced tree to furniture manufacturers in Michigan. "Eleven logs were from a 60-year-old stand at Opana on Maui, eleven from a 45-year-old stand at Mountain View, Hawaii Island, and eight from a 33-year-old stand at Honomu, Hawaii Island."

Khoury Bros. Furniture Company made a chest of drawers, a coffee table, "some sawn chair legs, and some standard turned chair parts....Mr. Ed Khoury, owner of the plant, felt that robusta would have no chance of breaking into the midwestern furniture market. He would not be willing to buy the wood for even as low a price as $75 per thousand board feet because of its problems with instability, surface and bud-knot checking, glue-line failure, and heavy weight."

In fact, "the heavy weight of the wood was considered very detrimental. Pieces made of robusta were estimated to weigh about twice as much as pieces made of aspen, the wood normally used. This weight difference would increase freight costs enough to price robusta furniture out of their market."

How unfortunate, therefore, that 296,374 out of a total of 354,349 million board feet of exotic forests in Hawaii consist of "mainly eucalyptus" species (George B. Harpole, 1970. U.S.D.A. Forest Service Research Paper PSW-61).

Federal Foresters were not easily discouraged, however, especially when trying to justify something for which there was no justification. Although eucalyptus is an Australian tree, robusta eucalyptus has a "plus factor," according to Mr. Skolmen: "It is 'Hawaiian.' Anything with the name 'Hawaiian' attached to it will find a ready initial market these days." Consequently, Mr. Skolmen suggests that "in trying to develop a market

for robusta eucalyptus as a furniture species, we recommend that its image as a product of Hawaii be held in the forefront."

It would appear that totally specious arguments were published by foresters in order to "explain the great need" for a timber industry in Hawaii. The proponents cited the high cost of housing as justification for the total destruction of unique Hawaiian ecosystems and their replacement by exotic tree species, whereas State-sponsored studies have shown conclusively that the high cost of houses (and other living expenses) is in no way due to the cost of shipping from California to Honolulu. Moreover, foresters have been planting foreign trees in Hawaii for more than 50 years, and there still is no viable timber industry in the State. Although it is highly doubtful that Hawaii needs, or should have, a timber industry, native and exotic tree species should be planted on already cut-over land and not where the pitiful remnant of the endemic forest remains.

The State Department of Land and Natural Resources receives the bulk of its funds for destroying native forests and for introducing foreign plants and animals from Washington. One of the "nice" things about these Federal funds is that they are "free" to the states. It seems a little late in history, however, for one branch of the Federal Government to provide monies to destroy native ecosystems while at the same time another branch is providing funds for the acquisition of lands to preserve flora and fauna and to conduct research on rare and endangered species. Four Federal biologists of the rare and endangered species program are assigned to full-time study in Hawaii, and seven other employees of the U.S. Fish and Wildlife Service also work full time on animals (including rats) and various environmental concerns.

We document the past destruction of the native habitat in order to explain why so many of Hawaii's unique birds (as well as other animals and plants) have become extinct and why most, if not all, of the species now classified as rare and endangered probably will become extinct before the end of the century.

The irony lies in the recent and long-belated concern of civic-minded citizens for the preservation of historic sites and other aspects of the Hawaiian culture, but which is a concern that seems to be totally unaware of the even more remarkable and unique Hawaiian biological heritage. Even the trustees of the Bernice P. Bishop Estate appear to be completely oblivious of that heritage.

Hawaiian Feather Work: The extensive use of feathers by the Hawaiians was discussed by Brigham (1899) and Berger (1972). There appears to be no evidence that the Hawaiians caused the extinction of any endemic forest bird because of the value of its feathers, especially prior to about 1850. There does not seem to be any doubt, however, that the use of firearms during the latter part of the 19th century contributed significantly to the extinction of such birds as the Molokai 'O'o, Hawaii 'O'o, Molokai Black Mamo, and the Hawaii Mamo.

Writing in 1903, R.C.L. Perkins had the following to say about the Mamo: "Formerly it was without doubt of wide range over the island of Hawaii since it is known to have occurred both in the leeward and windward forests as well as in the Kohala Mountains. Unlike the 'O'o, which after the yellow axillary feathers were plucked out, could be, and sometimes was, liberated practically uninjured, the Mamo entirely denuded of its yellow feathers would have been in a sad plight, and would almost certainly have succumbed to such rough usage. It is quite certain that up to about 20 years ago these birds still existed in some numbers in the forests of Hilo district, for at the time of the great lava-flow of 1880 a considerable number were shot for the sake of the yellow feathers, as many as twelve having been obtained by a native bird-hunter in a single day. None of these were preserved as entire skins, the yellow feathers alone being saved...."

Apparently Henry Palmer, the collector for Lord Rothschild, obtained the last specimen of the Mamo for museum purposes. Palmer had been "severely kicked by a horse, and therefore, not being able to do long walks in the woods, sent the old bird-catcher Ahulan with several other natives, together with his 'assistant' /Wolstenholme/ into the forests on the Mauna Loa above Hilo." The group left Hilo on April 12, 1892, and continued working their way up the slope, the Hawaiians cutting a trail through the dense forest. The single Mamo was caught on April 16; Wolstenholme recorded the events of that day as follows:

"Broke the camp up at 6 A.M. and pushed on till 4 P.M. The old bird-catcher Ahulan was leading to cut the trail, whilst Holi and myself came next, followed by the others, who were a long way behind. We had not gone more than three miles, when I heard a call from the other side of the gulch, and thought it was a native calling, but immediately

afterwards a bird flew across, and I saw in a moment it was the bird we were after. I was going to follow it up to shoot it, but Ahulan begged me not to shoot as it would scare the other away, which I had heard calling a little way off. Ahulan fixed the snares and bird-lime on a haha, which growed out on a tree-fern, and which has flowers somewhat like those of a fuchsia. Ahulan fulfilled his promise and caught the Mamo! He is a beauty, and takes sugar and water eagerly and roosts on a stick in the tent. I now feel as proud as if someone had sent me two bottles of whisky up."

Wolstenholme and his party worked in this area for two or three days, but neither saw nor heard any other Mamo. They returned to Hilo with their live bird, which Palmer killed and skinned on April 21. After he was able to travel again, Palmer visited the Mamo's habitat but he found no birds.

H.W. Henshaw wrote to Lord Rothschild on October 9, 1899: "Drepanis pacifica is still a living species, though unquestionably very rare. No doubt it is on the verge of speedy extinction. About a year ago last July I found what, no doubt, was a family of Mamo in the woods above Kaumana. I am sure that I saw at least three individuals, possibly four or five. They were flitting silently from the top of one tall 'Ohi'a-tree to another, apparently feeding upon insects. The locality was a thick tangle, and a momentary glimpse of a slim, trim body as it threaded its way through the leafy tree-tops was all I could obtain. After about two or three hours I succeeded in getting a shot at one bird in the very top of a tall 'Ohi'a-tree. It was desperately wounded, and clung for a time to the branch, head downwards, when I saw the rich yellow rump most plainly. Finally, it fell six or eight feet, recovered itself, flew round to the other side of the tree, where it was joined by a second bird, perhaps a parent or its mate, and in a moment was lost to view. I need not speak of my disappointment, which was bitter enough, for I had looked upon that bird as absolutely mine own. Of the others I saw no more, though I have repeatedly visited the locality again."

Henshaw's observations of the Mamo in July 1898 are the last of record. Despite his 10 years of intensive field work in Hawaii, Perkins apparently never saw this species.

H.W. Henshaw gave another example of the use of guns for collecting plumage birds. He wrote in 1903 that the Hawaii 'O'o had been "widespread throughout the lower as well as the middle forest," but that "the districts of Olaa and Puna are today almost absolutely tenantless of this beautiful bird, where formerly there were multitudes. As late as 1898 more than one thousand individuals of this species were shot by the lei hunters in the heavily wooded district north of the Wailuku river, where their presence had probably been overlooked" in earlier years. The Hawaii 'O'o is presumed to have become extinct soon after the turn of the present century.

Indiscriminate Collecting: We list this potential contributing factor to extinction, especially when combined with destruction of habitat and the killing of birds for their feathers by the Hawaiians, because of our scanty knowledge of the Black Mamo of Molokai. The Black Mamo or Perkin's Mamo was first discovered by R.C.L. Perkins on June 18, 1893 at an elevation of about 5,000 feet. Hawaiian names were 'O'o-nuku-umu and Hoa. Only Perkins gave us information on the behavior of the Black Mamo, pointing out that it took the place of the Mamo on Hawaii.

"From what we know of the habits of the latter the two forms closely resemble each other in these, as well as in their cries. The 'O'o-nuku-umu is one of the rarer island birds and is now confined to the higher parts of the forest on Molokai, where the ground is soft and boggy. At the time when I discovered it these woods were in an absolutely natural condition, but since that time both cattle and deer have run through them and they are in most parts much less dense and less wet than they were in 1893."

Perkins added that the Black Mamo appeared to be the rarest of all of the bird species that he collected. This rarity made the species especially valuable in collections. William Alanson Bryan collected three male specimens during June 1907. Museum specimens of birds are rightly needed for serious studies, but the zeal and philosophy of some collectors leaves much to be desired. After shooting his first Black Mamo, Bryan exclaimed: "To my joy I found the mangled remains hanging in the tree in a thick bunch of leaves, six feet or more beyond where it had been sitting. It was, as I feared, badly mutilated. However, it was made into a very fair cabinet skin."

George C. Munro wrote in his Birds of Hawaii that "private collectors later depleted the district above Pelekunu valley where Perkins had collected. Neither Alanson Bryan nor I could find any there in 1907, but Bryan secured 3 male specimens at Moanui further round

the island to the east." Dean Amadon wrote that the "Meyers family, Perkins' hosts on Molokai, collected a few others," and that the Black Mamo had not been seen since 1907.

Introduced Diseases: More than 160 species of foreign birds have been released in Hawaii during the past century and a half. Most of these birds were released intentionally, although a few escaped from captivity. We know that some of these birds carried diseases and parasites that were previously unknown in Hawaii. We know, as well, that the Hawaiian people were highly susceptible to such simple--for Europeans--diseases as measles, which often was fatal to the Hawaiians. In fact, King Kamehameha II and his queen died of measles in London in 1824.

Hence, the introduction of foreign diseases appears, especially at first glance, to be one of the "most logical" explanations for the extinction of so many Hawaiian birds. The fact is, however, that we have no acceptable evidence that this is so.

Bird malaria is often cited as the principal villain. It is assumed that bird malaria did not occur in Hawaii at the time of Captain Cook's discovery. Actually, there were no mosquitoes in Hawaii at that time to transmit the disease from one bird to another. Mosquitoes were probably introduced at Lahaina, Maui, in 1826. We know all too little about the altitudinal distribution of mosquitoes in Hawaii even today. They are thought to be most common below 2,000 feet elevation.

Apparently no attempt to diagnose bird malaria were made until 1941, when Paul H. Baldwin found malarial parasites in the blood of one Red-billed Leiothrix in Volcanoes National Park. To the present, however, no one seems to know how serious bird malaria is to the birds that have it. Is it always fatal? sometimes fatal? or do most of the birds get sick and then recover? The answers to these questions must be obtained before one can assert that bird diseases caused the extinction of the Hawaiian birds.

Did destruction of the habitat or bird diseases result in the elimination of the native birds in the lowlands? And, if malaria and other bird diseases and parasites played a role in the killing off of the lowland native birds, what caused the extinction of the birds at the higher elevations? Why are the 'Apapane, 'I'iwi, and 'Amakihi still so common in suitable habitat, whereas birds such as the 'O'u, Nuku-pu'u, 'Akialoa, and 'Akepa are very rare, or even extinct, in the same habitat?

The 'Elepaio appears to be the most adaptable of all of the endemic forest birds. The Oahu 'Elepaio can be found in areas consisting almost exclusively of introduced vegetation, and a population inhabits such a forest near the head of Manoa Valley, where malaria is known to be prevalent. These birds may have developed some immunity to the disease, although there has been no long-term study of this population.

Observers in the 1890s, especially, referred to both native and introduced birds that were afflicted with "bumblefoot" or birdpox, a viral disease that produces large, irregular growths around the base of the bill, on the skin around the eye, and on the legs and feet. It could be this disease that sometimes causes one, or even all, of the toes to fall off, a situation not infrequently seen among Barred Doves and other birds in Honolulu. Some birds do undoubtedly die as a result of this infection, but, as with bird malaria, no thorough studies have been conducted.

Even though we may never reach a clear-cut decision on the role of introduced diseases in the extinction, or drastic reduction in numbers, of endemic forest birds, there is still a great need for thorough research on bird diseases and parasites in Hawaii. New blood parasites were first discovered in introduced birds as late as 1970, and new internal parasites were first reported in 1974. Any of these might present a serious threat to the remaining endemic birds as well as to the introduced game birds.

Competition with Introduced Birds: Early records of the importation of foreign birds to Hawaii are meager. The Common Pigeon or Rock Dove (Columba livia) was brought to Hawaii as early as 1796, and Captain Vancouver brought domestic chickens before 1800. Wild turkeys were imported from Chile to Kailua, Hawaii, by Captain John Meek in 1815. Certain other game birds, such as California Quail (Lophortyx californicus) were introduced before 1855. None of these are species that would have competed directly with the endemic forest birds, although it is reasonable to assume that some of the birds harbored certain bird diseases as well as external and internal parasites. The same assumption is reasonable with regard to the House Finch (Carpodacus mexicanus), which was imported from western North America "prior to 1870," and to the Common Mynah (Acridotheres tristis), introduced from India in 1865. The Mynah, in particular, is known now to serve as a host for a wide variety of parasites and bird malaria. Nevertheless, there is absolutely no

trustworthy information available that would enable one to say either that the introduced birds competed adversely with the forest birds or that the diseases and parasites brought in with the exotic birds were transmitted to the endemic forest birds. Despite some unfounded statements in the literature, there appears to be no evidence that the Mynah attacks any of the forest birds. Unfortunately, there have been no careful studies of the interrelationships of any species of introduced bird with the endemic birds.

There are, however, potential problems for the few remaining endemic forest birds. In The Exotic Birds of Hawaii, Edward L. Caum listed 93 species of foreign birds known to have been released--or to have escaped from captivity--as of 1933. As of 1970, more than 160 species of such exotic species had been reported. Of these, about 50 species appear now to be established, although a few have become established as breeding birds so recently that their final fate is unknown.

Several species have been so successful that they may very well offer a threat to the endemic forest birds because of the diseases and parasites that the introduced species have, because of competition for food or, less likely, for breeding sites, or because of social harrassment.

The two most striking examples are the Japanese White-eye or Mejiro (Zosterops japonica) and the Red-billed Leiothrix (Leiothrix lutea). The White-eye was first imported in 1929; the Leiothrix was imported to Kauai in 1918 and to other islands in 1928. Both species are now found on all of the main islands, and they occur from sea level to tree line. The white-eye, especially, is found in the very wettest and in the driest habitats; in fact, there are very few places that one can go in Hawaii without seeing White-eyes.

Although little is known about its habits, the Hwa-mei or Melodious Laughing-thrush (Garrulax canorus) also is a potential detriment to the native forest birds. The Hwa-mei, a favorite cage bird, is said to have escaped during a fire in the Oriental quarter of Honolulu in 1900 and to have become established on Oahu. Birds later were imported and released on the other islands. The Hwa-mei has been a very successful species, and is a fairly common bird in such near-virgin areas as the Alaka'i Swamp on Kauai, where it lives in the same forest with a number of the rare and endangered endemic birds.

The Critical Number: The rape and desecration of the native forests had been so great by the 1890s that the plumage birds had a markedly smaller range than they had a hundred years earlier, and, as already mentioned, the coming of the shotgun made collecting the birds much easier. There is some evidence among the higher animals that a species can be doomed to extinction long before its population has been reduced to an unusually low number. There seems to be a minimum number of animals that is necessary to insure successful breeding. When the population falls below some critical number, there may be a serious loss of viability of the offspring because of inbreeding, or the essential interaction and social stimulation may be inadequate to initiate the breeding cycle. Thereafter, the population declines either slowly or rapidly. In either event, the species becomes extinct when the last individual dies by accident, disease, old age, or even by the collector's gun. A small population also is vulnerable to catastrophies, such as epidemics and severe storms. The last three Laysan Honeycreepers, for example, were killed by a storm that struck Laysan Island in 1923.

Overspecialization: Overspecialization has been cited as a probable cause of extinction of some continental animals in the remote past, but I know of no evidence that suggests that any species of honeycreeper became extinct because of overspecialization in bill structure or in food habits.

Introduced Rats and Mongooses: The Roof Rat, Norway Rat, and Ploynesian Rat are known predators on the eggs and young of ground-nesting birds. They may have played a role in the extinction of the flightless rail of Hawaii, but there is no first-hand information. Almost nothing is known about this rail, which was last seen about 1884, except that the Hawaiian chiefs are said to have hunted it for sport with a bow and arrow. Both the Roof Rat and the Polynesian Rat climb trees, and it seems certain that they prey upon the eggs and young of the endemic forest birds. Although the smallest of the three species of rats in Hawaii, the Polynesian Rat has been seen to eat into the back muscles of living Laysan Albatrosses on Green Island of Kure Atoll.

The mongoose was not introduced to Hawaii until 1883; its omnivorous food habits are well known. Its primary role in the destruction of birds and their nests certainly was limited to such ground-nesting species as the Nene or Hawaiian Goose, Koloa or Hawaiian Duck, seabirds nesting on the main islands, poultry, and introduced game birds. The

mongoose may very well have been one important factor in the extinction of the Koloa on all of the islands except Kauai, and, perhaps also, of some seabird populations on the main islands.

It seems likely, however, that both the rats and the mongooses served merely as one of the final obstacles to survival for endemic species, rather than as the primary factor in their extinction or great reduction in numbers.

Literature Cited

Berger, A.J. 1972. Hawaiian Birdlife, Univ. Press of Hawaii, Honolulu.

Brigham, W.T. 1899. Hawaiian feather work. Memoirs, Bernice P. Bishop Museum, Honolulu.

Caum, E.L. 1933. The exotic birds of Hawaii. Occ. Papers Bernice P. Bishop Museum,10:1-55.

Cooke, G.P. 1949. Moolelo o Molokai, A Ranch Story of Molokai. Honolulu Star-Bulletin Printing Co., Honolulu, 164 pp.

Knudsen, A.F. 1909. The need of practical activity. Hawaiian Forester and Agriculturist, 6:171-175.

Skolmen, R.G. 1971. Processing Hawaii-grown Robusta eucalyptus from logs into furniture. U.S. Forest Service, P.O. Box 245, Berkeley, California.

Stresemann, Erwin. 1950. Birds collected during Capt. James Cook's last expedition (1776-1780). Auk, 67:66-88.

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What's in a Name? Answers by Andrew J. Berger, 17 December 1974.

Q: Page 115, paragraph 6, line 5, Oo-nuku-umu. Pukui's HAWAIIAN DICTIONARY lists as 'O'o-nuku-mu. Is it umu or mu?

A: Munro (Birds of Hawaii, page 92) gives the name as OO-nuku-umu. Perkins also spells it that way. I know that there are some errors in Pukui's Hawaiian Dictionary, so this may be one of them. At any rate, I have followed Munro and Perkins.

Q: Page 117, paragraph 5, line 1, Why Melodious Laughing-thrush is the preferred name for the Chinese Thrush?

A: The preferred name by ornithologists is Melodious Laughing-thrush because it belongs to a fairly large group of laughing-thrushes, which belong to the babbler family (Timaliidae). Therefore, it is not a thrush (family Turdidae) at all, and therefore, both Chinese Thrush and Spectacled Thrush are misleading names, probably coined by some petstore dealer.

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Kauai Christmas Bird Count

	Lihue	Kapaa	Waimea	Total
Pied-billed Grebe	.	1	.	1
Wedge-tailed Shearwater	.	1	.	1
White-tailed Tropicbird	3	8	14	25
Brown Booby	.	3	.	3
Red-footed Booby	.	1832	.	1832
Great Frigatebird	.	10	.	10
Cattle Egret	.	215	31	246
Black-crowned Night Heron	1	19	.	20
Nene	6	.	.	6
Pintail	.	173	.	173
Hawaiian Duck	2	45	.	47
Lesser Scaup	.	1	.	1
Japanese Quail (Common)	.	12	.	12
Red Jungle Fowl	3	52	28	83
Chukar	.	.	3	3
Ring-necked Pheasant	17	16	.	33
Peafowl	2	.	.	2
Hawaiian Gallinule	23	50	.	73
Hawaiian Coot	30	191	.	221
Pacific Golden Plover	210	388	46	644
Ruddy Turnstone	15	13	.	28
Common Snipe (Wilson)	.	2	.	2
Wandering Tattler	2	13	.	15
Sanderling	.	.	1	1
Hawaiian Stilt	9	20	14	43

	Lihue	Kapaa	Waimea	Total
Rock Dove	.	25	.	25
Spotted Dove	67	281	41	389
Barred Dove	576	1419	22	2017
Short-eared Owl	1	5	1	7
Barn Owl	2	4	.	6
Melodious Laughing-thrush (Chinese Thrush)	8	58	7	73
Red-billed Leiothrix	.	.	11	11
Mockingbird	3	5	7	15
Kauai Thrush	.	.	2	2
Shama Thrush	17	16	.	33
Kauai 'Elepaio	.	.	28	28
Common Mynah	452	560	29	1041
Japanese White-eye	133	270	41	444
Kauai 'Amakihi	.	.	29	29
'Anianiau	.	.	53	53
Kauai Creeper	.	.	13	13
Kauai 'Akepa	.	.	7	7
'Apapane	.	.	290	290
'I'iwi	.	.	110	110
Western Meadowlark	16	102	.	118
House Finch	131	142	3	276
Spotted Munia (Ricebird)	261	832	.	1093
House Sparrow	137	262	51	450
Cardinal	71	121	23	215
Red-crested Cardinal	10	.	.	10
No. of Individual Birds:	2208	7167	905	10,280
No. of Species:	28	36	26	50

Lihue: 21°59'N 159°26'W, center N of belt road between Puhi and Koloa exits to include south of Wailua middle fork to Kalaheo and Hanapepe valley.

Habitat coverage: Valleys & ridges 35%, cane fields 40%, pasture 5%, ocean front, streams, holding ponds & irrigation ditches 15%, towns 5%

Date: 15 December 1974, hours--not available

Weather: A.M.--partly cloudy, intermittent moderate rain; P.M.--partly cloudy, intermittent light to heavy rain. Temperature--72 to 82°F. Wind--ENE, 25-40 mph

Total hours--27: Foot 9, car 13, bicycle 5. Total miles--190: Foot 10, car 167, bicycle 13.

Eleven observers in 7 parties: Myrna Campbell, Sophie Cluff, Elizabeth McCoy, James McDowell and sons Darren & Jay, Dan Moriarity, David and Winona Sears (compiler), Virginia Siewertsen, and William Theobald.

Unusual sightings from Winona Sears: The nene are at Paradise Pacifica in the lagoons along the north fork of the Wailua River. They are not penned nor restrained in any way, seem to be "naturalized" and faring well. (If you know anything about these 6 nene, please share your information by writing to Kojima, 725-A 8th Avenue, Honolulu, HI 96816. MAHALO)

Kapaa: 22°09'N 159°25'W, center foothill junction of Makaleha and Anahola Mountains.

Habitat coverage: Farmland 70%, oceans, lagoons, ponds 20%, residential 10%.

Date: 14 December 1974, 0700 to 1130 hours

Weather: A.M.--mostly clear, intermittent rain; P.M.--partly cloudy. Temperature 73 to 80°F. Wind--NE, 15-20 mph.

Total hours--24: Foot 6, car 17, feeders 1. Total miles--173: Foot 4, car 169.

Nine observers--8 in 3 parties, 1 at feeders: Jordan Hammond, Delano Kawahara (compiler), David & Winona Sears, David Sollner, Brian Yamamoto, Grace Yoder, Fred and Melly Zeillemaker.

Unusual sightings from C. Fred Zeillemaker, Assistant Refuge Manager, Hawaiian and Pacific Islands National Wildlife Refuges: My wife Melly and I were responsible for the northern portion of the Kapaa Count circle: those accessible areas from Moloaa Stream on the east to Lumahai Stream on the West, including Kilauea Point and Hanalei Valley. We observed the pied-billed grebe, common snipe and lesser scaup.

Count day (12/14/74) was the first time we found the pied-billed grebe. It was on a private reservoir southeast of Kilauea It was in winter plumage. Since the count I have

observed the bird on the same reservoir 1/22/75 and 2/7/75. I failed to find the bird there 1/10/75, 1/26/75 and 2/16/75 (the last time I was there). The bird was beginning to attain its breeding plumage including the ring around the beak on 2/7. As far as I have been able to determine, it is a state record.

The lesser scaup, a female, was on the Lumahai River estuary above Highway 56 bridge. A male bird has been there from 1/22/75 to 2/16/75 (my last visit there). I also located a group of seven (three males, four females) on Kaloko Reservoir southeast of Kilauea 2/16/75.

The common snipe were observed on Hanalei National Wildlife Refuge. Two birds could be found there 12/14/75 (count day), 12/23/75 and 1/17/75. Single birds were observed 1/3/75, 1/22/75, 2/7/75 and 2/14/75. None were observed during censuses there 2/21/75 and 2/28/75.

Waimea: 22°02'N 159°40'W, center E of junction of Koke'e Road from Waimea and Kekaha.

Date: 28 December 1974. Other information--None

Four observers: Takeshi Fujita (compiler), Shige Nishikawa, Betty Gagne, Erika Wilson.

Comments from Takeshi Fujita: The cattle egrets were very common during the summer and autumn in the pasture lands and alfalfa fields. This past Sunday /9 March/ I saw six. However, time during the day is a factor, for they go into the kiawe forest as the day gets hotter.

With the heavy rain, the stilts are much more easily seen now than they were in December. On Thursday /6 March/ I counted 20+ in an area which is not within the area counted.

Mockingbirds are very commonly seen on the dry, westside of the island. ...

Koke'e report from Erika Wilson: Under partly cloudy skies on December 28, 1974, Betsy Gagne and I participated in the Waimea Christmas Count, our section being the Koke'e area. In the morning we counted in "dry koa forest" where 'Apapane is most abundant. 'I'iwi, 'Anianiau, Kauai 'Amakihi, and Kauai 'Elepaio are all common in this habitat. A few introduced species, especially near the developed sections of the State park, are common; they include Japanese White-eye, Common Mynah, Red Jungle Fowl, and Cardinal. A large grassy field is also frequented by a number of Golden Plover in company with the Mynah and Jungle Fowl.

In the afternoon we counted birds in "'ohi'a rain forest"; again 'Apapane is most abundant. 'Anianiau is common, but 'I'iwi and 'Amakihi are less prevalent than they are in koa forest areas. However, we saw a majority of the 'Akepa and Kauai Creeper in the rain forest areas. With the exception of one bird that flew over us while we were in an Alaka'i Swamp bog, all the White-tailed Tropicbirds were seen in Waimea Canyon. ...

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Two very interesting articles on the Christmas bird counts were written by William P. Mull, HAWAII TRIBUNE-HERALD, 2 February 1975, Orchid Isle Magazine section, 2-8 February 1975, Native Birds Rule the Roost at the Volcano; and Harry Whitten, HONOLULU STAR-BULLETIN, 18 January 1975, page A-11, Bird Population Contrasts.

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FOR JUNIOR MEMBERS: Have you received the poster "We Care about Hawaiian Wildlife Habitat"? What did you do with it? Were you able to use it during the Wildlife Week, 16-22 March? What did you find out about Hawaiian wildlife habitat? About the birds on the map? Please share your experiences with other members by writing to Kojima, 725-A 8th Avenue, Honolulu, Hawaii 96816.

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I have something to share with you. On 4 March I found a beautiful orange moth (about 1½ inches) with a black round dot on the wings and a black rectangular marking on the edge of the wings, resting on the ground near a strawberry guava tree. About a month ago I had a glimpse of this unusual moth, but since it was late in the afternoon, I thought it was an optical illusion to see such a beautiful moth. It wasn't an optical illusion! On 5 March I took the specimen to the State Department of Agriculture and what do you think I found out? I'll let you know later.

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Have you noticed the beautiful red wiliwili and yellow gold tree blossoms? Are you watching the plover getting ready to leave? Let's become concerned participants in this wonderful Hawaiian ecosystem. Please observe and write to Kojima what you find. It's fun and challenging. MAHALO. Schweitzer Legacy...Man can no longer live for himself alone.

Field Trip by Erika Wilson: The Waipio Peninsula was the site of the monthly field trip held on Sunday, February 9, 1975; four people constituted the group. At Walker Bay, where the tide was out, we flushed a male Pintail in breeding plumage when we first arrived. The shorebirds were present in usual numbers with the notable absence of Hawaiian Coots. About a dozen Black-crowned Night Herons (both adults and immatures) were feeding in the company of three dozen Golden Plover, a dozen Hawaiian Stilt, half a dozen Sanderlings, half a dozen Ruddy Turnstones, and two Wandering Tattlers.

In the scrubland and sugar cane fields we also saw several large groups of Cattle Egrets, some of whom were sporting orange breeding plumes on the head and breast. Other species seen on the peninsula included Red Munia (strawberry finch), Spotted Munia, Black-headed Mannikin, House Finch, Cardinal, Red-crested Cardinal, Japanese White-eye, Common Mynah, Spotted Dove, and three female Ring-necked Pheasant.

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Field Notes from C. Fred Zeillemaker: Although I heard of the Kauai golden eagle soon after arriving here last August, I have not received any first-hand reports of the bird since.

As assistant refuge manager for the Hawaiian Islands National Wildlife Refuges on Kauai, I visit the Hanalei Refuge, Huleia Refuge and Kilauea Point (where we reside) frequently. Perhaps the following is of interest:

Laysan Albatross--one at Kilauea Point 2/10/75, flying very close to shore at sunset (observed by Melly Zeillemaker).

Bonin Petrel--one at Kilauea Point 9/20/74, grounded after striking an obstruction previous night, photographed and released apparently unharmed.

Mallard--adult male at Menehune Fish Pond 1/27/75, 2/12/75 and 2/18/75.

Cinnamon teal--adult male (breeding plumage) with pair of koloa at Hanalei NWR /National Wildlife Refuge/ 2/14/75. Possibly the second State record for the species. One was collected in the State in 1968.

Redhead--three birds (females and/or juveniles) on a pond near Hanalei 1/22/75. Studied at close range.

Bufflehead--female at Hanalei NWR 11/29/74 and 12/6/74.

Long-billed Dowitcher--single bird at Hanalei NWR 10/16/74 and 10/18/74.

White-throated Laughing Thrush--Two in tree at Menehune Fish Pond overlook 1/23/75.

The following two observations were made on Hawaii and Oahu:

Ring-billed Gull--one photographed in sub-adult plumage at South Cape, Hawaii 11/26/75. Also observed by Dr. Michael Scott of that island.

Least Tern--one immature at West Loch, Oahu, 10/25/75. Also observed by Palmer Sekora, Gene Kridler, Dave Marshall and others. ...

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From Erika Wilson: Coastal Kauai--On December 29, 1974, Betsy and I drove along the coast of Kauai, looking for birds. In the Hanalei area we came across a group of velvety Hawaiian Coots on a big stream. It was a real pleasure for me to watch them dive into clear, mountain-fed water, quite unlike their behavior while feeding on Pearl Harbor's mud-flats. We made a sudden stop when I saw a large brown bird land along a stream; it was an immature Black-crowned Night Heron.

At the Kilauea Lighthouse we watched a fascinating display of bird behavior as Great Frigatebirds harassed the Red-footed Boobies. One frigatebird in particular was quite deft at following the erratic flight of its booby victim, eventually forcing the booby to land on the sea, and resuming the chase when the booby again took wing. I missed the groups of terns I associate with seabird watching along Oahu's windward coast.

To the south of Kilauea we spotted a Barn Owl hovering over a field. Then came a very rewarding stop at a marshy area below Opaekaa Falls where we saw a Hawaiian Coot, two Hawaiian Gallinules, and four Hawaiian Ducks. We were so excited about the ducks, which arrived in pairs, that we could hardly focus our binoculars! Other birds in the area included Ring-necked Pheasant, Common Mynah, and flocks of Spotted Munia (Ricebird). The gallinules were quite shy, only occasionally showing themselves in the grasses along open water. In marked contrast was the nonchalance with which three Hawaiian Gallinules walked about the lawns of the Kauai Surf Hotel near an artificial pond. One settled down in the sun and began a lengthy preening session; then they all strolled to the water's edge and disappeared into the overhanging shrubbery.

A stop at the Menehune Fish Ponds was disappointing; we had hoped to see Hawaiian Stilt, but the area was without birds, perhaps due to the boats moving through.

Kapiolani Park--An hour's birding on Monday morning, February 17, 1975, in Kapiolani Park with six Mainland visitors yielded fourteen species. We stepped through the wet grass less delicately than the Golden Plover feeding there, but we, too, enjoyed the relative emptiness of the park at that early hour. The three dove species, Rock, Spotted, and Barred, were present in great numbers, as were the Japanese White-eyes, and Common Mynahs. A pair of Red-vented Bulbuls flew from tree to tree, chortling deeply. A bright flash of yellow proved to be a Yellow-fronted Canary on the grass. Other species feeding in the park included House Finches, Spotted Munia, Java Sparrows, House Sparrows, Pin-tailed Whydahs, and Red-crested Cardinals. We heard some raucous calls from the ironwood along Kalakaua Avenue, which may have been parrots, but we didn't see them.

Ulupau Head and Nuupia Pond--At 9 a.m. on February 17, 1975, our group of seven met Sgt. Johnson (Joint Public Affairs Office) at the main gate to the Kaneohe Marine Corps Air Station. He kindly escorted us to the Red-footed Booby colony at Ulupau Head. Perfect weather conditions made bird watching very pleasant. A few boobies were on completed nests, but most pairs were in the process of building. One bird was seen incubating an egg, although it is rather early in the breeding season. A few of last year's young were flying about in their brownish plumage, as were a few two-year-olds with their more adult-like plumage. A small number of Brown Boobies were flying off Ulupau Head and several could be seen on Moku Manu with the spotting scope. Also present on Moku Manu were many Red-footed Boobies and a large contingent of Great Frigatebirds. At least a half a dozen males at a time were displaying their brilliant red gular pouches fully inflated. Immatures, females, and males all flew overhead at various times during the morning, giving us a closer look.

At Nuupia Pond we had plenty of shorebirds to watch, including Hawaiian Stilts, Ruddy Turnstones, Sanderlings, Wandering Tattlers, and the ever-present Golden Plover. Also stalking about were Black-crowned Night Herons, and we saw a group of three Koloa (two dyed red, the other unmarked) flying across the ponds. On the makai pond we added some White-capped Noddies feeding in the shallows to our day's list.

Tantalus--On Saturday, February 22, 1975, three guests and I walked the Tantalus-Manoa Cliffs Trail. We had intended to walk the Poamoho Trail, but turned back when it began to rain steadily above Wahiawa. Indeed, we had showers on Tantalus during the first part of our walk, but it cleared about midmorning. Near Tantalus Drive we saw Japanese White-eyes, Cardinals, and Spotted Doves, and a little further on a female or immature 'Amakihi. Up in the bamboo thickets we heard the Japanese Bush Warblers singing loudly, but well-concealed from view. On the back side of Tantalus there were many koa trees in bloom and we heard a number of 'Amakihi calling and singing. Twice we heard 'Apapane as well, but we couldn't locate them. Throughout the walk we heard Japanese Bush Warblers; at one point there were three singing all around us, but we couldn't spot a single one! Several Shama Thrushes were seen along the trail above Manoa proper. I was disappointed that no inquisitive 'Elepaio came to check on us.

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From ATLANTIC NATURALIST, Vol. 29, No. 4, Winter 1974, page 183: Fish and Wildlife Service

The name of the Bureau of Sport Fisheries and Wildlife was formally changed to U.S. Fish and Wildlife Service, effective July 1, 1974. The action followed the transfer in 1970 of the sister Bureau of Commercial Fisheries from the Department of the Interior to the Department of Commerce, leaving the wildlife agency as the only branch of the Fish and Wildlife Service.

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Op. cit., pages 159 and 160: Ellen Swallow, Environmentalist by Stanley A. Cain

This is a book commentary on ELLEN SWALLOW: THE WOMAN WHO FOUNDED ECOLOGY by Robert Clarke.

Professor Cain is a professor of environmental studies at the University of California at Santa Cruz. He says, "Her work was soundly based on individual sciences, but she used them together and in relation to one another, so it is reasonable to think of her as an environmentalist, yes, and as an ecologist, too, but founder of ecology she was not. Ecology was named for strictly biological work concerned with the interrelations of organisms and environment."

Ed.Note: A reference copy of ELLEN SWALLOW is available at the general meeting for your use.

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Request for Nesting Information: Audubon members can add a great deal to our records of the nesting activities of both introduced and native species if they will call when they find a nest. Dr. Berger has agreed to coordinate the nest-record program. If you find a

nest, please call him at the Department of Zoology, University of Hawaii, telephone 948-8655 or 948-8617. MAHALO NUI LOA for your interest and KOKUA.

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Following members have generously donated to help pay the ever-increasing expenses to achieve our objective to make this a better world: George-Ann Davis, Vice President in charge of education during 1974-$2.00 with a note, "I wish you much success in the Hawaii legislature...."; Charles M. Dunn, founder and honorary life member-$10.00. For the last few years, this is the way he actively participates in our projects.; Ronald L. Walker, a life member and a concerned contributor to THE ELEPAIO-$1.00 with a note, "for postage and expenses" with his reservation for the annual and five-year indexes.; and an anonymous gift of seven boxes of nature stationary-$8.75. MAHALO NUI LOA!

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ALOHA TO NEW MEMBERS:

Junior - Gregory C. Cone, 94-531 Anania Court, No. 108, Mililani Town, Oahu 96789*
Regular - Virginia B. Cleary, 94-531 Anania Court, No. 108, Mililani Town, Oahu 96789*
Diane Elliott, 841 Stowell Circle, Honolulu, Hawaii 96818
Mrs. Margaret R.W. Finch, 14 Aulike St, Apt 402, Kailua, Oahu 96734
Virginia Goldstein, 201 Lukia St, Hilo, Hawaii 96720
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Mrs. Robert K. Kepner, 50 West Shore Road, Denville, New Jersey 07834
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Raymond S. Spencer, 2441 Pacific Heights Road, Honolulu, Hawaii 96813
Mr. & Mrs. Lester R. Walls, P.O. Box 278, Haleiwa, Oahu 96712

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The annual and five-year indexes will be mailed to the members only upon request. If you are interested in receiving either one or both copies of the indexes, please send in your request indicating (1) annual, (2) five-year, or (3) both, before June to Kojima, 725-A 8th Avenue, Honolulu, Hawaii 96816.

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HAWAII'S BIRDS, a field guide, is available for $2.50 postpaid. AIRMAIL 65¢ extra. Send in orders to: Book Order Committee, Hawaii Audubon Society, P.O.Box 5032, Hon., HI 96814.

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APRIL ACTIVITIES:

13 April - Field trip to Waianae Kai Forest Reserve to study forest birds. Bring lunch, water, and if possible, your car. Transportation cost ($1.00) to be paid to the drivers. Meet at the State Library on Punchbowl Street at 8:00 a.m. Leader: Omer Bussen, telephone 262-5506.

14 April - Board meeting at McCully-Moiliili Library, 6:45 p.m. Members welcome.

20 April - NOTE. Extra field trip to Ulupau Head booby colony. Bring lunch, water, and if possible your car. Transportation cost ($1.00) to be paid to the drivers. Meet at the main gate, Kaneohe Marine Corps Air Station at 9:00 a.m. Leader: Mrs. Erika Wilson, telephone 523-1843

21 April - General meeting at the Waikiki Aquarium Auditorium at 7:30 p.m.
Program: Parasites of the Pacific Golden Plover and Their Use in Studying Migratory Habits by Ben Okamoto (slides)

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20 April at 12:00 noon - Be sure to watch "Old Songs, an Ancient Creation Chant and New Poems about Hawaiian Wildlife" on KGMB-TV (Voices of Concern)

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