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PAIKO LAGOON AND KULIOUOU BEACH PARK ECOLOGY*

By Edward Arrigoni

Though muddy seashores do not appear to be very attractive, they contain a greater amount of living material or biomass than rocky shores or sandy beaches. This seashore life is not "stagnant" but highly productive. By standing over small mud puddles containing marine algae (seaweed) one easily can see fresh air being created in the form of clinging oxygen bubbles. (In fact, probably most of the oxygen gas we breathe comes from marine algae.)

In Paiko Lagoon off Kuliouou Beach Park this algae forms the major part of a food chain containing plants and animals with life styles beautifully adapted to this kind of a seashore. However, the interesting features of this quaint little park can be appreciated without venturing onto the mud, particularly if the visitor is aware of the fascinating stories about some shorebirds and other life here. The Pacific Golden Plover, for instance, makes an amazing migration flight over 2,000 miles of open ocean to breeding grounds in Alaska and Siberia about April or May. Studies of our wintering shorebirds indicate the Golden Plover is capable of making these long flights in less than two days, reaching flying speeds of 60-70 miles per hour! Upon reaching its northern destination the Golden Plover quickly builds a nest, breeds, and raises young in less than four months, after which time these young birds are ready for the 2,000 mile flight to Hawaii.

This wondrous knowledge about the plover perhaps could be appreciated without the reader visiting a muddy seashore. However, directly observing and comparing these shorebirds and other kinds of life in the Paiko Lagoon Wildlife Sanctuary a lesson in ecology becomes dramatized. For instance, when the Golden Plover is feeding you can see it making short runs and stopping quickly to probe into the mud for shrimps, worms, and anything else edible. Then in the same area of the mudflat during winter months, the Ruddy Turnstone often can be seen feeding in another manner, frequently using its bill to turn or flip over small rocks or stones in its hunt for the small creatures which live underneath. Or sometimes in the water of the lagoon one can see the elegant Hawaiian Stilt probing deeper into the mud with its long, sensitive bill. The food of the stilt consists partly of shrimp and worms at lower strata, which are usually different from the shrimp and worms closer to the surface eaten by the plover. Also a visitor here sometimes can see the Black-crowned Night Heron stalking fish in the lagoon, and this bird will often feed at night.

Many less conspicuous kinds of animals here have interesting life styles. The snapping noise in the mud which becomes more audible as the water recedes during a low tide is made by the snapping shrimp. This creature has one large claw which makes a loud compression wave to stun tiny prey or serve as a defense. There is speculation by some invertebrate zoologists that the noise may be a territorial sound or some sort of signal for other snapping shrimps.

Small clams in the mud feed by filtering large quantities of water to strain out small organic matter. The oysters fastened to rocks and the concrete wall by the lagoon can filter well over a hundred gallons of water in a day. The parted shells or gaping appearance of dead oysters and clams is caused by the relaxing of the adductor muscles, which

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*By special permission excerpted from the Marine Science Education paper by Edward Arrigoni: Featuring Kuliouou Beach Park and Paiko Lagoon or the Highlights of a Muddy Seashore

were used by the animals to close their shells when they were alive.

A small squid (Euprymna scolopes) which lives in the mud during the day emerges at night to hunt small shrimp. This animal has a "photophore," an organ it can use for emitting subtle light shading as camouflage. Or it can be used by the squid to emit a burst of brighter light to stun an attacking enemy and escape. Currently this animal is being studied for possible use in behavioral, physiological, and genetic experiments. It is collected for research in Paiko Lagoon.

Frequently the mullet, tilapia, and some other fish here can be seen jumping out of the water, which is a method of escaping predators or dislodging parasites. Sometimes a large school of the young mullet can be seen from the side of the Kuliouou Stream where their silvery bodies aid as camouflage in rippling or shimmering water. Muddy seashores and bays in many places are nurseries for fish of economic importance. So the importance of preserving this kind of muddy seashore is not just for learning about the word, "ecology": In this case Paiko Lagoon is a substantial nursery for mullet, a favorite local food fish.

An aggressive kind of swimming crab with a brown body and black-tipped claws lives on the shallow areas of the shore here. (When captured with the hand, it puts up a vigorous pinch.) Unlike the rock crabs, the back legs of the swimming crabs are flattened for quick thrusts through the water. These crabs live near the top of the local food chain.

The mantis shrimp in the mud can make ferocious attacks on the crabs, other shrimps, and even small fish.

The large holes at the upper part of the shore near the grass are dug by ghost crabs (sand crabs--Family: Ocypodidae). The mounds they leave are clues about the animals inside. A large mound with a pointed top usually indicates a large male, a rounded top a female or immature male, and a scattered pile of sand a juvenile.

The holes in the mud and lower shore are made mostly by burrowing shrimps and various kinds of annelid worms. Certain kinds of mud shrimps with a huge digging claw (Callinassa spp.) tend to pile mud dug from below outside their holes, and this pile of subsurface mud has a grayish color. Some annelid worms (Marphysa) make a U-shaped, double-holed burrow to aid circulation of oxygen and food particles in the water.

Shrimp and worms are not easy to capture in these subterranean dwellings, but once caught some of their burrowing habits can be studied in a large jar. Fill the jar with mud and add seawater to an inch from the top. Then cover the sides with a cylinder of heavy paper. The shrimp and worms placed inside will dig burrows next to the glass, and these can be observed occasionally by simply lifting the paper.

Brother Kevin Thomas of Saint Louis High School has done a study of the annelid worms and some other small creatures living in the mud at various levels, and he has compiled some impressive testimony on the tons of mud all thses natural diggers overturn in keeping their burrows oxygenated. He points out that actually this area is not a pure muddy seashore, but a mud-sand combination. This combination is more suitable for digging burrows for many subterranean marine invertebrates than pure mud (too compact) or pure sand (too loose).

The black, odorous mud under the surface is probably what mostly makes a muddy seashore unappealing to some people. This situation is caused by a lack of oxygen under the compact surface. The shortage of oxygen leads to the growth of certain kinds of bacteria (anaerobic). In their decomposition of organic material, these bacteria produce hydrogen sulfide as a waste by-product. Then sulfurous compounds that are black or gray in appearance usually form in this subsurface mud.

Along some parts of the shore of the lagoon, pickleweed (akulikuli-kai) can be seen to have a restraining effect on drifting of the mud. Interestingly, the leaves of the pickleweed are so full of salt that few animals eat it, which is a protection of the plant.

Thus as one studies birds and other living things of this muddy seashore, a symphony of various life styles emerges. Each creature in the lagoon is performing in a manner that often is essential to the harmonious living of all the other creatures here. Various kinds of marine algae support various kinds of shrimps, worms, and other small life which in turn support birds, fish, and crabs. Then the waste products of all these living things contribute to the nutrient value of this muddy seashore.

The interrelationships become even more complex as we discover that certain larger animals, such as the mullet fish, feed directly on the marine algae; that leaves and other organic material carried down by the Kuliouou Stream play a significant role as a food source for bacteria, paramecia, worms; etc. Some ecologists who have examined all the

interdependent biological and physical relationships of these kinds of ecosystems have become tempted to treat the whole complex area of a muddy seashore as a single living thing.

Some teachers, such as John Hawkins of McKinley High School, have been bringing students here to perform various systematic observations, including measuring of oxygen and nitrates in the water, measuring of current flow; plotting concentrations of marine algae; using microscopes to examine surface mud for diatoms (the most common plants on earth); examining old marine algae for paramecia and a myriad of other microscopic animals; sifting the water for fish larvae and other kinds of plankton; counting the number of holes in square meters of mud along a transect line; and digging for animals inhabiting the burrows. (The students found that apparently these subterranean animals can outdig them.)

Teachers from nearby schools, such as Holy Trinity and Wailupe Valley Elementary School, have been bringing their students here too. Students in my high school classes (Kaiser High) and adult education classes have found the park to be an interesting and refreshing stopover while exploring other kinds of seashores on this part of the island. When a walkway (with gates) has been connected to the peninsula, visitors will find on the other side a pretty little beach which has much value because of its isolation. From here an extremely spacious view of the bay shoreline and the back of Diamond Head can be enjoyed.

One use for the park and muddy shore area is to compare it to a rocky shore or sandy beach just visited, and try to determine why certain kinds of plants and animals are not found here. For instance, the students can theorize why sea lettuce (Ulva spp.) is not found here but is found in tidepools of a rocky shore. I have found some of these lessons to be suitable for even third graders who are learning about the various forms of plants and animals along the seashore. Other science teachers agree with me that the evolutionary concepts involved in these kinds of lessons are highly important for an understanding of basic life forms.

The proximity of this shorebird area to the University of Hawaii and the fact that Paiko Lagoon is a wildlife sanctuary make it useful to college level biology students who want to perform research.../and/ geology students to make studies of the sediments here.

On the whole island there is no similar park and lagoon combination with all the educational advantages just described.

Other Features: Trees--At this small park can be seen some kinds of trees which were brought to the Hawaiian Islands during the earlier voyages of the Polynesians. The coconut tree (niu) and pandanas (hala) were probably the most useful trees to the ancient Hawaiians, and these uses are generally well known.

The milo tree is easy to identify because of its conspicuous leaves which are heart-shaped, pointed, glossy, and yellow-veined. The young leaves have been used for food. (But do not try eating anything in the park because sometimes pesticides are used.) The milo is a popular shade tree which grows well by the seashore. Not many trees do. Its fine grained wood is useful for making utensils and other items. Maximum height is about 40 feet.

The true kamani trees are recognized easily by thick, parallel veined leaves. The wood of the kamani was used for making calabash bowls and end portions of canoe decking. All parts of the tree were used for medicine. Maximum height is about 60 feet.

The false kamani, at the Koko Head side of the park entrance across from the milo trees, is a kind of tree introduced after Captain Cook's arrival. Still it was worked into the Hawaiian culture, and most parts of it had medicinal uses. Now it is planted mainly for ornamental purposes. The large leaves form circular rosettes at the ends of the branches. Usually there are old red leaves on the tree or on the ground below it, which aids in identification.

The bushes planted along the fences are mostly the naupaka or "half-flower," our most common seashore flowering plant. All these trees and other shrubbery within the area help in dampening the noise from the highway.

Recreation, including bird watching--At this park a few playground facilities, the restrooms, picnic tables, the shaded lawn, the picturesque scenery, and the opportunity to watch birds, make it a good stopover for students and teachers on outings. It is an ideal spot off the highway to relax and eat lunch.

Bird watching sometimes is still considered an uneventful or "sissy" activity, as playing tennis or becoming a scientist was three or four decades ago. But all youngsters can learn to highly enjoy field trips to parks and seashore areas to watch birds. As the students learn to adjust binoculars, brace their arms on a fixed object (such as a picnic

table), position themselves so that the sun is behind them, and develop other viewing techniques, they obtain pleasure each time they make a small discovery about the appearance or behavior of a bird, much as someone enjoys making a connection in a crossword puzzle or a detective story.

By learning to use patience the students learn that certain birds have particular markings, some birds run, some move slowly, some feed only in certain areas, etc. Pleasure in feeling one's powers of observation increase. When I have asked students to put into writing what they like most about field trips which involve bird watching, the word which most frequently appeared is "peace" or "peaceful."

During the morning hours when the sun is in the east, it is advantageous to walk to the Koko Head end of the park and sit there to view the birds with the sun at your back. Binoculars, the larger the better, are a "must" to fully enjoy shorebird behavior and become acquainted with the color and markings reflected off feathers. Youngsters should be shown how to steady the binoculars by resting their elbows on their knees if sitting on the ground. (If they sit on the ground, be certain they are on mats or some other protection from dampness.) Picnic tables, such as those at the ewa end, are ideal fixtures for young birdwatchers who easily may tire of holding up binoculars.

Just as fifty years ago when few classrooms in the nation contained microscopes, very few today have binoculars. Now that the cost of binoculars has lowered considerably, teachers may like to explore the recreational/educational values of bird watching. During the school year, at Paiko Lagoon students can usually see any of four migratory shorebirds--Pacific Golden Plover (kōlea), Sanderling (huna-kai), Wandering Tattler ('ūlili), and Ruddy Turnstone ('akekeke). A few birds remain during migration time. Also the rare Hawaiian Stilt (ae'o) and the Black-crowned Night Heron ('auku'u) make appearances periodically. For descriptions of these birds and others, consult the splendid new guide issued by the Hawaii Audubon Society, HAWAII'S BIRDS. The cost is $3.

Because of the many unique aspects of this quaint little park, I have recommended to the Honolulu Parks and Recreation Department that a bird observation area be set up. This viewing area could possibly include benches, durable plaques with descriptions of shorebirds, and a viewing telescope similar to those in front of Diamond Head. (A similar suggestion was made by local author Margaret Titcomb over 15 years ago in the 'ELEPAIO.)

The view and a brief history--Maunalua Bay with Paiko Lagoon exists mainly because of the formation of two volcanic craters--first Diamond Head about 300,000 years ago and then Koko Head about 40,000 years ago. Koko Head is a filled crater. Behind it is Koko Crater, which erupted about 60,000 years ago. These three craters erupted with explosions of fragmented lava that shot miles into the air, became caught in the tradewinds, and was blown in a downwind or leeward direction. The result is that these craters tend to be higher on their leeward sides, which can be seen from the park when viewing the profile of Koko Head. The deep gullies on the side of Koko Head were formed mainly by rainwater streaming over the unsolidified lava after the eruptions.

Captain Portlock sailed into this bay in about 1786, seeking water and food. Probably sweet potatoes were the staple crop of this area since most of it is too dry for wetland taro.

Paiko Lagoon is named after Manuel Pico, a part-Portuguese resident of early Hawaii. He came from "Pico," a Portuguese fishing village in the Azores. The name was later Hawaiianized to "Paiko" and carried on by his son Joseph. He obtained much of the land in Kuliouou Valley, from the mountain to the sea (a Hawaiian ahupua'a) for $800. Despite considerable review of literature on our history, it has been difficult to find details on the earlier succession of this land. "Kuliouou" literally translated means "knee drum;" however, I have not been able to learn why that name was applied here.

The peninsula in the right foreground is partly natural and partly dredged. It is officially part of a wildlife sanctuary set up by the State, but an attempt is now being made by a private citizen to build a large house there. Currently this situation is highly controversial. There is much concern from local residents, teachers, and others about the possible effect of the proposed construction on the Hawaiian Stilt and other birds and also the effect on school groups quietly watching birds from the peninsula, the effect on scenery, etc.

The house will be located behind 16 islets in the lagoon dredged by the State in the hope that the endangered Hawaiian Stilt would use them for nesting. The success of these islets still seems undetermined--perhaps more time is needed to ascertain the value

of this effort. They serve now as an easily visible effort by our State Fish and Game Division to save one of our endangered native species or endemic (found only in Hawaii) subspecies.

Farther to the right one can see that Paiko Lagoon also is approachable from Paiko Drive, but auto parking there is difficult. A closer viewing area of the stilt mounds can be obtained from the end of Kuliouou Road, which is on the opposite side of the stream entrance, but parking here is also not feasible.

Conclusion: Only recently has the value of this park and lagoon combination been realized. The value will increase among our citizens as they become more aware of the pleasure of bird watching with binoculars, the fun of field tripping around the peninsula and shoreline, the scenic value of parts of the park that are not yet used, the need to keep this unique lagoon area and all its living things as undisturbed as possible, and the need to provide more beaches and parks for this district of rapidly increasing population. Kuliouou Beach Park and Paiko Lagoon then will become a feature attraction.

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Letter: Agenda item for meeting on 16 October 1975 at 1:30 p.m. Relating to the application by Rodney Inaba to install utility lines to a house site that is adjacent to the Paiko Lagoon Wildlife Sanctuary at Kuliouou, Honolulu; to Board of Zoning Appeals, Department of General Planning, City and County of Honolulu; from Mae E. Hull, 14 October 1975:

Over a period of many years, the State Department of Land and Natural Resources, the Hawaii Audubon Society and the community association have worked toward a common goal in establishing a wildlife refuge for threatened native waterbirds at Paiko Lagoon. During their terms of office, Society presidents Margaret Titcomb, Charles Kaigler and William Hull, and myself as secretary, have repeatedly promoted the Paiko refuge and public acquisition of all peninsula land. The State Legislature has twice appropriated funds for the purchase of the private parcel on the lagoon peninsula that lies between the two parcels of State-owned Conservation District land.

The 1973-1974 Report to the Governor by the Department of Land and Natural Resources gives this information: "The Paiko Lagoon Wildlife Sanctuary was established at Kuliouou on Oahu for the management and protection of indigenous species including the endangered Hawaiian stilt and migratory shorebirds. This action, long sought by conservation groups, represents a forward step in the development of the site as a wildlife sanctuary and park for future generations." (page 20)

The next step in the project is the acquisition of the private parcel for inclusion into the refuge. We understand that negotiations are underway at the State level for acquisition of this parcel. The goal of the Paiko refuge to establish a stable and protected habitat for native waterbirds now rare on Oahu will be defeated if a private inholding, with all the attendant human activity, remains on the narrow peninsula.

The Hawaii Audubon Society asks this Board to withhold permission for the installation of utilities on the private parcel pending the outcome of the land acquisitions procedure between the State and the landowners. It would be unfortunate to compromise in advance the public ownership of the whole peninsula. ...

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Testimony: HB 2146 & SB 1880--Acquisition of single houselot in Paiko Wildlife Sanctuary (HAS in favor of acquisition to prevent construction of a residence now underway); HB 2058 & SB 1922--Acquisition of all privately owned land bordering the Sancturay (HAS not in favor; not necessary and too expensive--$7-10 million) by Sheila Conant at the hearing of the House Committee on Water, Land Use Development, and Hawaiian Homes, Chairman Richard A. Kawakami, 27 February 1976; and Senate Committee on Ecology, Environment and Recreation, Chairman Jean S. King, 10 February 1976. Since the House and Senate testimonies are similar, only the House version will be published.

House Bill 2058: ...For over twenty years the Hawaii Audubon Society has supported the establishment of Paiko Wildlife Sanctuary as part of our campaign to ensure protection of native waterbird habitats on Oahu from development and disturbance.

Paiko Lagoon provides suitable feeding habitat for the Hawaiian Stilt (Himantopus himantopus knudseni), the 'Auku'u (Black-crowned Night Heron, Nycticorax nycticorax hoactli), and various species of migratory shorebirds. The Hawaiian Stilt is one of Hawaii's 30 endangered species and subspecies of birds.

We do not feel that the residences presently situated on the border of the lagoon are in positions such that the activities associated with them would adversely affect potential

nesting of the Hawaiian Stilt. It is apparent that they do not disturb the feeding behavior of species presently known to visit and feed in the lagoon. The Hawaii Audubon Society does not feel that the extremely large sums of money that would be involved in the condemnation of these residences for the proposed expansion of Paiko Wildlife Sanctuary are justified as measures to protect it as a bird habitat. Furthermore, we fail to see the validity of the proposed expenditures to provide a recreational area for the residents of the Paiko and Kuliouou areas. For these reasons we do not support House Bill 2058.

House Bill 2146: The Hawaii Audubon Society feels, and I support this viewpoint as an ornithologist, that Paiko Wildlife Sanctuary should be preserved as it is now, that is, without construction of a private residence on Paiko Peninsula (specifically on that parcel of land whose Tax Map Key is 3-8-01-69). It would seem reasonable, however, to construct a small bird observatory on the peninsula in a manner that would cause the least possible disturbance to the birds in the lagoon. We recently iterated our feeling in a resolution /'ELEPAIO, Vol.36, No.9, March 1976, pp. 109-110/, which is attached to this testimony, passed by unanimous vote of the membership at the January 19, 1976, general meeting of the Society.

It is our understanding that one of the principle reasons for the creation of this sanctuary was to provide area potentially suitable as nesting habitat for the endangered Hawaiian Stilt, and have strongly supported its establishment as such. While it is true that the lagoon is also suitable as a feeding habitat for this species and several others, we have always contended that its value would be significantly enhanced should the Hawaiian Stilt begin to use it as a breeding ground. However, we have never contended that Paiko Lagoon is critical to the survival of the Hawaiian Stilt. Rather we see it as a valuable supplementary feeding and potential nesting habitat, as well as an invaluable educational and aesthetic resource. A great deal of time, effort, and money have already been expended to improve the lagoon (e.g., by building nesting islands) so that it might be more attractive as a nesting ground for Stilt.

In order for breeding to take place, a minimum of disturbance, along with vigilant protection from potential predators is essential. It is our opinion that the proposed construction of a residence out on the peninsula is likely to decrease the likelihood that Hawaiian Stilt will nest on the peninsula itself or on the specially constructed nesting islands. The planned residence will be some distance from presently existing houses, and, more important, out on the peninsula itself, where no vehicles or buildings of any kind have ever been permitted, except State vehicles on official business. The residence would be located within 10 yards of the lagoon waters and within 50 yards of the nearest nesting island--much closer than any existing buildings. Needless to say, it will be very conspicuous (to birds as well as people) in an area quite close to the nesting islands, which were placed in their present location at appreciable expense to the people of the State of Hawaii.

The presence of a residence out on the peninsula will undoubtedly increase the number of people moving on and off of the peninsula. Of course, there will be a 100-fold increase in vehicular traffic, which is not now permitted. We feel very strongly that the kinds of activities associated with a residence, that is, disturbances of an irregular nature, are likely to discourage Stilt from choosing nesting sites both on the peninsula and the islands in the lagoon. (It is known that regular disturbances, including considerable noise and vehicular traffic, are unlikely to disturb the daily activities of bird species found to frequent the lagoon.) We also feel that such irregular disturbances are likely to be sufficient to disrupt the nesting cycle of birds that may nest on the islands or peninsula in the future, and thus possibly reduce their nesting success.

For these reasons we urge that this Committee vote in favor of House Bill 2146, which constitutes legislation to condemn and appropriate funds to purchase the parcel of land in question. This will provide lasting protection for Paiko Wildlife Sanctuary and the birds found therein.

The State of Hawaii has already spent nearly one million dollars to purchase Paiko Peninsula, and to improve the lagoon as a potential nesting habitat for the Hawaiian Stilt, an endangered bird found only in Hawaii. It seems highly inappropriate to allow the construction of a single private residence within a wildlife sanctuary, especially when this action could defeat the purpose for which the sanctuary was originally established.

Testimony: SB 1880 (10 Feb 76) & HB 2146-76 (27 Feb 76)--Making an Appropriation for the

Paiko Lagoon Wildlife Refuge and Park, Oahu; to Senator Jean S. King, Chairman, Committee on Ecology, Environment and Recreation and Rep. Richard Kawakami, Chairman, and Members of the Committee on Water, Land Use Development, and Hawaiian Homes; from Mae E. Mull; dated 8 February and 24 February 1976.

Since both testimonies are similar, only House Bill 2146-76 follows: Twenty years ago the Hawaii Audubon Society initiated a campaign seeking protection of native waterbird habitats on Oahu from the development that was threatening the survival of these beleagured birds. One of the areas focused on then was Paiko Lagoon, a feeding grounds for the endemic Hawaiian Stilt--whose remarkably long legs seem almost improbable to the human eye. In earlier times the Stilt could well have nested here.

When the Division of Fish and Game started work to establish the Paiko Lagoon Wildlife Sanctuary years later, a major goal was to restore suitable nesting sites for the Stilt in rehabilitation of the lagoon. That is still the goal.

To expect these wild birds to have sufficient safety and security for feeding, let alone nesting, with a house and all the attendant human activity along the peninsula is unrealistic.

The Society does not agree with the position of the University biologist who would write-off Oahu as far as endemic birds go because of the massive degradation and loss of habitat. We share his sense of real loss and discouragement over the extinction of so many species on Oahu and the endangered status of several species that remain. But we cannot give up on Oahu!

We must continue the fight for maximum protection of the habitats that do remain, and Paiko Lagoon is one of them.

The Society urges this Committee to endorse House Bill 2146 to acquire the samll remaining inholding and right of way on Paiko peninsula--so that the waterbird refuge can truly function as a sanctuary.

A different bill, House Bill 2058-76, also before this Committee and relating to Paiko Lagoon, confuses this simple issue and does not warrant further consideration. ...

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Following are some articles from the Honolulu Star-Bulletin on Paiko:

28 August 1975, p.	B-1:	Bird reserve "bargain" hit by Helen Altonn
5 December	A-4:	Suit seeks to halt home in erfuge area by Helen Altonn
9 December	A-4:	Judge refuses to stop Paiko house by Harriet Gee
29 December	A-11:	Judge refuses injunction in Kuliouou homes case
14 January 1976,p.	D-20:	Condemn every home--Paiko "solution" is proposed by G.K. Kakesako
12 February	E-4:	Committee favors Paiko lot purchase
19 February	B-7:	Panel urges purchase of houselot in refuge
21 February	A-6:	Paiko Lagoon
4 March	A-5:	New hearing ordered on Paiko home
12 March	A-22:	Paiko Wildlife Sanctuary (aerial photo of the peninsula)
18 March	D-6:	Funds may be available to buy Paiko lot by Harold Morse

On the front pages of the Sunday Star-Bulletin & Advertiser of 4 April and The Honolulu Advertiser of 5 & 6 April 1976 were articles on the Paiko flap by David Pellegrin. The political, financial, and personal subjects were headlined (1) A house in midst of park--Protest for delay followed by speedup, (2) How State determined price for Paiko property, and (3) Inaba answers criticism of decision to build house. Also on page A-7, 4 April was a brief history of the peninsula.

The Advertiser on 7 April, page A-8, concluded the editorial, "But it is just plain inappropriate to have a house in such a sanctuary, and the incongruity would be even more apparent as time went by. The house would be a monument to a legislative mistake. If there is a positive side to this costly and time-consuming environmental lesson it is about how aroused community groups can be effective in their own and the broader public interest while saving government from its own mistakes."

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Review by Lani Stemmermann: Endangered Plants

In an article appearing in the October 1975 issue of National Parks and Conservation magazine /pages 4-10/ Dr. F.R. Fosberg traces the history of the destruction of the Hawaiian flora and explains the genesis of the lengthy list of plants compiled by him and Dr. Herbst which was submitted by the Smithsonian Institution for inclusion in the Federal

Register. This list is the first step in many that will legally protect plant species and varieties which are threatened in a significant portion of their range.

Prior to man's appearance in Hawaii, there were no predators for most plants, and adaptations against predation were not common. With the advent of the Hawaiians came pigs and rats, as well as small scale agriculture. These stresses probably resulted in the loss of some species, but no doubt the effects of the Hawaiians and their animals on the flora were minimal in comparison to the destruction which resulted after the Europeans arrived in Hawaii. With large scale agriculture and ranching, especially in the fertile lowlands that likely supported some of the best of the natural flora, man's destruction became great and there was little apparent means of stopping such destruction.

For many years Dr. Fosberg had been keeping a file of species in the Hawaiian flora which he considered rare, and when in 1973 Congress instructed the Smithsonian Institution to prepare a report on the endangered plants in the United States, the list included 1,088 Hawaiian taxa. Though this may seem large, the list was considerably shorter than a similar list published by Drs. Fosberg and Herbst in the first issue of Allertonia, the journal of the Pacific Tropical Botanical Garden, which was evident that 70% of the Hawaiian flora was in danger of extinction.

Dr. Fosberg addresses the question of what can be done to protect these species, and suggests that botanical gardens cannot be considered the way in which these species may be saved. He suggests instead that preservation of many samples of suitable habitat is our only assurance for protection of plants against the threat of man and the problems he brings with him. Such areas as the national parks are a start, but we have a long way to go.

Elsewhere in the issue some of the problems involved with the establishment of rare and endangered status for plants are mentioned. With but two botanists hired by the Department of the Interior to review the Smithsonian list, it will take considerable time to adequately protect all the species in the Smithsonian list. The review of the status of each proposed plant apparently takes approximately thirty days, and at such a rate it would appear as if the job may never be completed. Persons wishing to address their concern about the lack of funding for this project write to the Honorable Nathaniel P. Reed, Assistant Secretary for Fish, Wildlife and Parks, U.S. Department of the Interior, Washington, D.C. 20240.

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Honolulu Star-Bulletin, 24 January 1976, page A-10: Further Decline in Quality of Life by Harry Whitten: ...Palila Count--Fewer birds were observed during an autumn census of the palila, an endangered Hawaiian bird, than during a census in January 1975, but the drop in numbers is ascribed to the fact that the birds are quieter and more secretive during breeding season.

The only place in the world where the palila exists is in the mamane-naio forest on the Big Island's Mauna Kea.

The two counts, conducted to determine if there were any significant changes in distribution on the mountain from one season to the next, were the first intensive censuses ever made of the palila. Sixteen observers, including federal, State and University of Hawaii biologists, walked 264 miles of transects through the known palila habitat. They observed 177 birds, compared to 256 a year ago. Based on statistical analysis of the count, they estimated the palila population at approximately 900 birds, compared to an estimate of 1,000 last January.

Annual counts will be held near the Puu Laau Cabin on Mauna Kea and the extended census on the mountain will be repeated every five years, according to Eugene Kridler, endangered species coordinator with the Fish and Wilflife Service. ...

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Field Trip for Waterbirds by Robert L. Pyle, 14 March 1976

The Hawaii Audubon Society field trip March 14 went to several good waterbird habitats on southeast Oahu in observance of the "Save Our Wetlands" theme of this year's National Wildlife Week. Weather was sunny and warm. The early 7:00 a.m. meeting time gave an extra hour of observing time during the prime morning period, when birds are active and temperatures are more comfortable.

The seven participants went first to Sand Island for some good studies of golden plover, ruddy turnstones and sanderlings in excellent morning sunlight, and to watch the pomarine jaegers feeding over the sewage outfall well offshore. High count of jaegers was

23 in sight at once, including both light and dark phase plumages. They were too distant to be able to make out any elongated tail feathers even through scopes, but wing shape, style of flight and white wing flashes could be seen and compared with the one brown booby that flew by while we were there.

Moving on to Waipio Peninsula, the group first hiked into the large "Waipio Pond" near the upper ewa (west) side of the peninsula about one-third mile below the filtration reservoir. Among the American wigeon standing facing us on the far side of the pond was one bird with a brilliant rich chestnut head--the male European wigeon first found here February 15 by Walter Donaghho and others. Also present were about 30 cattle egrets, at least 6 black-crowned night herons, 2 cackling Canada geese (seen here irregularly since last fall), 40 pintail, 20 American wigeon, 105 northern shoveler, only 1 Hawaiian coot, and between 45 and 50 Hawaiian stilts.

During the 20 minutes of observation in excellent light, the bird obligingly showed his yellow crown patch and took a short walk allowing good views of his body pattern.

Returning from the pond, the group visited two of the settling basins near the main Waipio Road along the east shore of the peninsula. The basin nearest the road had deep water, no mudflats, and only 3 northern shovelers. The next basin had ample mud exposed on the bottom, with a good complement of turnstones, stilts, golden plovers and a few sanderlings. Also here was a sandpiper of the genus Actitis, either the spotted sandpiper of North America or the common sandpiper of Europe and Asia. The two are very difficult to distinguish in winter plumage, and some authorities consider them races of the same species. The bird is a medium size sandpiper, warm uniform brown above, white below with a white mark extending up in front of the folded wing, and yellow legs. Probably the same bird was studied carefully in the next settling basin in early January by Bob and Peter Pyle and Walter Donaghho, and a bird of this type was seen by Fred Zeillemaker on Kauai last September (see 'ELEPAIO, Vol.36, No.9, March 1976, p.116). We know of no prior records of this genus in Hawaii.

At Walker Bay the tide was high so that only a few black-crowned night herons and golden plovers were found. However, the group was rewarded with skylarks singing energetically overhead at the turnoff to the airstrip. Everyone also had good views of the black-headed munias /black-headed mannikin/.

Moving on to the shrimp ponds off of Kahua Ranch Road in Honouliuli, we had a fine view of an adult Hawaiian coot with two very young black and red downy chicks. Two nearly full grown juveniles (alone) and one other adult coot were seen on the same pond, but no Hawaiian gallinules were seen today. None of the coots showed the dark forehead shield that was seen on some birds here and elsewhere last fall. On the larger pond mauka (north) of Kahua Ranch Road were two Hawaiian coots and a male scaup, probably a lesser scaup based on head shape. The scaup was watched at leisure through a scope along the far side of the pond, about 100 yards away. The replacement habitat area near here, still dry and barren, showed no change from our last visit. This is the area being developed to replace the good waterbird habitat areas destroyed by construction of the new reef runway at Honolulu airport.

From Honouliuli, the group went first to Moanalua Gardens for lunch near a big monkey-pod tree, and then continued on over the pali to Kaneohe Marine Corps Air Station. Here we were met by Tim and Jonathan Burr, who took us to some good vantage points on Nuupia Pond. At one spot on a large bare flat, we counted over 300 golden plovers, evidently assembling for the northward migration. Most showed at least some faint dark smudges on their underparts, and about one in 40 was in nearly complete breeding plumage. At least 45 Hawaiian stilts were in sight at this spot, mostly paired and some very noisy. Tim Burr and Dave Hattan had a brief glimpse of the wintering black brant in flight. The group made one final stop at the rifle range to scope the hillside where many hundred red-footed boobies were nesting.

Time ran out before the group could take the trail into the vantage point overlooking the ponds at Kawainui Marsh. In addition to the birds mentioned above, the following were recorded on the trip: wandering tattler, black noddy, rock, spotted and barred doves, melodious laughing-thrush (heard at the edge of Kawainui Marsh), red-vented bulbul, mockingbird, common mynah, white-eye, spotted munia, house sparrow, cardinal, red-crested cardinal and house finch.

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Field Notes from Peggy Hickok Hodge: Mockingbird--Margaret Muller of Kaelepulu Drive,

Lanikai, directly across from the Mid-Pacific Country Club golf course, reports seeing a mockingbird in her garden two successive days, January 29 and 30. She heard the song on Christmas bird count day but did not see the bird that day.

The bird was seen Janaury 29 at noon on the top of Mrs. Muller's sugi pine tree, and at 8 a.m. the following day singing his heart out on top of the telephone pole across the street. A neighbor also viewed the bird with Mrs. Muller for definite identification. The bird was flying between the pole and a kiawe tree on the fringe of the golf course, possibly indicating a nesting site.

This was the first time the mockingbird had been seen by Mrs. Muller this year and it was not seen at all last year, but was een the two previous years. However, since he is back this year (and only usually heard by the Mullers in winter), they hope he is here to stay in Lanikai.

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Field Notes from David Smith & David Bremer, 31 January 1976: Poamoho Ridge

The field trip began at the end of the jeep trail at 8 a.m. Approximately three inches of rain had preceded us during the previous night. The weather during most of the day was inclement with intermittent showers. The bad weather broke around noon, and the sun remained with us during the last quarter of the hike.

Very little bird activity was heard or seen on the trip to the summit. After we had eaten lunch there, we saw an adult 'apapane, and observed it at close range for ten minutes. The bird was quiet and appeared lethargic as it moved among the 'ohi'a flowers. As we hiked back down the trail, at least fourteen other 'apapane were sighted individually. In contrast to the first sighting, these 'apapane were more active and more vocal. It was apparent that the population was evenly distributed throughout the length of the ridge and were sighted at all trail elevations. The only other bird sightings were numerous white-eyes. Strawberry guava, which lines the lower trail, had ripened and might explain the large white-eye count. 'Ohi'a was abundant and appeared healthy throughout the trail.

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From Maria E. Tseu, received 9 February 1976: Cattle Egret

Seven cattle egrets were recently seen around Peterson chicken farm in Wahiawa (Dole & California Avenues). The attendant said usually over two dozen birds come during the day and fly north for the night. They feed on the farm flies. There is an egret area I recently visited on the north road bordering the Haleiwa Pony Farm Drive-in. One will see that a long established egret marsh is being filled in on one side of the road. A long time resident there says the egrets have been diminishing markedly. Could the Wahiawa egrets have a connection to this area?

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From Mae E. Hull, 14 March 1976: Osprey in Hilo

On February 5, 1976 Richard P. Northwood reported watching an Osprey at 7 a.m. that morning for about 20 minutes circling above his garden which is $\frac{3}{4}$ of a mile from the Wailuku River at 1,000 feet elevation in Hilo. The Osprey flew quite close, perhaps attracted by a flock of Spotted Munia (Ricebird) chattering in a clump of uluhe fern.

Northwood said the early morning sun shining on the bird's cream-colored breast and brown back and the strikingly long, powerful wings were distinctive marks. Northwood had reported an Osprey previously in his garden in March 1975 /'ELEPAIO, Vol.35, No.12, June 1975, pp. 140-141/ when the migrant bird perched above his lily pond, came down to the ground and showed keen interest in the pond's carp.

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From Barbara Macaulay Stejskal, 1 March 1976: Fairy Tern

A fairy tern fluttered overhead in Kapiolani Park just in time to be my Heavenly Valentine--February 15th. Since then I have seen six terns. One pair can be seen in front of the Outrigger Canoe Club perching on an ironwood tree. Another tern is looking over a kiawe tree just beyond the fountain near the feeders. The bird feeders have brought us two long-tailed parakeets, since the feeders have been filled with sunflower seeds. I suppose they are the rose-ringed parakeets recorded in the Christmas bird count. They are pale leaf-green with slender bodies and very long blue-green tails; silent so far.

Lavender firefinches with their spectacular oxblood tails seen in the area near the tennis courts on Paki below La Pietra. Another watcher of firefinches with binoculars turned out to be a young man who traps lavender firefinches and sells them to pet shops where they are sold for $45 a pair. How much better to see them wild!

I keep watching for the fairy terns to start egg sitting. Last year there was one in the kiawe tree near the fountain. Please, please don't point or gawk if you see one, as there are many children who climb trees and throw stones!!

15 March 1976: The fairy terns which appeared February 14th, after one month, have selected their egg site--the same kiawe tree they had last year, in fact the very same "puka" in the branch. She is sitting there now; it is 10:30 p.m. I just went out to check. Her white form is there softly swaying on the branch with full moon over Diamond Head. Isn't it a beautiful pledge of love, trust and renewal of life? So reassuring to us humans with less reliable instinct!! Of course, I observe birds daily just waiting for the bus here in Kapiolani Park and try to go for a sunset stroll every evening.

The two silent long green-tailed parakeets still appear on the bird feeder near the fountain. Little balls of saffron gold are around--saffron finches--and green singing finches too. We see a few boobies but no frigates. There were 40 to 50 frigates a day all last summer. Where have those 'iwa gone?

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A MEMORABLE DAY IN HAWAII*

By Connie Kitney

Every day visited in the Hawaiian Islands is a memorable one, but certain days stand out in one's memory. One such day was Tuesday, December 30th, '75 on the island of Kauai....

Along with thirteen other naturalists under the skillful guidance of Gus Yaki of Ontario Nature Tours, we departed from our accommodation at Waipouli Beach, located on the east side of the island, to travel northward and explore various points of interest in that direction. The weather was perfect; clear and sunny, temperature about 82° with always the gentle trade winds providing comfort. Western Meadowlarks could be heard continually this morning and added a note of gaiety to the incredibly beautiful landscape.

We paused to see the Wailua River plunge over a high cliff to form Opaekaa Falls (Rolling Shrimp) so named because shrimps once gathered near the rocks at the base of the falls to lay their eggs. Japanese White-eyes, a small introduced olive-green bird with yellow throat and conspicuous eye-ring, flitted among the bushes at the edge of the cliff, while far below a White-tailed Tropicbird flew impressively into view, its long tail gracefully stringing out behind.

Further along we stopped at a Japanese garden where three varieties of Hibiscus were grafted onto one plant; some of these striking blooms being easily ten inches in diameter. Several Skinks were noted on the garden wall here.

During a walk through an old cemetery we noted Flame Vine, Shrimp Plant, Sweet Potatoes (with a Morning-Glory like blossom) and many Roses in bloom. We passed ponds of Taro, a member of the Arum Family, which grows in water and from which Hawaiian "Poi" is made. In some ponds we saw Black-crowned Night Herons, Stilts, Gallinules and Coots. We also observed several Great Frigatebirds and Cattle Egrets as well as dozens of Golden Plovers which seemed to be everywhere.

After lunch we continued along the shoreline to Kilauea Lighthouse, advertised as the "largest of its kind in the world". This lighthouse is situated on a peninsular bluff high above the ocean with steep 180 foot cliffs on three sides. The area is a protected National Wildlife Refuge. Adjacent to the bluff on another elevation, several hundred Red-footed Boobies roosted in bushes and trees on the hillside, and many Brown Boobies could also be seen flying out from the cliffs in the distance.

One of our group, Phyllis McKim, spotted a huge Sea Turtle in the rough water below and we watched it periodically raise its large head out of the water for air before it disappeared from sight.

Suddenly a Peregrine Falcon flew into view and as we watched it, it followed and then dived at a Great Frigatebird. The Frigatebird dropped a short distance in the air but then recovered and flew off. A short time later the Peregrine was seen to follow and harass a White-tailed Tropicbird and still later flew out from behind one of the cliffs chasing a Brown Booby. Later it was learned that this bird, a female, had been seen in the vicinity of the lighthouse since early November, the first such record for this island. Only about 10 previous sightings have been recorded in the whole of Hawaii for this species and those mostly on the out-island chain that extends to Midway Island.

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*By special permission reprinted from February 1976 Niagara Falls Nature Club Bulletin No. 99, pages 11 and 12.

As we left the lighthouse area, a Shama Thrush (similar in colouring to our Rufous-sided Towhee) flew across the road in front of the cars. An introduced species from Malaysia (1931) the Shama's song has a beautiful rich quality with a variety of loud, clear phrases.

Returning to the lower altitude of the valley, we noted fields of corn being grown. House Finches were flying up from the corn to hydro wires overhead, their rosy breasts shining in the sunlight. As we looked back toward the higher elevations in the lighthouse area, we counted seven Great Frigatebirds soaring in the air with outstretched wings.

On the return trip we repassed fields of Sugar Cane, Pineapple and miles of rolling meadowlike country where three separate sightings of Short-eared Owls, a species that occurs naturally in Hawaii, completed a most enjoyable and exciting day.

Note: A second Peregrine Falcon was seen several days later on the island of Maui making two sightings in one week for our group, when in all previous recorded time only ten sightings were noted for the combined islands of Hawaii.

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Testimony: Budget items for the Department of Land and Natural Resources of the State of Hawaii; at the hearing of the Senate Committee on Ecology, Environment and Recreation, Chairman Jean King; by Sheila Conant; February 12, 1976:

...We support the proposed budget for the Natural Area Reserves System, but would like to suggest a slight amendment. At present the budget calls for the addition of one full-time position for a person to act in both administrative and scientific (as a biologist) capacities. We feel that instead of one position there should be two half-time positions, one for an administrator, and one for a biologist. Our reasoning behind this suggestion is this: it is extremely difficult to find an individual well-qualified to act in both capacities. In particular, biologists are not well-known for their ability as administrators, and it is nearly impossible to be an effective administrator while doing justice to one's duties as a biologist. We feel that one person doing both kinds of work is likely to exceed at one type, at the expense of the other duties.

We are in strong support of the creation of a State Botanist position. We feel,however, that whomever is hired for this position should be housed with a good plant collection. This would be essential for the Botanist to carry out his work effectively. We are aware that there is a Federal Agency (i.e., the U.S. Forest Service) has had staff members working at the Bishop Museum. The Museum has an excellent collection of Hawaiian flora, and we urge that the arrangements be made for this new State position to be housed with the Museum. Should this turn out to be administratively impossible, we strongly suggest that the position be placed within either the State's Environmental Center or with the Department of Planning because we feel these are the most appropriate Departments for such a position. Of course, the Department of Botany at the University of Hawaii has a small collection of Hawaiian plants and could also be considered as a potential location for the new State Botanist.

We would also like to encourage enhancement of the Division of Fish and Game's Budget for enforcement activities. In fact, it seems appropriate to suggest the consideration of the establishment of a separate Division for Enforcement within the Department of Land and Natural Resources, in order to increase the effectiveness of this branch. Equipment (e.g., a boat for the island of Maui to patrol offshore islands) and personnel as well as administrative independence might really help to solve some of the serious problems the enforcement branch must cope with.

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Testimony: SR 95, SB 1981-76--Salt Lake be preserved for park use to Senate Committee on Ecology, Environment and Recreation from Sheila Conant, February 17, 1976:

The Hawaii Audubon Society has, in the past, been opposed to the development of Salt Lake because it provided suitable habitat and protection for native and migratory waterfowl and shorebirds. We are encouraged to see a revival of effort to preserve that part of the lake that remains intact (unfilled). There are approximately 17 acres in the northwest corner of the lake that have not been filled in, and still provide suitable habitat for waterbirds.

We urge the support of SR 95 and SB 1981-76 because they are steps toward preserving the remaining part of Salt Lake that is of value to birds, and to the people who enjoy observing them. It would seem wise to set aside at least this area and also a "buffer" zone that would provide suitable area for observing birds, as well as minimize disturbance to the birds themselves.

Although we regret the loss of most of Salt Lake, we feel that what remains would provide a good source of recreation for local residents and would serve as a small but important refuge for Hawaii's waterbirds, who are losing more of their habitat to development every day.

It is unfortunate that the water courses that are now part of the golf course being developed were not constructed so as to be suitable feeding areas for shorebirds. After making inquiries, members of the Society were assured by the developer that this would be done, but recent field trips to the area revealed that the water courses are unsuitable because they are too deep, and because their shorelines are too steep. This unfortunate situation increases the potential importance of preserving the undeveloped part of the lake.

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Testimony: SR 145, SCR 37--Supporting Kaneohe Outdoor Circle's Bicentennial Project

"Kaneohe Bay Park" to Senate Committee on Ecology, Environment and Recreation from Sheila Conant, February 25, 1976:

...The Hawaii Audubon Society urges this Committee to vote in favor of SR 145 and SCR 37. We are particularly concerned that the Heeia Meadowlands/Marshlands be given protection from development. These areas provide suitable nesting habitat for the Hawaiian Gallinule and the Hawaiian Coot. Both these species are considered "endangered."

We feel that the abovementioned resoultions will be a concrete step toward protection of this waterbird habitat. Hawaii's waterbirds are losing their habitat than any other groups of birds, and any measures that afford protection are strongly supported by the Hawaii Audubon Society.

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Corrigenda: Vol.36, No.10, April 1976, page 121, koloa-mohā: add koloa-mōhā (P-E);
page 122, 'ō'ō-nuku-mū and 'ō'ō-nuku-umu: change mamo to mamo, Perkins.

Anyone who knows why the shoveler was also called koloa-mōhā, please write to Kojima, 725-A 8th Avenue, Honolulu, Hawaii 96816. Or is this a typographical error?

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Donations: MAHALO! Following members have generously included donations with their membership renewals: William J. Edgar-$2.00 and Julia K. Yoshida-$2.00. MAHALO NUI LOA for your generosity.

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ALOHA to new members:

Junior: Mark Dyer, 344 Ilihau St, Kailua, Oahu 96734
Jeffrey Yim, 3363 Alani Drive, Honolulu, HI 96822

Regular: Chip Jobanek, 38713 McKenzie Hwy, Springfield, Oregon 97477
Kenneth R. Kupchak, 704 Ululani St, Kailua, Oahu 96734
SSgt Kenneth C. McGowan, 212-C 14th Street, APO San Francisco 96553
Sherrie Moore, 47-148-A Kaalaea Road, Kaneohe, Oahu 96744
Jon E. Rickert, 122 North Main, Elizabethtown, Kentucky 42701
Mrs. Thea Shonberg, 6125 E. Indian School Rd, Apt 161, Scottsdale,Ariz.85251
Mrs. V. Pauline Wollaston, Box 237 Pahala, Hawaii 96777

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In order to save paper the annual index for Volume 36 will be mailed to members only upon request, so if you are interested in receiving a copy, please send in your reservation before June to Kojima, 725-A 8th Avenue, Honolulu, Hawaii 96816.

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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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HAWAII'S BIRDS, a field guide, is now available. Price per copy: $3.00 + postage & tax (sorry we can't continue to absorb). Postage: U.S. 21¢ book rate, 57¢ first class(airmail); foreign--variable, weight 5ozs; sales & mailing in Hawaii--add 12¢ sales tax. Send in orders to: Book Order Committee, Hawaii Audubon Society, PO Box 5032, Honolulu, HI 96814.

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MAY ACTIVITIES:

9 May - 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 State Library on Punchbowl Street at 7:00 a.m. Leader: Dr. Robert Pyle, telephone 262-4046.

10 May - Board meeting at Waikiki Aquarium Auditorium, 7:00 p.m. Members welcome.

17 May - General meeting at Waikiki Aquarium Auditoriu, at 7:30 p.m.
Program: From Goats to Nenē--A Progress Report on Resources Management in Hawaii Volcanoes National Park by Don Reeser, Management Ecologist. (color slides)

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