



**NUTMEG MANNIKIN (*LONCHURA PUNCTULATA*):
A COMPARISON OF ABUNDANCES IN O'AHU VS. MAUI SUGARCANE FIELDS:
EVIDENCE FOR COMPETITIVE EXCLUSION?**

Michael P. Moulton¹, Stuart L. Pimm², and Mark W. Krissinger¹

INTRODUCTION

Differences in the bill lengths of congeneric pairs of passerine species introduced to Hawai'i are significantly greater in pairs in which both introductions have succeeded than in pairs where one has failed (Moulton 1985). On O'ahu, an exception to this general pattern involves two species of introduced finches: the Chestnut Mannikin, *Lonchura malacca*; and the Nutmeg Mannikin, *Lonchura punctulata*. These species differ in bill length by less than 2% and yet have coexisted on O'ahu for more than 50 years (Moulton and Pimm 1983).

Chestnut Mannikins were introduced to O'ahu ca. 1936 (Udvardy 1960) and are now most abundant in southwestern O'ahu, from Pearl Harbor to the west end of O'ahu (Moulton, pers. observ.). Nutmeg Mannikins were introduced to all the main islands in the late 1800s (Caum 1933) and now occur islandwide on O'ahu (Berger 1981, Pratt et al. 1987). One extensive habitat in the region occupied by Chestnut Mannikins is sugarcane. Other habitats in this region include dry woodland and forest dominated by *kiawe* (*Prosopis pallidus*), as well as urban parks and residential areas.

Based on previous field work on O'ahu in 1981, one of us (MPM) observed that Chestnut Mannikins appeared to be common, and Nutmeg Mannikins rare, in waste grasses that grow around the borders of sugarcane fields in southwestern O'ahu. This raises two questions. Are Nutmeg Mannikins significantly less abundant in waste areas near sugarcane fields when Chestnut Mannikins are present? And if so, what is responsible for this reduced abundance?

Assuming that the difference in abundance is significant there are at least two possible explanations. First, the habitat on O'ahu (i.e., waste areas around sugarcane fields) may for some reason be inadequate for Nutmeg Mannikins. Second, these species may compete intensively, to the extent that Nutmeg Mannikins have been displaced from sugarcane by Chestnut Mannikins on O'ahu. With this in mind, the major goals of our study were to determine whether Nutmeg Mannikins are indeed significantly less abundant in the presence of Chestnut Mannikins, and, if so, to evaluate factors (i.e., competition or habitat differences) that might influence this pattern.

METHODS AND MATERIALS

To determine if Nutmeg Mannikins are significantly less abundant in the presence of Chestnut Mannikins, we

compared the abundance of Nutmeg Mannikins in sugarcane on O'ahu, where Chestnut Mannikins are abundant, to the abundance of Nutmeg Mannikins on Maui, where Chestnut Mannikins do not occur.

Sugarcane on O'ahu is grown on both the southern and northern coasts, but we limited our observations to the southern coast where sugarcane is grown in two separate areas: the Waipi'o Peninsula and the Ewa Plain. We discuss differences between these areas below. On Maui, sugarcane is grown throughout the central valley. On both islands sugarcane is grown at low elevations (Anonymous 1986).

On each island we walked transects along the borders of sugarcane fields during July 1983 and again in August 1989. In both years we identified and counted all mannikins that we either saw or heard. In 1983 we estimated transect length by counting paces. Basically, we would re-walk the transect at a regular pace after recording mannikin observations. In 1989 we measured each transect with a Rolotape[®] measuring device. We scaled the abundances of each species to number of individuals per 100 meters (1989) or paces (1983) of transect length.

In 1983 no effort was made to estimate resource availability or habitat differences between islands. However, in 1989 we located a 0.1-m² quadrat at the beginning and end of each transect and at 50-meter intervals along each transect to assess potential differences in habitat and resource availability. We systematically placed each quadrat so as to encompass the greatest density of seed-bearing grass stems. In each quadrat we counted all the seed-bearing grass stems of all species of grasses, and categorized stems as either green or dead. We then calculated the mean number of stems of different species and conditions (green or dead) per quadrat per transect. Previous experience indicated that on O'ahu both mannikin species feed on green grass seeds (Moulton, in prep.). We also attempted to identify all grass species using keys in Rotar (1968) to evaluate the possibility that sugarcane habitat differed between islands.

RESULTS

In 1983 we walked 18 transects over four days on O'ahu and 11 transects over two days on Maui. In 1989 we walked 24 transects on O'ahu and 17 on Maui on eight separate days on each island. In both years we walked all transects between dawn and 0930 h. In 1983, total transect length on Maui was approximately half that on O'ahu (O'ahu = 11,091 paces,

Maui = 5,367 paces), whereas in 1989 total transect length was roughly the same (O'ahu = 8,479 m, Maui = 9,229 m).

Census results for both years on both islands are presented in Table 1. Around O'ahu sugarcane fields, Chestnut Mannikins were far more abundant than Nutmeg Mannikins in both years. In 1983 we recorded a total of 198 Chestnut Mannikins and 30 Nutmeg Mannikins on O'ahu transects. On Maui we recorded a total of 81 Nutmeg Mannikins. On O'ahu, the mean numbers of individuals of both species per 100 paces of transect length were 1.83 Chestnut Mannikins versus 0.27 Nutmeg Mannikins. On Maui, Nutmeg Mannikins were much more abundant, with a mean number of 1.90 per 100 paces of transect length.

In 1989 we observed 179 Chestnut Mannikins but only two Nutmeg Mannikins on O'ahu. This represents an average abundance for O'ahu of 0.01 Nutmeg Mannikins per 100 m of transect. On the other hand, the average abundance of Chestnut Mannikins was 2.34 individuals per 100-m transect length.

Chestnut Mannikins were not evenly distributed on O'ahu, being significantly more abundant on the Waipi'o Peninsula than on the Ewa Plain. The two Nutmeg Mannikins were observed on the Ewa Plain, where Chestnut Mannikins were less abundant. The average abundance of Chestnut Mannikins on the Waipi'o Peninsula was 6.20 individuals per 100 m of transect, whereas on the Ewa Plain the mean abundance was 0.73 individuals per 100-m transect. The difference in abundance between these two areas was significant (Kruskal-Wallis, approximate $\chi^2 = 10.85$, $p > \chi^2 = 0.001$). This difference may be related in part to the availability of waste grasses. On the Waipi'o Peninsula, large areas of waste grasses surround several settling ponds and irrigation canals; on the Ewa Plain, drip irrigation appears to be more common and canefield borders support fewer waste grasses. The possibility that this accounts for the difference in abundance of the two species, although appealing, cannot be the only answer, since the mean number of seed-bearing grass stems of all species per quadrat did not differ significantly between the Ewa Plain and the Waipi'o Peninsula (Ewa, $X = 9.17$ stems/quadrat; Waipi'o, $X = 12.45$ stems/quadrat, Kruskal-Wallis, approximate $\chi^2 = 0.40$, $p > \chi^2 = 0.53$).

Again in 1989, in contrast to O'ahu, Nutmeg Mannikins were abundant around canefields on Maui, where we observed a total of 135 individuals. This total translated to a mean abundance of 2.40 individuals per 100 m of transect.

In both years, the difference in the abundances of Nutmeg Mannikins on Maui versus O'ahu was significant (Kruskal-Wallis: 1983, approximate $\chi^2 = 8.53$, $p > \chi^2 = 0.003$; 1989, approximate $\chi^2 = 25.12$, $p > \chi^2 = 0.0001$).

As a further test we compared the combined abundances of Nutmeg and Chestnut mannikins on both islands. The total number of mannikins of either species did not differ significantly between islands in either year (Kruskal-Wallis: 1983, approximate $\chi^2 = 0.03$, $p > \chi^2 = 0.86$; 1989, approximate $\chi^2 = 0.21$, $p > \chi^2 = 0.65$).

Despite the apparent homogeneity of sugarcane fields between islands, our work in 1989 indicated that the species composition of grasses that surrounded the fields on the two islands differed. On O'ahu the principal species was a type of finger grass (*Chloris* sp.). The average number of green seed-bearing stems of this species on O'ahu per quadrat per transect was 10.08. Few other species of grass were en-

countered on O'ahu. On Maui this species was present but it was less abundant, with a mean number of seed-bearing stems per quadrat per transect of 3.62. These mean numbers differed significantly between islands (Kruskal-Wallis, approximate $\chi^2 = 16.83$, $p > \chi^2 = 0.0001$). Other grass species were more abundant than *Chloris* sp. on Maui, including barnyard grass (*Echinochloa crusgalli*), goose grass (*Eleusine indica*), and bristle grass (*Setaria* sp.). Nevertheless, the average number of seed-bearing stems of all grass species also differed between islands (Maui, $X = 4.58$; O'ahu, $X = 10.12$; Kruskal-Wallis, approximate $\chi^2 = 14.33$, $p > \chi^2 = 0.0002$).

We also tested the relationship between numbers of mannikins per transect and mean number of seed-bearing grass stems per quadrat per transect. In these analyses we used Spearman rank correlations and found no significant relationships.

Unfortunately, the present data are limited to a single month (August). Given the nomadic nature of Nutmeg Mannikins (Scott et al. 1986) it is logical to wonder if their abundance around O'ahu canefields varies across seasons. However, our finding that Chestnut Mannikins outnumber Nutmeg Mannikins around canefields on O'ahu is consistent with Audubon Christmas Bird Count (CBC) results from the Waipi'o CBC from 1983 through 1988 (Bremer 1984, 1985, 1986, 1987, 1988, 1989). Specifically, counts of mannikins from the Waipi'o sector indicate that Nutmeg Mannikins are less abundant than Chestnut Mannikins in winter as well as in summer (see Table 2).

DISCUSSION

Our results indicate, first, that Chestnut Mannikins are the dominant species around canefields on O'ahu, and, second, that Nutmeg Mannikins were more abundant around canefields on Maui than on O'ahu both years, although the total number of mannikins of either species did not differ significantly between islands in either year. Taken at face value the results support the hypothesis that these species compete to the extent that Chestnut Mannikins are able to exclude Nutmeg Mannikins from O'ahu canefields. If so, a similar situation could also exist on Kaua'i, where these two species have coexisted since 1976 (Pratt 1977). On islands where Chestnut Mannikins do not occur (i.e., Hawai'i) Nutmeg Mannikins should be as abundant around canefields as they are on Maui.

The data are too limited to reject the possibility that differences in Nutmeg Mannikin abundance between islands are due to habitat differences. The composition of grass species surrounding canefields on Maui did differ from that on O'ahu, where canefields are bordered chiefly by finger grass (*Chloris* sp.). This species was present on Maui but was much less abundant. If Nutmeg Mannikins were not able to use finger grass efficiently, or simply avoided it, their reduced abundance on O'ahu would be no surprise. In previous field work we have observed Nutmeg Mannikins feeding on seeds from a wide variety of grass species on O'ahu including finger grass. Thus it is unlikely that O'ahu sugarcane is inadequate habitat in terms of resources. We emphasize, however, that we have no quantitative data on food preferences of either species, nor any data on differences in feeding efficiencies or behavioral interactions between these species in this particular habitat.

Results from this study suggest that Chestnut Mannikins are competitively excluding Nutmeg Mannikins from O'ahu sugarcane. However, more data are needed on possible seasonal differences in the abundances of both mannikin species on O'ahu and Nutmeg Mannikins on Maui. Moreover, the habitat suitability hypothesis remains to be rigorously tested.

ACKNOWLEDGMENTS

Our early visits to Hawai'i would not have been possible without the hospitality extended to us by C.J. Ralph, C.P. Ralph, and Alan C. Ziegler. We also thank Sheila Conant and Bob Pyle for sharing their knowledge of Hawaiian birds, and two anonymous reviewers for several helpful comments.

We thank Jim Wriston of the O'ahu Sugar Company and Bobby Motooka of the Hawaiian Commercial and Sugar Company for allowing us access to sugarcane lands on O'ahu and Maui respectively. We also thank Jim Wriston for sharing his views on the future of sugarcane agriculture on the island of O'ahu.

Our work was funded in part by grants from the National Geographic Society, the American Philosophical Society, Hawaii Audubon Society, Texas Tech University, and Georgia Southern College (now Southern Georgia University).

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¹Department of Biology
L.B. 8042

Georgia Southern University
Statesboro, GA 30460-8042

²Graduate Program in Ecology
The University of Tennessee
Knoxville, TN 37996-1610

Table 1. Mean abundances (= numbers of individuals per 100 m of transect) in canefields on O'ahu and Maui for 1983 and 1989. Totals for 1983 represent the number of individuals recorded per 100 paces of transect, whereas those for 1989 represent the number per 100 m of transect.

	Year	Maui	O'ahu
Nutmeg Mannikin	1983	1.90	0.27
	1989	2.40	0.01
Chestnut Mannikin	1983	—	1.83
	1989	—	2.34

Table 2. Raw abundances (not corrected for party hours of observation) of Chestnut and Nutmeg mannikins for the Waipi'o Sector of the Waipi'o, O'ahu, Audubon Christmas bird count. Data are from Bremer 1984, 1985, 1986, 1987, 1988, 1989.

	Chestnut Mannikin	Nutmeg Mannikin
1983	97	18
1984	25	8
1985	279	70
1986	225	4
1987	639	4
1988	159	16

SPECIAL OFFER FROM
BIRD WATCHER'S DIGEST

The bimonthly *Bird Watcher's Digest* has made a special offer to Hawaii Audubon Society members. HAS will receive \$7.50 from each subscription (half of all new subscriptions generated by the chapter).

Recent articles have covered the common barn owl, recognizing bird watchers, how to clean your binoculars, birders and hunters, to feed or not, how to photograph birds in flight, teaching children about birds, the forest birds of Hawai'i, the Hawaiian Stilt, growing up without a field guide, and stories on various species of birds.

Send a \$15 check payable to the Hawaii Audubon Society, along with your name and address, to the Hawaii Audubon Society, 212 Merchant Street, Suite 320, Honolulu, HI 96813.

HELP WANTED

Computer-knowledged volunteer to assist in establishing a Society membership address and mailing list in the Society's MacIntosh Plus computer. Please contact Robert Pyle at 262-4046.

CONSERVATION NEWS

Ka'elepulu Wetland, O'ahu - The Hawaii Audubon Society is working with the National Audubon Society and members of the community in opposing an-after-the-fact wetland fill permit for a portion of the Ka'elepulu Pond (aka "Enchanted Lake") shoreline, Windward O'ahu. Prior to residential development, Ka'elepulu Pond provided major habitat for the endangered Koloa (*Anas wyvilliana*), American Coot (*Fulica americana alai*), Common Moorhen (*Gallinula chloropus sandvicensis*), and Black-necked Stilt (*Himantopus mexicanus knudseni*). Ka'elepulu Pond is identified as "essential habitat" for the waterbirds by the U.S. Fish and Wildlife Service. The U.S. Army Corps of Engineers is currently processing the fill permit, and a public hearing will be held on 2 October, 7:00 P.M., at the Enchanted Lake Elementary School Cafetorium. We are encouraging the Corps to look into the possibility of having this area restored and managed for the waterbirds.

Waihe'e Wetland, Maui - HAS is also following the proposed development at the old Waihe'e Dairy on Maui. The area includes Waihe'e Stream, a wetland, and a relatively intact dune ecosystem with native strand vegetation. The State Land Use Commission is considering a land use boundary amendment petition, and other permits will be required if the petition is granted. HAS has taken the position that this site is inappropriate for the kind of development proposed (golf course and associated facilities) and would better serve as a nature center and outdoor classroom for Maui's school children. Concerned citizens are encouraged to notify their elected officials on the matter.

Kaua'i STARS - HAS has joined a number of other organizations and concerned citizens in commenting on the proposed Strategic Target System (STARS) program, which involves the Kaua'i Test Facility, located at the Pacific Missile Range Facility, western Kaua'i. The U.S. Army Strategic Defense Command is proposing this project as part of its overall Strategic Defense Initiative. The cultural and natural resources affected are significant and include Hawaiian human burials, endangered Hawaiian waterbirds at Mana, and the endangered Humpback whale (*Megaptera novaeangliae*). The HAS Conservation Committee has found that the Army's Environmental Assessment is inadequate, and we are requesting that an Environmental Impact Statement be prepared.

For more information on HAS Conservation matters, please

MAHALO DONORS!

The Hawaii Audubon Society thanks the following members and friends for their generous contributions. The list reflects contributions received from 11 June 1990 through 17 September 1990.

Dr. Hugh A. Buck, Timothy Burr, Mary Dillingham, Joanne Dobbs, Laura Drufna, David Eickhoff, Carol Fox, Desiree Groesbeck, Dr. Wayne Hansen, Paul Higashino, Rick Ingram, Carolyn Larson, T. B. Lyons III in memory of Marlene Lyons, Mark Mendoza, Audrey Newman, Stella Norton, Thane Pratt, Neil Reimer, James Shipp, Max Stanton, and Mike Walsh.

NOMINATING COMMITTEE REPORT

The Nominating Committee has presented a slate of officers and directors for the December election. Bylaws amendments passed in May changed the term of office to two years, with half the board and officers elected each year. In 1990 only, half of the board and the president, second vice president, and recording secretary will be elected for two years, with the remainder of the board, first vice president, corresponding secretary, and treasurer elected for one year. A maximum of 10 directors may be elected. The following members have been nominated:

President, Reginald David; First Vice President, M. Casey Jarman; Second Vice President, Phil Bruner; Treasurer, Lynne Matusow; Corresponding Secretary, Marjorie Ziegler; and Recording Secretary, Linda Paul.

For two year terms as director, Carl Christensen, Dave Hill, and Daniel Moriarty; for one year terms, Allen Allison, Dr. Mark Caspers, Kersten Johnson, and Craig Rowland.

Should any member wish to run or nominate additional candidates, the nomination must be sent to the Nominating Committee (c/o Hawaii Audubon Society, 212 Merchant Street, Suite 320, Honolulu HI 96813). The deadline for written nominations is 10 November. The written nomination must be accompanied by a four-line biographical description of the nominee and the nominee's written consent that he or she is willing to run for election and will serve in the designated post if elected.

MOVING?

Please allow four weeks for processing address changes. Because our records are kept in order by zip code, we need both old and new addresses.

BIRD WITH US IN MICRONESIA

The Hawaii Audubon Society is sponsoring a visit to Micronesia from 15 February to 3 March 1991. The focus is on birds.

Koror, Yap, Truk, Saipan, and Pohnpei are among the thousands of coral atolls and volcanic islands scattered across nearly 12,000 square miles of the Pacific Ocean and known as Micronesia.

The Pohnpei Flycatcher, Fantail, Lory, Cicadabird, Long-billed White-eye, Oceanic Flycatcher, Blue-faced Parrotfinch, Great Truk White-eye, Palau Fruit-Dove, Micronesian Pigeon, Palau Ground-Dove, Nicobar Pigeon, Nightingale Reed-Warbler, Golden White-eye, Rufous Fantail, Mariana Fruit-Dove, Mariana Crow, and Black Drongo are among the birds the group can hope to see.

Dr. H. Douglas Pratt, an authority on the natural history and bird life of Hawaii and the Pacific, will lead the HAS group. Pratt, a talented artist as well as a zoologist, illustrated the *Field Guide to the Birds of Hawaii and the Tropical Pacific*. His work is on display at the Bishop Museum.

The tour will cost \$3,895 a person, including round-trip air fare from Honolulu. If there are fewer than 13 participants, the cost will be \$3,995 each. Hawaii Audubon will receive \$150 per participant.

For more information and a detailed itinerary, contact Hawaii Audubon Society, 212 Merchant Street, Suite 320, Honolulu, HI 96813.

YOUR GUIDE TO CONSERVATION

AS AN INDIVIDUAL YOU CAN MAKE A DIFFERENCE!
 You do not have to be a scientist or politician to work for protection of our environment. Your own show of interest makes a difference. Here is a list of things you can do to help:

* Become active in an organization such as the Hawaii Audubon Society, actively working to protect and enhance the environment. Your participation may be merely financial, or you can volunteer for a more active role as office helper, lobbyist, writer, educator, field trip participant or as a special-interest committee member.

* Explain to your children the value of plants, animals and the natural environment. Books, video tapes and nature kits are available to help you and are fun for everybody.

* Do not release unwanted cats and dogs into the wild. These animals will prey upon native wildlife and complicate efforts to save many of Hawaii's birds from extinction.

* Express your support for the protection of our natural resources by writing or telephoning to Hawaii's Congressional delegation, to the Governor and to members of the State Legislature. Tell State and Federal agencies you want wildlife refuges, marine sanctuaries and natural parks to be protected against development. A letter to the editor can do wonders.

* Report environmental violations--hunting or harrasing protected species, littering, operation of off-road vehicles on beaches or in protected areas, illegal filling-in of wetlands, or vandalism of parks or refuges. Your phone call may be the first alert to reach enforcement officers and be the difference between life and death. (U.S. Fish and Wildlife Service Division of Law Enforcement, 541-2682 on Oahu; State of Hawaii Department of Land and Natural Resources Enforcement Division, 548-5918 on Oahu.)

* If you fish, avoid using gill nets, the number 1 killer of fish and sea turtles, or poisons, which destroy all life on the reef. Dispose of derelict nets, fishing lines and plastic along the shoreline. They often kill sea birds, marine mammals and turtles.

* Never dump motor oil, cleaning fluids, pesticides, battery acid or other hazardous substances on the ground anywhere in the islands. Such toxic waste eventually will percolate into our ground water, poisoning you as well as the environment. Avoid aerosol sprays; the fluorocarbons they contain are destroying our earth's protective ozone layer.

* Do not throw litter around. Find a trash barrel, or carry it home. Recycle aluminum, plastic and paper; not only does it improve the scenery but there may be some money in it.

* Interest yourself in environmental problems. Read up on them in newspapers and magazines. Watch for television specials on natural science. Get involved!

* Learn about Hawaii's natural wonders. Visit wildlife refuges (they are on every island), museums, nature preserves, marine sanctuaries, national parks, zoos, and aquariums.

* Join local groups on their nature walks. Participate in beach clean-ups, whale-watching trips, "bird-a-thons," and fundraising activities by environmental organizations. You'll learn a lot and have fun.

* Attend public hearings regarding developments involving wetlands, beaches or endangered species habitats. Your voice could turn the tide of destruction or force developers to change their plans.

* Volunteer to help a teacher lead a class visit to the reef or park to study wildlife.

* Businesses can help finance organizations or individuals seeking to protect endangered species and their habitats, or any number of other critical efforts. And remember--most such contributions are state and federal tax-free.

* And, simplest of all, learn to conserve both water and electricity in both home and workplace.

Editor's Note: Your Guide to Conservation was distributed by the Hawaii Audubon Society on Earth Day 1990 during celebrations on Maui and O'ahu.



HAS 1st Vice President Bruce Eilerts, Conservation Chair Marjorie Ziegler, and volunteer "Audubonettes" at the Earth Day 1990 celebration at Kapi'olani Park on O'ahu.

Photo by Brenda Duhon

CHRISTMAS COUNTS? WHAT CHRISTMAS COUNTS?

Why hasn't 'Elepaio published some of the 1988 and 1989 Christmas Bird Counts? The missing reports include Maui 1988 (one count), Hawai'i 1988 (one count), and all 1989 counts except for North Kona.

The simple explanation is that 'Elepaio has not received the reports mentioned above from the compilers.

We hope this note will remind the compilers to submit their reports as soon as possible. Our Christmas count readers include biologists who use the data in their publications. Compilers should remember to include scientific names in their reports.

Sheila Conant

JULY MEMBERSHIP MEETING: WILD BIRDS OF JAPAN

Three films dealing with the wild birds of Japan were the feature attractions of the Hawaii Audubon Society 16 July membership meeting at the Bishop Museum. Glenys Miller was in charge of the program. The films were provided by the Consulate General of Japan in Honolulu.

The first and longest dealt with 20,000-acre Kashiro Swamp sanctuary for Japanese Cranes on the northern island of Hokkaido, established in 1958. The central figure in the showing, in addition to the cranes, was a Mr. Takahashi who has been involved in the study, management, and protection of the birds for nearly 50 years.

The black and white Japanese Crane stands four to five feet tall, with a wingspan close to six feet. It becomes very protective of its clutch of two or three eggs during incubation; in one scene, Takahashi is seen in full retreat from a large aggressive bird that resented his curiosity.

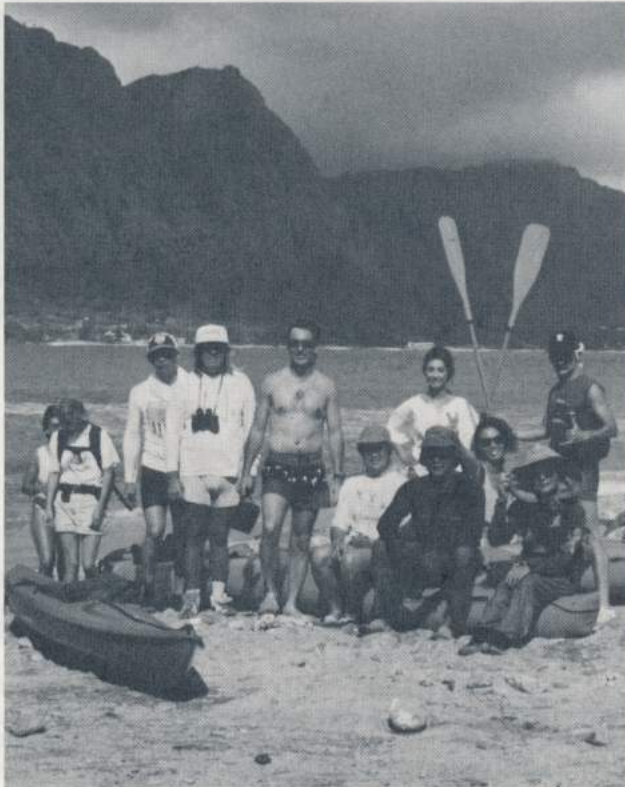
Numerous dangers--some manmade--threaten the Japanese Crane. Eggs left uncovered will not hatch. High water in the swamp is a threat. Pesticides make hatching uncertain.

Takahashi has developed a system of artificial incubation and some of the chicks he has raised have been returned to the wild. (Interestingly, before the eggs hatch, Takahashi talks to them so that the chicks will be accustomed to his voice!)

Once hatched, crane chicks are voracious eaters, driving the parent birds to great effort to supply them. At the end of the year, they are as large as the parents.

Other films dealt with migratory birds and sea eagles on ice flows.

Betty L. Johnson



Hawaii Audubon Society "Expeditionary Forces" successfully land on Manana Island 15 July 1990.

HAS DUES SET FOR YEAR 1991

The Hawaii Audubon Society Board of Directors has approved the following membership schedule for the calendar year 1991. The basic \$6 rate is unchanged from 1990. Surcharges for postage have been added for certain classes of mail to compensate more adequately for certain mailing costs.

HAS DUES FOR 1991 Includes delivery of 'Elepaio

U.S. Zip Code Addresses	\$ 6
(Bulk mail, not forwardable to new address)	
(Life Membership, may be paid in three equal installments)*	150
(Junior Membership age 18 and under)*	3
Mexico	12
Canada	13
All other countries, surface mail	13
(Delivery in 6 weeks to 3 months)	
*Additional postage charged for airmail and foreign addresses	

Optional Airmail Delivery

U.S. Zip Code Addresses (1st Class)	12
All other countries except U.S., Canada and Mexico	24

The foregoing dues schedule is based on current U.S. Postage rates. An increase in U.S. rates is possible in 1991. However, the Society will maintain the above dues level through 1991.

'ELEPAIO NEEDS YOU

Lynne Matusow and Marjorie Ziegler, who have been handling the production of 'Elepaio this year, both have other substantial HAS duties -- one as the Society's treasurer and fundraiser and the other as corresponding secretary and conservation committee chair -- in addition to full-time outside jobs.

To give these two busy people a break, 'Elepaio needs one or more volunteers to assist with keying non-scientific articles and announcements on a Macintosh Plus computer using Write Now software. The time is flexible. Help is also needed with the once-a-month "paste-up" for the printers. The work is done at the HAS office.

Call 'Elepaio Managing Editor Stuart Lillico at 734-3703 if you can volunteer, particularly for the word processing job, which is most urgently needed.

Stuart Lillico

HAWAII AUDUBON SOCIETY PUBLICATIONS

Hawaii's Birds by the Hawaii Audubon Society, 4th edition, 1989. Over 150 color photographs and illustrations. \$10.20 per copy (\$8.95 plus \$1.25 postage).

Checklist of the Birds of Hawaii -- 1988 by R.L. Pyle. Lists all taxa naturally occurring in Hawai'i and introduced species that have established viable populations. Also includes all changes from the 1983 Checklist. \$2.00 postpaid.

Checklist of the Birds of Micronesia by P. Pyle and J. Engbring, 1985. Lists all taxa naturally occurring in Micronesia and introduced species that have established viable populations. \$2.00 postpaid.

Field card of the Birds of Hawaii by R.L. Pyle and A. Engilis, Jr., 1987. A pocket-sized field card listing bird taxa found in Hawai'i with space for field trip notes. \$.25 postpaid, ten or more, \$.10/copy.

Endangered Waterbirds of the Hawaiian Islands by R.J. Shallenberger, 1978. Hawaiian Stilt, Coot, Gallinule (Moorhen), and Duck each described in two pages of photographs and text. \$1.00 postpaid.

Posters, 43 x 56 cm., \$1.00 each, postpaid:

Our Homes are Hawaii's Wetlands, 1984. Native wildlife of a Hawaiian marshland.

Hawaiian Forests are More Than Trees, 1988. Hawaiian forest plants, invertebrates, birds, and the Hawaiian Hoary Bat. Booklet included.

* * * * *

If you are interested in purchasing any of these publications or posters, please send your order and check (payable to the Hawaii Audubon Society) to the HAS office, 212 Merchant Street, Suite 320, Honolulu, HI 96813.

BEQUESTS

A bequest to the Hawaii Audubon Society is an excellent way to help in our conservation efforts. George C. Munro, enthusiastic and tireless field ornithologist and naturalist, provided for a fund to be used exclusively for the protection of native dry forests. Today, the George C. Munro Fund provides money for research projects on such forests. Although an attorney should be consulted in the drafting of your will, a model clause for bequests is set forth below.

"I hereby give, devise, and bequeath to the Hawaii Audubon Society, Honolulu, Hawai'i, the sum of _____ dollars (or set forth a description of property), to be used for the general purpose of said organization."

For more information and assistance, contact the Hawaii Audubon Society, 212 Merchant Street, Suite 320, Honolulu, HI 96813, (808) 528-1432.

ENVIRONMENTAL DIRECTORY AVAILABLE

The Hawaii Audubon Society recently published the *Hawai'i Green Pages*, a directory compiled in celebration of Earth Day 1990. The directory lists over 150 environmental efforts in Hawai'i. For a free copy, send a self-addressed stamped #10 envelope to Directory, Hawaii Audubon Society, 212 Merchant Street, Suite 320, Honolulu, HI 96813.

HAWAII AUDUBON SOCIETY STICKER

Three inch round bumper stickers depicting the 'Elepaio (see logo on page one) are available free of charge at the office or by sending a self-addressed stamped envelope to Sticker, Hawaii Audubon Society, 212 Merchant Street, Suite 320, Honolulu, HI 96813.

HAWAII AUDUBON SOCIETY
212 Merchant Street, Suite 320
Honolulu, Hawai'i 96813
(808) 528-1432

BOARD OF DIRECTORS

President	M. Casey Jarman	263-6396 (hm) 956-7489 (wk)
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Publicity	vacant	

'ELEPAIO STAFF

Editor	Sheila Conant, Ph.D.	956-8241 (wk)
Managing Editor	Stuart Lilloco	734-3703 (hm)
Production	Lynne Matusow	531-4260 (hm)
	Marjorie Ziegler	247-5318 (hm)
Mailing	George Campbell	941-1356 (hm)
	Elizabeth Edwards	-
	Susan Schenck	-
	Alan Ziegler	247-5318

CALENDAR OF EVENTS

- Oct. 8 HAS Board Meeting: HAS office at 6:00 P.M. Call (Mon.) M. Casey Jarman for details, 263-6396 (hm), 956-7489 (wk).
- Oct. 15 HAS General Meeting: Atherton Halau, Bishop (Mon.) Museum, 7:30 P.M. Call M. Casey Jarman for details, 263-6396 (hm), 956-7489 (wk).
- Oct. 20 HAS October Field Trip: Night Reef Walk, Koko (Sat.) Head Tidal Pools. Bruce Eilerts will lead this one-mile walk. Participants will be given the opportunity to encounter reef fishes, invertebrates, molluscs, and many other types of marine life. Bring tabbies or old tennis shoes, shorts, a warm shirt and a flashlight (bucket and net are optional). Meet at 7:30 P.M. at the Hawaii Kai Baskin-Robbins. Call Bruce Eilerts for details, 599-4795.

HAWAII AUDUBON SOCIETY
212 MERCHANT STREET, ROOM 320
HONOLULU, HAWAII 96813



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