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THE LAYSAN FINCH BILL IN THE HONOLULU ZOO

Psittirostra cantans cantans

By Jack L. Throp

Laysan Island "Finches" are members of the Hawaiian Honeycreeper group, the Drepaniidae. Most members of this unique family are nectar feeders but a few have adapted to a seed-eating diet. The Laysan Finch belongs to the latter group. The total population exists on tiny Laysan Island, 1,000 miles west of Oahu. That is, they did until the U.S. Fish and Wildlife Service transplanted a breeding nucleus to Pearl and Hermes Reef, south-east island, to help insure their survival. In 1966 a few birds were brought to the Honolulu Zoo and to the University of Michigan to learn something of their ability to adapt and reproduce in captivity.

Near the turn of the century the Finch was introduced to Midway, another island of the Hawaiian Leeward chain. This satellite population grew and flourished. During the Pacific War, rats found their way to Midway and overran the island. By 1945 they had completely wiped out the Laysan Finch population on that island. There are accounts which indicate that Finches were brought to Honolulu near the turn of the century and sold as cage birds. Unfortunately, these records do not show how long the birds survived or whether they ever reproduced.

Laysan Island has had an unfortunate history. The island once housed five indigenous species of land birds as well as a colony of countless nesting seabirds. The first exploiters came following after the craze for guano, the white gold of bird islands. There is not much indication that these miners greatly affected the stabilized island environment. But on their heels came the feather merchants. Thousands of seabirds were killed. Still the land birds were little affected.

The lasting damage was caused when rabbits were released on the island as a business venture to establish a meat-canning plant. Almost complete destruction followed. The rabbits destroyed the vegetative cover and ate themselves out of existence, but not before three bird species were lost. Endemic to the island were the Laysan Miller Bird, Laysan Rail, Laysan Honey-eater (another drepaniidae species). All now extinct. A duck species (Anas laysanensis) escaped extinction by the narrowest margin ever yet recorded for a species and still survives. In 1912 only seven Laysan Duck were counted. The Laysan Finch numbers were estimated at no more than thirty at that time.

With the rabbits gone the vegetation again began to grow and the surviving bird populations began to increase accordingly. Now a population of several thousand Finch inhabits Laysan.

The Laysan Finch may now be considered secure from extinction if there is no further destruction to their susceptible environment. But still we know little

about these unique birds. A few were brought to captivity for study. The following is an account of this venture in the Honolulu Zoo:

Eugene Kridler, U.S. Fish and Wildlife Service officer for the State of Hawaii, arranged for special permit for Jack Throp of the Honolulu Zoo and Dr. Harrison B. Tardoff, University of Michigan, to receive Laysan Finch. Kridler himself did the collecting. On April 7, 1966 he returned from an inspection trip of the Hawaiian National Wildlife Refuge (the Hawaiian Leeward Islands) with twenty-five birds for Dr. Tardoff, twelve birds for the Zoo breeding program (hopefully six pairs), and seven extra birds for display.

The Navy flight from Midway carrying Kridler and the birds arrived at Barbers Point in the middle of the night. I was there to meet them to get the birds to the Zoo as soon as possible. The fact that Navy flights always seem to arrive at an inconvenient hour was expected. The birds suffered a slight inconvenience when customs inspectors searched the interior of the box with a flashlight. It is interesting to question why there should have been a customs inspection. The Leeward Islands are a portion of the State of Hawaii. So the birds were never out of the State. More than that, the Leeward Islands are a part of the City and County of Honolulu so that the birds were not even out of the County. Next day, the Tardoff birds were transshipped to Michigan and each of the six Zoo pairs were given compartments in a battery of finch breeding cages. The three-foot square enclosures were outfitted with nest sites, perches of several sizes, nesting material, food, and water. The seven extra birds were put on public exhibition. All of the birds were housed in what is called the Zoo Animalanai.

This building is a controlled environment enclosure where the birds could be protected from mosquitos and exposure to other birds. We hoped that this protected environment would give the birds the best possible chance for survival. Mosquitos might carry avian diseases such as malaria and pox; other birds could transmit parasites.

In the study we were looking for answers to the questions of what do Laysan Finch eat? Can they be kept in captivity? Will they reproduce in captivity, and can they be kept in communal aviaries? In short, is it possible to have a captive population as a backup for the wild population which is restricted to such a tiny bit of land in the vast expanse of the Pacific?

The finch soon demonstrated an acceptance to a wide variety of foods. Seeds such as sunflower, millet, and canary are a mainstay in their captive diet. For the first week they were given raw egg, and it was eaten avidly for two or three days but by the end of the week the egg was ignored. Chopped hard-boiled egg was then substituted for raw egg. This was mixed with a basic preparation for insectivorous birds which we call "mockingbird food." The finch were attracted for a short while, then discontinued eating this also. It is now eaten only when there are young in the nest.

At first most of the birds took mealworms, often in preference to all else. But gradually mealworms also lost their attraction.

The basic diet accepted by the adults is sunflower and parakeet seeds, a little fruit, such as orange, apple, banana, or papaya, and lots of green food; Manoa lettuce preferred.

The diet changes dramatically when there are young to be raised. The hatchlings are fed exclusively on animal food and egg for the first two weeks. Other foods are gradually fed in small quantities by the parents as the fledglings grow.

The Laysan Finch in the Zoo have never been seen to drink water though it is available at all times. They seem to get the needed moisture from the green food and fruit. They have no aversion to bathing as long as it comes in the form of rain or spray.

Various types of nest receptacles were tried, two or three in each compartment. The birds never entered the closed parakeet-type boxes though it has been suggested that they frequently nest in cavities among coral boulders. Open-fronted nestboxes and platform nests with solid or wire bottoms were also unacceptable.

The only type that created interest in the females was the wire canary-cup nest

with or without cloth lining. These nests excited the birds and several efforts at nest building took place. A nest would be built in a cup only to be torn apart and rebuilt. Broken eggs were found on occasion in the bottom of two of the cages. The birds were in breeding condition but it was obvious that we hadn't yet provided an acceptable nesting site.

During this period the birds were singing loudly, males in long melodious trills, females with shorter less musical song. There was a lot of territorial defense displayed by the males, much aggression was spent on the unseen males in the adjoining compartments.

A successful nesting was not accomplished until a cup nest was concealed in a heavy bunch of long-leafed grass.

In trying to stimulate nesting, we had tried bunches of grass but it was not until a very large bundle of broad-leafed grass was tried that a female was stimulated to incubate.

In cage No. 2, on June 27, 1966, the female began incubation in the hidden nest. On June 30, three eggs were seen. The hen did all of the incubating while the cock was prepared to defend the territory against all would-be intruders (other Laysan Finch). By midday, on July 12, two eggs had hatched. The third egg was pipped and it hatched soon after. From the beginning of incubation to hatching was sixteen days.

The inside of the mouth of the chick is pink, the surrounding soft bill is bright yellow so that a striking color contrast is made. The chick is naked and pinkish in color at hatching. By the second day it is well fuzzed along the feather tracts with a dark gray down on head and back. The skin color gradually darkened so that one week after hatching the chick was dark skinned above while remaining lighter colored on the abdomen.

The first nesting attempt was not a happy success. Five days after hatching, one of the chicks died. Four days later a second perished.

The male was doing the major part of the feeding. He showed a preference for mealworms which he mashed into a milk-like form with his beak, expelling the exo-skeletons. It took approximately five minutes for him to prepare a mealworm in this manner. The female continued to brood the chicks very closely, unusually close, and would leave the nest only when the male came to feed. He was very careful in feeding, making sure that each chick was given a little at a time. After feeding, he left for another mealworm and the female returned to brood. On July 26, fourteen days after the chicks hatched, the male died. Dr. Fred Lynd's post mortem report of the bird concluded that it died from liver degeneration which was attributed to advanced age. The condition was one of long standing and may have been caused by deficient diet long before capture.

Prior to the death of the male, the female had not been seen to feed the young. An uneasy day followed until it was evident that she was taking over the feeding chores of the lone chick.

On July 27 the first true feathers were sprouting. On August 3 it left the nest and by September was independent of the mother. The chick was then removed and another male was put with the female.

The next few months proved to be very trying on the birds. On October 14, one of the female finches developed a sore on the right leg. The area about the upper tarsus was a little swollen. Two days later, both legs were infected and the bird appeared listless. A second bird also showed signs of swelling on the tarsus. The infection was diagnosed as staph. It swept through the colony, probably carried by the keeper although every precaution was taken. Other bird species were housed in the building, including other drepaniidae, but none of these contracted staph. Apparently the Laysan Finch had no resistance to it. By mid February, 1967, the infection had run itself out. Some of the infected birds had recovered but several others had died, including the one captive-raised chick. The colony had shrunk from the original nineteen birds to ten. The true extent of the tragedy was not discovered for two years to come. Of the six pairs of adult finches, three males had died. All of the others, including the unsexed ones, proved to be females.

One of the remaining three pairs of adults successfully nested in 1967. The

following is from notes:

March 9 - A pair was placed in a 6 foot square aviary. The floor is covered with sand and coral rock. A large clump of dried California grass stands in one corner.
March 19 - The female is building a nest inside the grass clump.
March 21 - One egg laid. Female sitting.
March 22 - Female on two eggs.
March 23 - Female is sitting continuously.
March 29 - A third egg seen for the first time. The female sits very closely. A mirror was placed from above so that the nest could be watched unobtrusively.
April 7 - An egg hatched in the early morning.
April 8 - Another hatched.
April 9-12 - The female sits very closely in the nest. The parents are being given all the live food they desire. On April 19, 90 mealworms were eaten. The exoskeletons were never eaten, only the soft inside of the worms.
April 24 - The female spent most of the day outside of the nest.
May 2 - Young on the edge of the nest.
May 4 - Out of the nest for a short time.
May 7 - Chicks out of the nest.

During the early stages of staph infection, I took two pairs of the birds to my home on zoo grounds. This was well before we realized the seriousness of the outbreak. Fortunate that we did. These four were spared.

Mosquito-proof aviaries were constructed for them and I alone cared for them. One of these pairs soon nested and raised a single chick.

There was again staph among the Animalanai birds that summer. Others died, including the male and both fledglings. Four birds lived on for two years. All proved to be females. The last of these died on March 21, 1969 from cranial trauma. Dr. Allen Miyahara's report found no blood or intestinal parasites. The last male died in 1969. Three of the finches remain after four years in captivity, all females. One of these is a captive-raised bird.

From the experience gained through keeping these birds, I feel that this much has been learned. The Laysan Finch is adaptive to the captive environment as long as it is not too closely confined. An enclosure three feet square was about as close as it could comfortably tolerate. Flight aviaries are preferred. The Finch will eat a variety of foods, none of which are difficult to supply.

They nest readily and can be reared provided insect food is available. The principal difficulty in establishing a breeding colony is their seeming susceptibility to common infections. A resistant colony could be established with care. The nucleus for such a resistant strain is present in these three remaining females.

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The following news article is contributed by Ethel M. Matheson, Washington, D.C.:

BIRDS FLY IN V FORMATION TO EXTEND A HELPING WING by Walter Sullivan

Two specialists in aerodynamics have concluded that large migrating birds fly in V formations because in that way each bird boosts the other, increasing their flight range as much as 71 per cent.

Calculations by the specialists at the California Institute of Technology show that each bird leaves a strong updraft off its wingtips. The bird following places itself in the formation so as to take maximum advantage of this lift and gain greater range.

The optimum spacing of the birds, the specialists say, depends on the angle of the V. If a bird gets ahead of its proper position, according to this analysis, it immediately senses its increased work load and drops back. If it lags behind, it

does less work than the others, and the two scientists suspect that "social pressure" forces it to stay in its proper spot. Thus, the question arises: Is the constant honking of Canada geese on the move a series of exhortations to the lazier birds?

The analysis was performed by Dr. Peter B.S. Lissaman and Carl A. Shollenberger. Dr. Lissaman has been a visiting professor at CalTech but has returned to the Northrop Corporation, where he heads the Continuum Mechanics Laboratory....Mr. Shollenberger is a graduate student at CalTech....They had presented preliminary results in the May 22 issue of SCIENCE.

Their theory is derived almost entirely from the laws of aerodynamics, rather than from observations of birds in flight. However, they point out that the V angles and spacings derived from their calculations are much like those seen in flights of migrating birds.

Dr. Lissaman said the updraft enabled each bird to fly forward more easily, much as a hawk or glider pilot takes advantage of updrafts. For birds in such an updraft, the most efficient flight mode is one that reduces forward speed while extending range, he said. Thus, according to the calculations, a flight of 25 birds that, by formation flying, increases its range 71 per cent per unit of expended energy, will also reduce its speed 24 per cent. Dr. Lissaman pointed out that birds leaving a V formation typically speed up and those joining the formation slow down. However, he said, it could be argued that a departing bird increases its speed merely to scout ahead, or it could be contended that a joining bird flies faster to overtake the formation.

The two scientists expressed hope that bird watchers would help them evaluate their theory.

"It would be of great interest," they wrote, "to acquire good data of bird formation, from which actual spacing, V angle, speed, and flapping frequency could be established."

Most available photographs are taken at an oblique angle, distorting the geometry of the formation.

From the calculations, it appears that the lead bird does little or no more work than others of the formation. In fact, if the birds flew abreast in a straight line the center bird would get the most uplift of all. In a V formation the updraft from birds on either flank of the lead bird extends far enough forward to help the leader as well. Mr. Shollenberger said that the extent to which the flight of the lead bird was eased by the others depended on the spacing and shape of the V. Hence,he suggested, the leader may still have to do the most work and may, therefore, be the strongest bird, or perhaps the best navigator. The outermost birds would have to do more than their share of work if perfectly in line with the others. Therefore, the calculations say, they should drop back slightly to even the load....The birds must also fly roughly in the same horizontal plane, which seems to be the case in nature.

If the V formation were designed, as with military aircraft, merely to facilitate following the leader visually, other formations, such as one in which each bird is lower than the one ahead, would serve as well.

Any comments? Please share your experiences with other members by writing to Kojima, 725-A 8th Avenue, Honolulu, Hawaii 96816.

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Book Reviews: PETERS' BIRDS OF THE WORLD, Volume XIV

E.H. Bryan, Jr. reports receiving a copy of the latest volume of this very useful series from Dr. J.C. Greenway, Jr., who is the author of the portion having to do with the Drepanididae or Hawaiian Honeycreepers.

The full title of the book is Check-list of the Birds of the World, a continuation of the work of James L. Peters, edited by Raymond A. Paynter, Jr. in consultation with Ernst Mayr. Volume XIV: Parulidae, Drepanididae, Vireonidae, Icteridae, Fringillinae, Carduelinae, Estrildidae, Viduinae.

The aurhors of the various sections, together with the more familiar names of these families and subfamilies are:

Family Parulidae, Wood Warblers, by George H. Lowery, Jr. and Burt L. Munro, Jr.
Family Drepanididae, Honeycreepers, by James C. Greenway, Jr.
Family Vireonidae, Peppershrikes, Shrike-vireos, and Vireos, by Emmet R. Blake.
Family Icteridae, American Orioles and Blackbirds, by Emmet R. Blake.
Family Fringillidae
Subfamily Fringillinae, Chaffinches and Brambling, by Ernst Mayr.
Subfamily Carduelinae, Serins, Goldfinches, Linnets, Rose Finches, Grosbeaks and allies, by Thomas R. Howell, Raymond A. Paynter, Jr. and Austin L. Rand.
Family Estrildidae, Waxbills, Grass Finches, and Mannikins, by Ernst Mayr, Raymond A. Paynter, Jr., and Melvin A. Taylor.
Family Ploceidae
Subfamily Viduinae, Indigo-birds and Whydahs, by Melvin A. Taylor.

The index alone fills 33 pages, double column; the whole book 433 pages.

Dr. Greenway's listing of the Drepanididae is on pages 93 to 103. In general he follows the nomenclature proposed by Dean Amadon in his monograph (Bulletin of the American Museum of Natural History, 95, 1950). His concise presentation together with notes on distribution and present status, makes these ten pages an important reference for bird enthusiasts in Hawaii.

Several birds listed in the balance of the book are species introduced to Hawaii. They include: the Ricebird, Strawberry Finch (now placed in the genus Amandava), Black-headed Mannikin, Western Meadowlark, House Finch, and a few others less well known.

BLUE-FACED BOOBIES ON KURE ATOLL

An informative little book, BREEDING BIOLOGY OF THE BLUE-FACED BOOBY, Sula dactylatra personata, on Green Island, Kure Atoll, by Cameron B. Kepler, has just been published by the Nuttall Ornithological Club, Cambridge, Massachusetts (publication No. 8, 1969, 97 pages, illustrated by drawings and photographs and two maps).

The author was a member of the Smithsonian Institution's Pacific Ocean Biological Survey program, and was on Kure Atoll from October 25, 1964 to February 28, 1965, gathering the information which he presents in detail. After a concise description of Kure Atoll, its flora and fauna and their environment, and the taxonomy, distribution and morphology of this species of Booby, the bulk of the book covers the subjects of the bird colony, breeding biology, spacing out and behavior of the pairs. All this is summarized concisely at the end of the book, with an appendix on how to capture, handle, band, mark for observation, weigh and measure the birds and their eggs, and record observations. There is a bibliography of the literature cited.

E. H. Bryan, Jr.

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Field Trip to Manana Island, 9 August 1970 by William W. Prange, Jr.

Twenty-two members and guests, including leaders Robert Shallenberger and me, visited Manana (Rabbit Island) during the morning and early afternoon hours of 9 August. The weather was excellent with minimal cloudiness, tradewind of 10 to 15 miles per hour and visibility nearly perfect. Molokai, Lanai and Haleakala on Maui were clearly visible on the horizon.

Harold Ahuna provided the usual competent transportation to and from the island on his small skiff and was able to get the entire group to Manana in two trips at the expense of dampening the backsides of the forward-most passengers. The sandy beach at the landing point had disappeared, and a few of the less agile members of the party performed some dramatic and futile acrobatics trying to keep upright on

the slippery rocks.

We were met on the island by Rob Shallenberger, who through the Oceanic Institute is conducting several facets of research relative to Manana's seabird population. His knowledge of the island and its birds was impressive and largely responsible for a very informative and worthwhile field trip.

Our first stop was to observe the nesting Bulwer petrels in holes and shallow caves above the shoreline shelf on the Waimanalo side of Manana. Rob secured for our perusal one member of a pair of Bulwer which had set up residence beneath a supply trunk he had stashed in the largest of the caves. The bird was allowed to demonstrate how its hooked beak is used in climbing. Several adults and chicks were found in much the same areas as those of the past years.

We then climbed directly above the petrel area to the base of the grassy area beneath the crater's rim, and in the process we flushed one of the small remaining groups of adult and fledgling sooty terns. Rob noted here and in several other locations that population pressure had caused the s ooty tern colony to infringe on territory which was formerly devoted exclusively to the wedge-tailed shearwater burrows. These areas had been denuded of the tall grass noted on previous trips, apparently due to constant activity of the sooties. Rob thought since these areas were among the last to be occupied, they were possibly the least desirable sooty nesting sites. The number of occupied wedge-tail burrows in these areas appeared to be markedly reduced from the previous year.

We then proceeded clockwise around the bare rock crater rim through the common noddy tern nesting colony. I was startled by the almost complete lack of older chicks, most appearing to be less than a week old. As the noddy's nesting period ranges from late spring to late fall, we normally expect to see hundreds of older chicks scrambling from our path along the rim.

Rob observed that a small number of night herons which nest behind Sea Life Park fly out to Manana each evening to prey on the chicks and mice. (Remains of chick have been isolated in the 'auku'u's droppings.)

It seems that predation by the 'auku'u may reach a significant level, although there is not enough quantitative data to support this. Rob commented that noddy chicks have been hatching since May, but the peak was not until mid to late August. However, we probably observed less than 20 over three- to four-weeks old. I did not see any evidence of dead noddy chicks, although Rob has found several at the cliff base. This observation plus Rob's statement that occasional noddy chicks he has been measuring and weighing have disappeared overnight without a trace seem to confirm predation by the night heron. He is investigating this situation as a part of his research.

From the crater rim we observed three red-tailed tropicbirds in spectacular courtship flight above the crater involving stationary and seemingly backward flight followed by dramatic drops. Earlier we observed a fledgling sooty tern unexplainedly pursuing a solitary red-tailed tropicbird well above the island and apparently attacking it at least twice. Rob has not discovered any red-tailed tropicbird nesting on the island, but speculates that they may be attempting to nest in an inaccessible hole on the seaward slope. They have been observed landing in this hole on many occasions. Two white-tailed tropicbirds were also observed by part of the group early in the trip.

From the summit we quickly proceeded around the remaining portion of the crater rim back to our starting point by the petrel caves. One group returned immediately to the shore, while the second lunched and beachcombed until pickup by Mr. Ahuna.

During our trip we witnessed the landing of an unauthorized party apparently intent in exploring at least the shoreline of the island despite a conspicuous sign forbidding such landings. Rob politely asked the group to leave, and they left reluctantly only after return of several caustic remarks from the group leader. According to Rob, these landings are becoming frequent during weekends. If the trespassing continues to increase, the suitability of Manana as a seabird sanctuary will be destroyed ultimately. The presence of such uninformed individuals within

the breeding colonies, regardless of their intent, causing parent birds to leave their nests for just a few minutes, can cause under normal weather conditions subsequent overheating and death of unhatched and newly hatched chicks. Because of the density of these colonies such incidents may involve hundreds or even thousands of nests! Add to this the large number of crushed shearwater burrows.

It may be in the Society's best interest to explore with the Fish and Game Division means of discouraging further landings through improved postings both on Manana and the adjacent shoreline, and through more stringent enforcement of present regulations by game wardens. Possibly individuals such as Rob Shallenberger, who is on the island for great periods of time, should be deputized for such enforcement.

The realization of a planned small boat harbor between Makapuu and Waimanalo will greatly encourage such landings in the future by making the island readily accessible to Oahu's many hundreds of trailer launched boats. It would be tragic if Manana were to receive the same fate as other island sanctuaries such as Moku Lua, Popoia, and Kaohikaipu (Black Rock), whose bird populations are constantly harassed by interlopers and their pets.

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Field Notes from W. Patrick Dunbar, USNS LONGVIEW, 19 August 1970: Seabirds

...The Longview is a missile tracker and spends considerable time steaming back and forth and round about the Northwestern islands. Sometimes spends a day or two within sight of Nihoa Island. It is there that I get my greatest opportunity to watch for birds.

Late in May we were in that area and I was able to get fairly good movies of quite a number of frigatebirds sailing along with the ship just above mast height. I had, a short time before, seen a flock of fifty or so of these wonderful flyers. This vessel is equipped with a large variety of antennas, one of which is a tall pole with few horizontal cross pieces each with a knob on the end. Imagine my surprise to see a frigatebird sail down and grasp one of these knobs in its beak and show no concern when the tension in the cross piece, from being bent, snapped it out of the bird's bill. Farther forward is a whip antenna (much larger but similar to those on automobiles) and they would grasp the button on it. The movies when stopped show one of them with its beak wide open reaching for it. Since that time in this area I've not seen more than two or three frigates. On 10 August within sight of La Perouse pinnacle, French Frigate Shoals, I saw two flocks; in the first I counted forty and in the second I stopped after one hundred twenty-six. For the latter I had to use binoculars.

Around Nihoa the birds commonly seen...are fairy, sooty, gray-backed, white-capped noddy, and blue-gray noddy terns; brown and masked boobies, red-tailed tropicbirds, Bulwer petrel and wedge-tailed shearwaters. A few other species I'm doubtful about.

Four separate times we've had a Bulwer petrel aboard and have had to give it our assist to get it flying again, and twice for a red-tailed tropicbird.

In June both black-footed and Laysan albatrosses were common. Have not seen any since. Yesterday and this morning an American golden plover was running around the helicopter flight deck. It was in fall plumage....

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From G. Causey Whittow, Big Island, 3 - 10 August 1970: Seabirds

Seabirds are not so easy to see on the Big Island as they are at Kilauea Lighthouse on Kauai, for example see Charles Kaigler's field note in the August 1970 issue of THE ELEPAIO. However, we did see, in addition to those in Halemaumau Crater, White-tailed tropicbirds near Whittington Beach Park in Kau and at Waipio Valley in the Hamakua Coast area. We also saw large numbers of Hawaiian noddies, intermingled with Noddy terns, flying along the cliffs between Kapaahu and Apua Point in the Puna District.

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From Mrs. John C. Plews, Koke'e, Kauai, 2 September 1970: Native birds

...With the exception of one week in August, I have been up here since July 8th, and although neither the Lehua nor the Eucalyptus are in flower, I have noted a number of Hawaiian birds including 'i'iwi, 'apapane, 'oma'o, koloa and 'amakihi, in fact, the 'oma'o came to my bird table along with spectacled thrush and other imported thrushes.

Since the honeysuckle has been in flower, the 'amakihi are much more numerous. The 'elepaio are as charming as ever, and we have a great many cardinals, although none of the Brazilian variety.

The other day at Kipu I heard the meadowlarks singing. The plover came back here on August 20th but were seen in the lowlands on the 15th. There are many koa'e both phaethon rubricauda and phaethon lepturus in the Canyon, and at Kalalau.

I have seen a very yellow bird much larger than any 'amakihi frequently, in my garden.

My speciosum lilies and other varieties attract the birds. It is a pretty sight to see them perched on the stems. Jungle fowl seem to have increased enormously, and I have not seen a cat in this part of the mountains.

We have a pueo, probably two, all the time, but none of us have seen our pair of 'auku'u. Perhaps this is because of the very dry summer; the water in our stream is very low. I keep a bowl of fresh water on my bird table which they enjoy.

We have not seen nor heard of the golden eagle this year.

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From Mary H. Roberts, 1711 Makiki St., Honolulu, 13 August 1970: Bubuls

Bulbuls have become frequent visitors to my garden on Makiki Street. I am now sure that we have two varieties, the ones with a vivid, red patch under the eye, and the ones with a white patch only. The latter, however, have a large patch of rust red under the tail, and the long tail feathers are a light gray with darker stripes horizontally across them. They seem unafraid of humans. It strikes me as strange that the Kentucky cardinal seems attracted to them and immediately flies into the trees near them, while mynah birds send out their alarm cry when they hear the loud call and chirping of the bulbul. Their visits are very short. I was interested to note that one of them ignored the ripening papaya while he sat on the tree apparently picking off insects on a leaf.

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Cornell University News Release, 14 July 1970: Cattle Egret

Ithaca, N.Y.--...The female cattle egret...clobbers a belligerent male into submission and then helps him build their love nest.

The aggressive courtship of the two-foot-tall bird is described for the first time in detail by Douglas A. Lancaster, assistant director of Cornell University's Laboratory of Ornithology, who watched a large colony of the birds along the Cauca River in Colombia.

Once she has let the male know who's boss, Lancaster said, the female then keeps any other female away from the male she has just overpowered.

Both sexes of the cattle egret are aggressive, Lancaster said, but the male starts singing his swan song shortly after he flies into the colony, plumes erect and strutting his stuff to attract attention. At first, the male fights off all comers, regardless of their sex. This may go on for several days--but the male's days of freedom are numbered when a mating relationship is established.

"The latter is accomplished," Lancaster said, "when a female flies to a male and, surprising him from behind, lands on his back and succeeds in remaining there long enough to subdue his aggression through repeated blows on the head."

Only a small fraction of the back-landings is successful, Lancaster noted, because the male fights furiously to dislodge the female and force her to flee. If he's unable to dislodge her, the male crouches low and submits.

"The female then turns her aggression toward any other female that attempts to mate with the male she has just subdued," Lancaster said. "Sometimes the male's

submissiveness does not stop the female's aggressiveness. In that case, the male struggles to rise and either attacks the female or flies off. He soon returns, however, usually attacking the female and driving her off."

If the subdued male is lucky enough to have tangled with a female that loses her aggressiveness after he submits, the pair happily build a nest together on the same site where the male had strutted his supposed superiority.

Cattle egrets get their name because of their habit of following cattle and eating insects and other small animals flushed up by the grazing cattle. Their bodies are white and they have yellowish legs and bill with buff colored plumes on the head, back and breast....

Lancaster made his study of the bird while he was a visiting professor at the University of Valle in Cali, Colombia. His work will be printed in the next issue of THE LIVING BIRD, an annual published by Cornell's Laboratory of Ornithology.

Any comments? What is your observations? Please share your experiences with other members by writing to Kojima, 725-A 8th Avenue, Honolulu, Hawaii 96816.

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For those wishing to help conserve threatened wildlife, a series of missions to East Africa has been developed to prepare them for educational endeavor in the U.S. and Canada. Participants will meet with world leaders and advance intercultural understanding, as well. Six missions are scheduled for December and through 1971. All expenses, including post-mission assistance on appearances and publicity: (U.S.) $1750. Applicants should state depth of concern; eagerness to educate; photographic or writing competence. Write: WARN (Women Against Ravishment of Nature), c/o Clement E. Herowit, 330 S. Broadway, Tarrytown, N.Y. 10591.

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ALOHA to new members:

Shirley Bennett, 3027-B Pualei Circle, Apt 201, Honolulu, Hawaii 96815.
Roger B. Clapp, 827 Walker Road, Great Falls, Virginia 22066.
Lois M. Drake, 45-535 Luluku Road, No. I-1, Kaneohe, Oahu 96744.
Toni Madsen, 1650 Kanunu St., PH 4, Honolulu, Hawaii 96814.
Capt & Mrs. L.S. Smith, Jr., 3-B Makalapa Drive, Honolulu, Hawaii 96818.
Charles Van Riper,III, Hawaii Preparatory Academy, Kamuela, Hawaii 96743.

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HAWAII'S BIRDS, a field guide, available for $2.00. Send in your orders to: Book Order Committee, Hawaii Audubon Society, P.O. Box 5032, Honolulu, Hawaii 96814.

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OCTOBER ACTIVITIES:

11 October - Field trip to study shorebirds. Bring lunch, water, and if possible your car. Transportation cost ($1.00) to be paid to the drivers. Meet at the State Library on Punchbowl Street at 8:00 a.m. Leader: William P. Mull, telephone: 988-6798.

12 October - Board meeting at the Zoo entrance bldg at 7:30 p.m. Members welcome.

19 October - General meeting at the Waikiki Aquarium Auditorium at 7:30 p.m. Speaker: Robert Shallenberger Topic: Birds of Manana Island (color slides)

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