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# NOTES ON FOODS AND FEEDING BEHAVIOR OF RAPTORIAL BIRDS IN HAWAII

By P. Quentin Tomich

The Hawaiian avifauna includes only two naturally distributed reptors, the Hawaiian hawk and the short-eared owl. The introduced barn owl has become a third member of this small group of terrestrial predators. This paper reports miscellaneous records of foods and feeding behavior of these species, gathered on the island of Hawaii from 1959 to 1970.

HAWAIIAN HAWK (Buteo solitarius): A dead bird recovered by Ernest Kosaka of the State Division of Fish and Game in South Kona District, March 14, 1962 contained the following items in the digestive tract: In the gullet were two adults of the Chinese praying mantis, (Tenodera angustipennis); two feet with bare leg bones, and the gizzard, of a barred dove (Geopilia striata); and a whole house mouse (Mus musculus). The stomach contained remains of a second house mouse. The site of this collection was at 2,500 feet, above the Konawaena School, in formerly forested lands given to cattle ranching.

A hawk that I recovered after it was crushed by highway traffic on a bridge at Papaaloa, North Hilo District, on November 27, 1967 had in the gullet about two-thirds of the body of a crayfish (Procambarus clarkii), broken into three pieces. This site is at 350 feet in a belt of sugar cane that is cut every half mile or so by a deep, wooded gulch that runs from the forested area above, to the sea.

The Hawaiian hawk has evolved as a distinct species in the Hawaiian archipelago, in the absence of rodents or other small mammals. The diminutive Polynesian rat (Rattus exulans) is thought to have arrived with Polyniesian cultures, perhaps 1,000 to 1,500 years ago; the house mouse has been present for less than 200 years (Tomich, 1969). The mouse is frequently active in daylight and would seem to be a suitable common prey for the hawk. On the other hand, R. exulans and other rats are almost exclusively nocturnal and are unlikely to be significant in the diet of the hawk for this reason alone. Additionally, except for R. exulans, they may be too large and powerful for the hawk to subdue. B. solitarius is a small, unwary species that inhabits only the island of Hawaii, not straying even infrequently to other islands. It is associated with forested lands, including rain forest, semi-arid forest, and lands now supporting remnants of former forests. Although it may be seen frequently soaring over rugged gullies and mountain slopes, it is not a strong flier. Seldom have I seen it stooping except during its spectacular courtship displays. Perhaps it captures prey largely at short range, from fixed perches. If the bird is not on the wing, in wooded areas it is often perched inconspicuously under the tree canopy. In more open country it may take up a perch on an isolated tree or pole. Only once have I observed it feeding. In late afternoon on February 5, 1964 one flew from one perch to another in a stand of screw-pine (Pandanus) at the base of the east wall of Waipio Valley. It then settled down to eating some small object held under one foot, on a bare horizontal limb inside a tree. I

approached incautiously from another direction and the bird was suddenly in view only 20 feet away, some 10 feet above the ground. It had finished feeding, regarded me curiously, looked away, and just seemed to rest. After 14 minutes the bird defecated with the tail sharply raised; then it flew off toward the beach.

The occurrence of P. clarkii, an introduced crayfish, in the diet suggests that other aquatic arthropods, as well as a variety of insects besides Tenodera, may be traditional foods of this hawk. The importance of endemic small birds is essentially unknown, but finding remains of the introduced G. striata suggests that other birds may be taken.

SHORT-EARED OWL (Asio flammeus): The widely distributed population of the short-eared owl in Hawaii is not markedly differentiated from its circumpolar relatives. It appears to be the same bird that one observes in temperate zone grasslands or on the arctic tundra of North America, and its behavior is much the same (Pitelka, Tomich and Treichel, 1955). On the island of Hawaii A. flammeus probably now depends primarily on the house mouse for food. It hunts in broad daylight as well as in the dark, and is a characteristic bird of the upland pastures. When high densities of mice arise (Tomich, 1969), the owls concentrate where the mice are abundant. Owls are especially attracted to roadways where the mice are easily caught as they venture into the open. Mouse populations were high in the semi-arid forest between Waimea and Kona in the summer of 1963. On August 15 a neighbor brought in a freshly killed owl he had picked up in the road near Puuanahulu. Then on the 19th, Harry T. Kami saw three specimens dead in the road in the vicinity of Puuwaawaa and eastward into Parker Ranch. All had apparently been killed by passing cars while foraging in the roadway. These observations were made on chance trips to this region; only such casual records are available on the relationships of owls to the unusual abundance of the house mouse. In August, 1964 when mice were so abundant that the road was literally alive with them late one afternoon and many were already crushed by passing traffic, I saw several owls along the route, and caught a live one that had a broken wing, apparently from a collision with some car or truck.

The short-eared owl is sometimes attracted to sugar cane fields during harvest when populations of rats are fleeing from the disruption of their habitat. In 1960, in Hamakua District, after harvest of Field 009 at the Paauhau Sugar Company, one or more A. flammeus worked the field at night, which coincided with the time of activity of displaced rats. On June 3 a head and intestinal tract of R. exulans were found together with three fecal deposits and a down feather of an owl. Nearby was the discarded gut of another rat. A third remains had only the head missing. Near the field edge were two more, one with the neck torn and broken at the nape, and another merely torn at the neck. All specimens were of R. exulans. When the work party left the field near mid-day, a short-eared owl flushed from a stand of trees in a gulch bordering one side of the field. The next day a small regurgitated owl pellet and a streaked body feather of A. flammeus were found in the field. Most rats leave a cane field if not killed outright by machinery during harvest (Tomich, 1970). It appeared that the owl or owls working Field 009 had available more rats than they could consume, so had left some of them merely mauled or partly eaten instead of consuming them entirely.

Other evidence shows that the short-eared owl will typically ingest most or all of the body of a Polynesian rat, and that one animal constitutes a meal. In the recently harvested Field 17 of the adjacent Honokaa Sugar Company, early in August, 1960 four pellets of the short-eared owl were found about the field, associated with a tail feather and a down body feather of this species. The pellets were typical masses of indigestible fur and bones of rats cemented firmly by mucus. Two contained each the crushed skull and apparently all bones of the body, including the tail, of R. exulans. The third and fourth pellets lay together on the ground and contained the remains of a single rat; the crushed cranium and small fragments or other bones were in one, and the bulk of the skeletal remains

were in the other. The series of four measured in length and thickness: 55 x 24; 57 x 24; 29 x 17; 42 x 22 mm. A pellet from another bare field at the rim of Waipio Valley on March 14, 1962 measured 48 x 23 mm, and contained the remains of two mice.

The short-eared owl is capable of feeding on the larger roof rat (Rattus rattus), as is demonstrated by one example. Whether it consistently attacks this rat is not known. Above the fields of the Honokaa Sugar Company in the Kapulena sector, at 1800 feet, an owl was flushed from the roadside in 'ohi'a-fern forest ahead of a car in mid-morning of March 15, 1962. The owl carried part of a large rat in its talons and crossed the road to alight on the sloping trunk of a tree, about 10 feet above ground. As the car stopped and an observer ran toward the owl with the intent of causing it to drop its prey, the bird rose in a tight 60-foot circle over the roadway, attempting to gain altitude. By the second turn it had risen only about 10 feet, whereupon it dropped the rat and flew off down the road over the car, unencumbered except by the portion of the rat it had already consumed. The prey was a large male roof rat of which the remaining hind quarters, tail and a flap of dorsal skin weighed 52 g. Obviously, this rodent was a large meal for the small short-eared owl, which had apparently already eaten the anterior portion of the body and had picked flesh from the vertebral column and under the flap of skin. Whether it would have succeeded in consuming the entire rat, bones, hide, tail and all, is problematical.

There is little evidence that the short-eared owl in Hawaii is a predator on birds. Alfred Hart, Sr., a lifetime resident of Honokaa who is familiar with this owl, reported in 1962 that some 20 years earlier an owl came into his yard, captured a week-old domestic chicken, and flew off downhill with it, over the roofs of houses below his yard.

BARN OWL (Tyto alba): The barn owl was first introduced into Hawaii by the Territorial Government in 1958, and has since become well established at least on Hawaii and Kauai (Tomich, 1962; Au and Swedberg, 1966). This species is almost entirely nocturnal and only rarely is it active before dark. However, because it establishes regular roosts or nest sites, and casts characteristic pellets at these places, its food habits can be traced easily in some localities.

The most prominent roost and nest site I have found was in an abandoned concrete silo at Waikii, Hawaii, at 4,650 feet on the west slope of Mauna Kea. The silo had been a roost for feral pigeons for some years before it was occupied by owls, and owls were succeeded in 1968 by a colony of honey bees. It is not known if any of the tenants forcibly ejected another. The surrounding country is open grazing land with occasional plantings of eucalyptus trees, and makes a suitable foraging area for the barn owl.

The regurgitated food pellet of the barn owl is larger than that of the short-eared owl. Five taken at random measured 67 x 28; 60 x 35; 60 x 34; 56 x 32; 47 x 32 mm, in length and width. These pellets tend to be flattened rather than cylindrical as in the short-eared owl. Two series of pellets were examined.

Of 58 taken from the Waikii silo in April 1964, 55 contained remains of M. musculus only, ranging from three to nine per pellet, with a mean of 5.4. The number of mice represented in each pellet was determined by counting mandibles. Three pellets contained each the skull and other remains of R. rattus and 5, 4, and 4 M. musculus, respectively. The rat is most probably associated with the occasional farm buildings or gullies with woody vegetation of the region, hence is uncommon. A second series of 42 pellets collected in September 1965 had 36 that contained from two to 10 mice each, averaging 5.4 per pellet. The other six contained roof rats and mice, or rats alone, in the following numbers: 3-2; 1-3; 1-2; 1-1; 1-0. This sample showed an increase in the frequency of rats; mice per meal remained the same.

A temporary roost in a Pandanus thicket near the mouth of Waipio Valley had four pellets scattered beneath it in April 1964. Together, these contained evidence

of seven R. exulans and two M. musculus.

Suitable shelters for the barn owl are found in the high sea cliffs along the Hamakua Coast, but these are generally inaccessible for study. One such cave is present somewhere near the entrance to Waipio Valley, for I have repeatedly noted owls first active and calling after dark just below the lookout near Kukuihaele. An old burial cave in the cliff between Waipio Valley and Waimanu Valley, about 450 feet below the rim and 800 feet above the ocean, was occupied by a barn owl when examined by a Bishop Museum archaeologist let down on ropes on July 21, 1968.

DISCUSSION: These few data help us to understand to some degree the relationships of predatory birds to the environment and to the interests of man. In this second regard, none of the species is measureably harmful. The Hawaiian hawk appears to be the least adaptable to changed environments, and the best suited to the several types of endemic forest. It may require a varied diet that includes the larger arthropods because such rodents and birds as it is able to capture may not be in sufficient abundance in its required habitat. The owls, on the other hand, can obviously subsist on the introduced rodents. For these reasons the hawk and owls are probably not in competition. The abundant house mouse has without doubt enhanced the quality of life for the short-eared owl. Perhaps there were no owls in Hawaii before the arrival of the Polynesian rat, and the barn owl could probably not have been successfully introduced without the rodents. While the barn owl feeds on rats when they are available, it is not likely a significant factor in their economic control.

I have encountered at least five barn owls dead on the major highways of the island, and this kind of mortality may be a substantial drain on local populations. Both owls, at least in some regions, seem to be attracted the year around to foraging on the roadways where they are frequently in danger of being struck by automobiles. Telephone and power lines may interfere in a small way with the activities of owls. In the Sacramento Valley of California, which is good barn owl country, one occasionally sees a pocket gopher (Thomomys) or a meadow vole (Microtus) draped over a high wire where it will hand mummified for several months. I have attributed these examples to the accidental loss of a captured rodent when an owl brushes the wire in flight, but have never actually seen it happen. Following the introduction of the barn owl to the Hamakua Coast, I have twice seen unidentified rats hung in this same fashion over wires adjacent to the major highway, which suggests similar accidental dropping of prey.

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LETTER to Director, Bureau of Land Management, U.S. Department of the Interior and copies to the President of the U.S.; Hawaii members of the U.S. Congress; and President of National Audubon Society: February 26, 1971

As President of the Hawaii Audubon Society, I wish to express my concern about the environmental impact of the proposed oil pipeline across the Alaska peninsula. I have been advised that the deadline is March 8, 1971 for admission of written testimony into the record of the hearings your Bureau is now holding on the pipeline issue. I request that this statement be included in that record.

Our Society's interest in the Alaska pipeline proposal is threefold:

(1) As Americans with a particular interest in our natural environment, we are concerned about the status of the total natural environmental resources of all the United States.

(2) As residents of the State of Hawaii, we are concerned about overall Federal policies and actions on natural environmental issues as reflected in specific cases in other States, since we anticipate similar Federal attitudes and actions would be applied on specific issues and cases in our own State.

(3) As a group whose overall objective is the "Better Protection of Wildlife in Hawaii," we are concerned about potential effects of the Alaska pipeline on the Alaska breeding grounds of migratory birds that spend most of the year in Hawaii and that represent a significant segment of the species and numbers of birds that make up the total bird population of these islands.

Regarding points (1) and (2), above, I am sure we could add little to the detailed testimony available to the hearings from the National Audubon Society and from other national conservation organizations that oppose the issuance of a Federal permit for the pipeline in advance of thorough environmental impact studies. Specifically, we endorse the position, philosophy and rationale expressed by the Alaska Coalition in their four-page report, "'Russian Roulette' in the Arctic."

We in Hawaii are especially sensitive to the potential for devastating consequences on the biota of an area when it is disturbed and altered by man without full knowledge of and concern for the biological consequences of his action: In the past two hundred years, out of sixty-nine known endemic Hawaiian bird species, twenty-five are now extinct and twenty-seven or more are considered threatened or endangered -- all as a result of man's actions here. Similar impacts on endemic plants, insects and other life forms are evident also in Hawaii. Hawaii's experience is compelling testimony to the proposition that the trans-Alaska pipeline be considered unacceptably dangerous until proved safe for the natural environment.

Regarding point (3), a significant number of the migratory birds that spend most of their lives in Hawaii are dependent upon specialized habitats in Alaska for their breeding grounds. The potentially massive alteration, disruption and degradation of vast sections of the Alaska wilderness as a direct or indirect consequence of the pipeline project would certainly affect the breeding grounds of migratory birds that live in Hawaii. The result could well be further impoverishment of Hawaii's bird species. Although our immediate concern is with migratory birds that live in Hawaii and breed in Alaska, we would point out that Alaska also serves as the breeding grounds for migratory birds from all over the United States and, in fact, from all over the Western Hemisphere. Thus the potential long-range biological implications of the Alaska pipeline for migratory birds -- and for the ecosystems elsewhere with which they are interdependent -- are broad indeed and, it would seem, deserve close and critical consideration by objective and competent biologists before the project is approved.

I appreciate the opportunity to express our concern on this issue. We shall be following closely all developments on the Alaska pipeline project.

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REPLIES to Alaska Pipeline Proposal:

Representative Patsy T. Mink, 8 March 1971....I share your concern over this matter and greatly appreciate being informed of the Hawaii aspects. You may be sure I will do all I can to oppose the pipeline until the environmental effects are studied to the satisfaction of responsible conservationists.

Senator Hiram L. Fong, 10 March 1971....You have provided valuable information for the hearing record, and I am pleased to be apprised of the particualr views of the Hawaii Audubon Society.

As you probably know, public hearings on this subject have been held in Washington and in Anchorage. Some 400 persons spoke at the hearings, and hundreds of additional

written comments have been received by the Department of the Interior. The complete record of the hearings, with the additional comments, will be studied in detail prior to preparation of a final statement by the Department of the Interior, to be submitted to the President's Council on Environmental Quality.

In remarks at the hearing, the new Secretary of the Interior, Mr. Rogers C.B. Morton, expressed the views that: "We must redouble our efforts toward insuring the maximum compatibility between development and environmental protection. Only in recognizing the magnitude of the challenge, and in the careful awareness of the sensitive balance of our northern ecosystems, can we insure a new and permanent environmental ethic for the Arctic."

Senator Daniel K. Inouye, 10 March 1971....As you are undoubtedly aware, the Secretary of the Interior has withheld issuance of the permit to construct this pipeline pending further investigation of its environmental impact. You may also be interested to learn that a report was transmitted by the Department of Defense to the Department of the Interior concerning the environmental impact of this pipeline. Sections of the Department of Defense report were prepared by the Alaska District of the Corps of Engineers and are most critical of the steps taken to insure protection of the environment. Should the Secretary of the Interior grant a permit to allow construction of the pipeline. The Corps of Engineers report also states that the Corps is unable at this time to assure that such a permit will be issued.

It is clear that additional study is needed on the proposal to construct a pipeline and you may be assured that I shall closely follow developments in this matter....

Assistant Secretary of the Interior Harrison Loesch to Representative Spark Matsunaga, 19 March 1971.

Thank you for your recent letter of March 1, 1971, on behalf of your constituent, Ray Greenfield, regarding the Trans-Alaska pipeline.

A project of this environmental and economic importance requires that the most meticulous development and evaluation be made by many experts, including those in the Federal Government. Careful technical and environmental analysis has been ongoing in the Department of the Interior for nearly two years.

The draft Environmental Statement on the Trans-Alaska pipeline which the Department has released for public review sets forth the exacting stipulations that have been proposed to safeguard the construction and operation of the pipeline system. It evaluates the environmental impact of alternative delivery modes and includes a description of the Federal surveillance teams that are proposed to enforce these stipulations.

The permit for the pipeline has not been granted, nor will it be until the Department has thoroughly considered the comments of Federal agencies which are now reviewing the Environmental Statement, and until the Department has thoroughly considered the transcripts of the public hearings....

News Release, March 10, 1971: MATSUNAGA QUESTIONS INTERIOR ON ALASKA PIPELINE PROPOSAL

Washington, D.C.--In a joint letter to Secretary of the Interior Rogers C.B. Morton, Rep. Spark Matsunaga (D-Hawaii) and more than 35 other members of the House and Senate today urged that plans to construct an oil pipeline across Alaska be given further study before construction of thepipeline is undertaken.

Matsunaga lauded the statement of the Interior Secretary before a Senate appropriations subcommittee in which he acknowledged the lack of adequate consideration given to the grave environmental problems that the pipeline poses to the Alaskan wilderness. The Hawaii lawmaker pointed out that "the Interior Department reportedly has not even considered the possibility of an oil spill resulting from an earthquake or from the collapse of the permafrost in areas where the pipeline will be constructed underground."

In addition, Matsunaga continued, the U.S. Government has an obligation to ensure the full protection of the rights and welfare of the Alaskan natives--both Indians and Eskimos--who will lose their traditional hunting and fishing grounds

if the pipeline is constructed in accordance with present plans.

"We believe the only sensible solution to the pipeline issue is the delay of the pipeline construction until we have the best possible assurance that, first, the damage to the environment will be absolutely minimal and, second, that the rights of the human beings in its path are fully protected," the letter read.

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To Hawaii Audubon Society's Position Paper:

Brigadier General V.A. Armstrong, U.S. Marine Corps, 1st Marine Brigade, FMF, Commanding, 19 February 1971:

...As a matter of interest to you, the Nuupia Ponds at the U.S. Marine Corps Air Station, Kaneohe Bay have already been set aside as wildlife refuges under a cooperative agreement between the State and Federal wildlife agencies and the U.S. Marine Corps for the permanent protection of endangered species of Hawaiian wildlife.

I am writing to acknowledge your letter of 26 January 1971 regarding the Hawaii Audubon Society's position paper on specific wildlife concerns....

Rear Admiral T.B. Hayward, U.S. Navy, Commandant, Fourteenth Naval District, 24 February 1971:

I was pleased to receive your letter of January 26, regarding the preservation of native plants and animals. You can be assured that I share your concern in this matter.

Members of my staff are working closely with both the State Division of Fish and Game and the U.S. Fish and Wildlife Service in the implementation of plans to preserve endangered species of Wildlife where they occur on Navy property.

At the invitation of the State Department of Land and Natural Resources, we will also be represented on the Committee which will prepare the "Forest Conservation Research Plan for the Seventies," which deals with the preservation of both plants and wildlife.

As you can see, the Navy maintains an active interest in conservation matters... I look forward to continued cooperation among all those who share this common interest.

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Following principles proved to be successful and worthwhile to adopt are from the NATIONAL PARKS AND CONSERVATION MAGAZINE, Volume 45, No. 1, January 1971, page 28: CONSERVATION NEWS: New Jersey Community Points the Way

Citizens of Middletown, New Jersey, have not only saved a woodland, brook, and marsh but have also developed the techniques of how to do it and published their story as a guide for others....

The committee leadership, in retrospect, credits its success to a few working principles which might be used elsewhere:

1. Citizens need to become thoroughly informed about the subject.
2. There needs to be an alternate proposal or proposals.
3. Force the agency to reveal the full costs, including the environmental costs.
4. Call upon the aid and advice of experts (but also rely upon local initiative).
5. Never relax because things seem to be going well.
6. If several false charges are made by the opposition, select one that can be clearly shown to be untrue and hit hard upon that, rather than trying to answer all charges.
7. Establish a small executive committee with authority to act on short notice when necessary.

Contributor: Ethel Matheson

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AUDUBON, January 1971, Volume 73, Number 1, page 95: THE AUDUBON VIEW:

The National Audubon Society sets forth the following nine major objectives for our action priorities:

Long-range goals for 1970s:

1. Advocate the stabilization of the human population as basic to the preservation of environmental quality.

2. Work for prevention and abatement of all forms of environmental pollution, including the debasement of the atmosphere, the waters of the Earth, the soil and the landscape.

3. Preserve our vital, productive, and eco-essential estuarine and wetland resources.

4. Change our national transportation policy, shifting the emphasis in public investment and public subsidy from highways to mass transit.

Priorities for 1971:

5. Eliminate the use of DDT, dieldrin, aldrin, endrin, toxaphene, heptachlor, and all other persistent (long-lasting) organochlorine pesticides that pollute the environment, poison food chains, and endanger many species of wildlife.

6. Protect the public land resources of the United States; prepare to turn back expected raids by exploiter groups who will try to gain special advantages from the 1970 report of the Public Land Law Review Commission.

7. Spotlight and resist stream channelization, a destructive engineering fad supported by federal funds that threatens the life and beauty of scores of natural streams in the United States.

8. Seek federal protection for hawks and owls.

9. Seek reform and reduction of the federal program that results in the wideapread, ecologically unsound, and generally unnecessary poisoning and trapping of carnivorous wild animals.

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

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Has anyone seen a Nanday or Black-headed Conure (Nandayus nenday)?

Alert Lance Uchida, sixth grader at Moanalua Elementary School, sent us the following descriptions: Parrot-like bird, color-green, size-12-20 inches, habits-flies in flock and calls in flight and when perched. Usually seen in morning and afternoon, voice-sounds like a person with a froggy voice saying "AWK"very loudly, place seen-flying back and forth from a large tree in the back of our playground.

President Kaigler has identified the bird as Black-headed Conure.

7:10 a.m., 26 April 1971, three black-headed conure feeding on the African tulip blossoms at Fort Shafter Buckner (H-1 Freeway) Gate, steps leading to the parking area.

5:00 p.m., 19 May 1971, four black-headed conure flew across the parking lot headed toward Moanalua Park.

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BIRDS OF THE WORLD by Oliver L. Austin page 147: ...Among the less familiar group of New World parrots are the conures, which are smaller and more slender-bodied than the amazons and have longer, pointed tails. Most striking of this group is the Golden Conure of Brazil. Also classified here is the only parrot native to the United States, the recently extinct Carolina Parakeet, a pretty little parrot about 12 inches long with a yellowish green body, a long pointed tail, and an orange-yellow head...

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Lance was concerned and took action. MAHALO NUI LOA! Now, who'll take the ball and find out about its origin, habitat, food, range, nesting, who and how introduced here, and present status. If you have any information, please write to Kojima, 725-A 8th Avenue, Honolulu, Hawaii 96816.

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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.

Field Notes from Hilde Kaigler: Fairy Terns

9 March 1971: The fairy terns have returned to Ft. DeRussy. At least one pair has and apparently nesting in the same tree, same branch, same spot as the pair (same pair?) that successfully hatched the chick reported last year (Sept. through Dec.).

9 March, noon: Tern sitting on same branch and same spot as last year.
6:40 p.m.: Two terns together on same branch - moving about - could not see if either was banded.
10 March, 4:00 p.m.: Tern sitting - on egg?
12 March, noon: "
13 March, 2:30-3:30 p.m.: "
15 March, 7:00 p.m. "
19 March, noon & 6 p.m.: "

During this time no other terns were observed flying about - although not much time was spent in the beach area. Last year's nesting place in Kapiolani Park was checked, but no tern was seen.

On 28 March at 12:30 p.m. the tern left the limb and flew out to sea, returning in 1 hour and 10 minutes. The top half of the egg could be plainly seen. Each day thereafter the tern was sitting on the egg until 6 April. On this date there was tree trimming activity in the vicinity. The tree was checked at 1 and 5 p.m., but the tern was not on the egg; however, it was again sitting on the egg on the following days. On 14 April the tern was moving about on the branch and pieces of eggshell were found on the ground beneath the limb.

Helen Stoody reported that she had seen the broken egg on the previous day.

Charles Kaigler saw the tern on the limb in the afternoon on 16 April with two other terns nearby in the same tree. All three flew off together after some 20-minutes observation, but one returned to the nesting limb after an absence of 5 minutes. Perhaps we can yet hope for another try. Two were sitting on the branch on the evening of 19 April.

From Charles & Hilde Kaigler: Osprey

17 March 1971, noon, low tide. An osprey was observed for some 20 minutes soaring, hovering and fishing in the shallows off Ft. Kamehameha. Observation was through a 30 power scope at from 75 to 300 yards. The observed feet-first dive was at about 125 yards. Blackish-brown above, clear white below. White head with broad black patch through cheeks clearly seen. Black carpal patches on whitish undersides of wings, which were crooked at "wrist."

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Field Trip to Kahuku, 14 March 1971 by William P. Mull

The Hawaii Audubon Society monthly field trip on March 14, 1971 was to Kahuku. The group met at 8:00 A.M. on Punchbowl Street, next to the main library in Honolulu, and drove 40 miles to Kahuku, stopping en route briefly to look over the marshy area opposite the Wigwam store in Kailua. Weather on the windward side of Oahu was fair, 75-80 degrees, with ½ cloud cover and 15 m.p.h. trade winds from the northeast. The Kailua stop produced only eleven cattle egrets, one black-crowned night heron, four golden plovers (one in breeding plumage), one spotted dove, two barred doves, one American cardinal, eighteen mynahs and six house sparrows.

We arrived at Kii Pond, behind the sugar mill at Kahuku, shortly after 10:00 A.M. and spent two hours observing the birds in the pond area. Following are the results: 25 cattle egrets, 12 black-crowned night herons (half immatures), 13 pintails (7 males, 6 females), one female scaup (species undetermined), 70 coots, 6 gallinules (in ((breeding?)) pairs), 8 black-necked stilts, 33 golden plovers (3 in breeding plumage), 3 dowitchers (species undetermined), one wandering tattler, one dunlin, 63 ruddy turnstones, 10 sanderlings, 4 spotted doves, 3 barred doves, one ring-necked pheasant, 25+ mynahs, 10+ house sparrows and 50+ ricebirds. The water level at Kii Pond was moderately low, with the pond area divided about half and half between water and mudflat.

Field Trip to Ulupau Head, 18 April 1971 by Charles G. Kaigler:

The weather favored our annual field trip to the red-footed booby colony on Ulupau Head within the Kaneohe Marine Corps Air Station and the 30 members and guests thoroughly enjoyed the day. We counted an even 50 golden plovers between the main gate and our first stop to overlook Moku Manu and added at least an equal number during the day. Almost all were in full breeding plumage - a beautiful bird. The red-footed booby colony must now consist of well over 600 birds on Ulupau Head and an even greater number on Moku Manu offshore. Moku Manu is also the nesting area for extremely large numbers of sooty terns and common noddies as well as much smaller number of brown boobies. We saw all of these on Moku Manu as well as a constant overflight of soaring great frigatebirds, but our prize for the day was a Laysan albatross over the islets. We also could count one red-tailed tropicbird. The red-footed boobies on Ulupau Head are nesting now, but there are no chicks yet - at least none that we could observe. Doves (both), cardinals (both), white-eyes, ricebirds and mynahs and house sparrows were also much in evidence.

After several hours at the colony the group went to the eastern Nuupia ponds where we found a total of 9 Hawaiian or white-capped noddies feeding in the shallows. We also counted 8 stilt, 4 ruddy turnstones, 3 black-crowned night herons and one wandering tattler. The western ponds added another tattler, 2 turnstones, 8 stilt, 8 herons, and another 5 Hawaiian noddies.

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ALOHA to new members:

Mrs. Louis W. Aiden, Star Route, Kaunakakai, Molokai 96748
Mrs. William L. Cromley, 641-B 10th Avenue, Honolulu, Hawaii 96816
W. W. Robinson, 500 Hakaka Place, Honolulu, Hawaii 96816
Helen M. Stoody, 441 Lewers Street, #605, Honolulu, Hawaii 96815
Alan S. Tyler, RR 1, Box 125, Captain Cook, Hawaii 96704
Wilfred W. Weddendorf, 224 N. Ridgewood Place, Los Angeles, Calif. 90004

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The annual index will be mailed to the members only upon request, so if you are interested in receiving a copy, please send in your reservation before July to Kojima, 725-A 8th Avenue, Honolulu, Hawaii 96816.

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JUNE ACTIVITIES:

13 June - Field trip to St. Louis Heights trail to study forest birds. Bring lunch, water, and if possible, your car. Transportation cost (50¢) to be paid to the drivers. Meet at the State Library on Punchbowl Street at 8:00 a.m.
Leader: William P. Mull, 988-6798.

14 June - Board meeting at McCully-Moiliili Library, 7:00 p.m. Members welcome.

21 June - General meeting at the Waikiki Aquarium Auditorium at 7:30 p.m.
Speaker: Gene Renard, State Park Planner
Topic: Preservation Policy of the State Park System (color slides)

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HAWAII AUDUBON SOCIETY EXECUTIVE BOARD:
President-LtCol Charles G.Kaigler, Vice-Pres.-William P.Mull & David Woodside
Secretary-Mrs. William P.Mull, Treasurer-William W. Prange, Jr.
Board Members-Miss Margaret Titcomb & Miss Christine Jones
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MAILING ADDRESS: P.O. Box 5032, Honolulu, Hawaii 96814

DUES: Regular-$3.00 per annum, Regular out of State-$2.00 per annum, Junior (18 years and under)-$1.00 per annum, Organization-$2.00 per annum, Life-$50.00