

# THE ELEPAIO

Journal of the  
Hawaii Audubon Society



For the Better Protection  
of Wildlife in Hawaii

VOLUME 33, NUMBER 9

MARCH 1973

## A COMPARISON OF DIFFERENT NESTING LOCATIONS OF THE CHINESE THRUSH IN HAWAII By Charles van Riper, III

Little is known about the nesting of the Chinese Thrush (Garrulax canorus) in Hawaii. Berger (1972) lists the height of four nests C. Robert Eddinger found on Kauai as ranging from three feet two inches to 12.25 feet. The only other published nesting record I can find is that of Tongg (1966), who tells of a Thrush that started, but never completed, a nest in a pair of brogues he had placed on an outdoor rack on Kauai.

I have found twelve Chinese Thrush nests on Kauai and Hawaii. Three of these nests were built directly on the ground. The remainder ranged in height from three feet to 15 feet three inches above the ground. The physical appearance of the ground nests as compared to those found higher in the trees was striking. The material used in the construction of the nests also was different.

The three ground nests were built in tall grass. They had a 'pie-pan' appearance with the bases composed of large leaves and the bowl of interwoven grasses. Table 1 shows that the nests had a fairly large diameter and were not very tall.

Five of the nests were located at heights ranging from seven feet to 15 feet three inches. The construction pattern of these nests was different from those found on the ground. The entire nest was composed of coarse grasses interwoven to form a high bowl with compact sides. The overall appearance was quite similar to many of the Cardinal (Richmondia cardinalis) nests I have found in the same areas on Hawaii. Table 1 shows that the average total height of tree nests is double that of ground nests and that the average width is two inches smaller.

The nests constructed at intermediate heights from the ground (three to six feet) had characteristics common to both the elevated and ground nests. The construction remained similar to those found on the ground, in that the base was still composed of large leaves, but the total height and bowl depth increased.

Clutch size in Hawaii appears to be either three or four eggs. One nest had three nestlings on 2 May 1971. On the previous day I had found a nest with one dead and three live nestlings. Both of these nests were found in the lower Kawaikoi Stream region on Kauai.

On 2 June 1972, in the Kohala Mountains on Hawaii, I found a ground nest that contained three eggs. Another ground nest from the Puu Laau region on Mauna Kea, Hawaii, contained three nestlings on 15 June 1972. On 12 July 1972, Richard L. Warner found an old nest that contained one egg which had failed to hatch; the nest was located in a mamane (Sophora chrysophylla) fork 15 feet from the ground. A nest six feet from the ground in a mamane fork contained one egg on 1 May 1972, three eggs on 4 May 1972, and the eggs were missing on 7 June 1972.



Table 1

A Comparison of Mean Nest Measurements between Ground and Elevated Nests  
of the Chinese Thrush (Garrulax canorus) \*

	N = 3			N = 5		
	Ground Nests			Tree Nests		
Total Nest Height .....	2.30±	.8	.....	4.50±	.6	
Total Nest Width .....	7.25±	.4	.....	5.00±	.7	
Bowl Width .....	4.60±	.8	.....	3.25±	.7	
Bowl Depth .....	1.08±	.4	.....	1.75±	.3	
Rim Thickness .....	1.04±	.4	.....	.80±	.2	

\* Measurements given in inches with one standard deviation from the mean.

Literature Cited

- Berger, Andrew J. 1972. Hawaiian Birdlife. University Press of Hawaii.  
Tongg, Richard C. 1966. Shoes for nests? Elepaio, 27:37.

\*\*\*\*\*

NOTES ON NESTS AND BEHAVIOR OF THE HAWAIIAN CROW \*

By P. Quentin Tomich  
First of Three Installments

Among the scanty writings on the Hawaiian crow (Corvus tropicus Gmelin), there is no detailed record of its nest and eggs or of its habits associated with the breeding cycle. Berger (in press) lists and reviews the literature and reports that the current total population of this species may be as small as 25 birds. This present paper describes the final example of use by crows of a traditional nesting ground on the lower northeast flank of the Hualalai volcano, Hawaii County, Hawaii, in 1964. A nest discovered under construction on March 26 was observed at intervals of 6 to 9 days, through April 26, when it failed; a single infertile egg remained from the original clutch of five and the crows were then in the process of abandoning the nest.

Description of Habitat

The nest area is a xerophilous native forest (annual rainfall about 60 cm) at an elevation of 730 m, about 0.8 km above the Mamalahoa Highway, in the Puuanahulu Game Management Area. The exact location is 3.1 km east, 6.0 km north of Puuwaawaa, a prominent cinder cone of the region. The substrate here is the undated Kaniku flow of rough 'a'a lava containing uncovered pockets (kipuka) of an earlier pahoe-hoe flow. These flows all spread in a northwesterly direction from distant flank eruptions of Mauna Loa. Hualalai is a relatively old mountain that was last active in 1801; now it is apparently dormant.

'Ohi'a (Metrosideros polymorpha) and lama (Diospyros ferrea) are the dominant trees of the area and form a relatively continuous forest on the pattern of older 'a'a flows. Mature trees are generally 5 to 12 m tall. The 'ohi'a is often as tall as 12 m, tends to have a spreading canopy, and the trunk may be made up of one or several stems. Lama reaches heights of 4 to 6 m and is usually dense and bushy. Both species appear to be slow-growing but well adapted to the site. One obvious characteristic of both trees is brittleness of the wood. Branches as large as 7 cm can be readily snapped off and are, therefore, undependable for rests in climbing.

A third prominent plant is fountain grass (Pennisetum setaceum), an aggressive African tussock grass that is dominant in the forest understory. It provides abundant ground fuel and, hence, promotes its own increase through fires that destroy other species. The ancient pahoe-hoe kipuka are now covered solidly with fountain grass and support few trees, apparently because of fires that have raged over the land since the accidental introduction of fountain grass about 1920. This grass is less able to invade the rough 'a'a, where there is little soil, but may still be scattered over about half the surface of the 'a'a. Fires in September 1960, before my observations, and in August 1969, both seriously reduced the acreage of endemic forest available to the crows by killing segments sufficiently undergrown by the grass.

pp.465-

\*By special permission reprinted from PACIFIC SCIENCE, Vol. XXV, No.4, Oct.1971, 474.



### Observation

Crows were reported along the highway adjacent to the nesting area by several observers as recently as the early 1960s. Dr. Glenn E. Haas, who suspected that nests might be found in the area, urged that we search for one. Neither of us had actually seen the crows, nor were there recent reports of them on March 26, 1964, when the search began. Working in from the highway through the 'ohi'a-lama forest at 8:20 A.M., we came within 20 minutes upon two crows moving about and foraging among the trees and, at times, on the ground, in one of the small kipuka that contained a few trees. We watched the birds for a time, but they retreated ahead in mild alarm when approached within 35 meters. Unhurriedly following the direction of their travel up the lava flow and listening for their occasional calls, we found the birds again at 9:44 A.M., engaged in construction of the nest designated in this paper as nest no. 2. Data gathered during the sporadic study of this nest, and in subsequent observations, are reported in the following pages by topic rather than in a strictly narrative account. I was accompanied on each trip to the nesting area by one or two other persons who acted as observers, but all information gathered was entered in my own field notebook.

#### Summary of the History of Nest No. 2

- March 26--nest under construction; large sticks and twigs carried.
- April 4--nest essentially complete but birds still lining it.
- 12--four eggs yolk-stained from a fifth broken egg; birds incubating.
- 18--incubation continuing; nest activity watched for 5 hours.
- 26--birds incubating, but restless; single remaining egg inviable.

#### Nests and Nest Sites

The nest area, as defined by a belt of rather continuous forest in which five nests were found, was about 1 km long, extending in a northeasterly to southwesterly direction between the broad expanse of the 1960 burn and the 1859 lava flow, from an elevation of 720 to 740 m. Four of the five nests were old ones from previous years. All were in 'ohi'a trees, and were generally built where the largest trees occurred in clusters with adjacent glades. They were constructed of coarse sticks, and the linings that remained were of stems and blades of grasses, a few small twigs, and some lengths of slender vines. Nests were placed in forks near the tops of trees, supported each by two to four branches that divided repeatedly to form the leafy canopies of the trees. Elevation above the ground ranged from 6.5 to 10.6 m.

Nest no. 1 was discovered on March 26, 1964, as the crows were followed from the point of original sighting toward the active nest no. 2. The site was about 275 m west of nest no. 2 and the adjacent nest no. 3, near an arm of the 1960 burn. This nest was starkly visible in the crown of a fire-killed 'ohi'a, supported in the fork of a limb 8 cm in diameter, 7 m from the ground, and 1.2 m from the top of the tree. Except for the loss of leaves and bark, the tree had deteriorated little in the warm, dry climate. The nest was in good condition, but weathered gray like the skeleton of the tree. It may have been in use at the time of the 1960 fire, or shortly before. Width was 50 cm, depth 20 cm, and the twigs were generally not greater in thickness than 6 to 10 mm. The nest lining was deteriorated, leaving a bare cup 20 cm wide and 9 cm deep. From below, light could be seen through the remaining structure of loose sticks.

Nest no. 2 was 8.2 m above the surface and about 1.5 m from the top of a tree whose single sloping trunk was about 45 cm in diameter. The nest was supported by three branches and a large twig of a limb 7 cm thick, measuring, respectively, 5.7, 5.0, 5.0, and 2.2 cm in diameter. Many leafy proliferations of these branches formed a segment of the dense upper canopy above the nest. Width of the nest was 45 to 48 cm with some twig ends projecting beyond this general periphery. The nest cup was 19 to 20 cm across, leaving a platformlike rim about 12 cm around it. Total depth was 24 cm and the lined cup was 7 cm deep. The lining was of stems and blades of fountain grass interwoven with the flexible strands of huehue (*Cocculus ferrandianus*), particularly about the periphery. The lining formed a separate unit easily removed from the supporting framework. About a third of the total bulk of the nest was dissected in detail after the birds had abandoned it; the entire lining was preserved. There were 57 twigs of 'ohi'a, 20 of lama, and eight strands of huehue in the segment of the framework studied. Of the 77 sticks (both species combined), 61, or nearly 80 percent, were branched; the remaining 16 were unbranched. Lengths ranged from 13 to 57 cm, and the mean was  $31.9 \pm 2.22$  cm (2 SE).



Diameters ranged from 2.5 to 11.8 mm and the mean was  $6.6 \pm 0.37$  mm. The eight strands of huehue were highly variable in length, ranging from 20 to 150 cm, with a mean of  $79.3 \pm 41.34$  cm. Diameters were uniform, ranging from 1.5 to 2.3 mm with a mean of  $1.9 \pm 0.64$  mm. Arthropods, but not including fleas, were extracted from this nest and its lining (Tomich, 1967).

Nest no. 3 was located in a tree whose crown adjoined that which supported nest no. 2, and was about 4 m from this nest. Nest no. 3 was 10.6 m above ground, slightly higher than nest no. 2, but supported in a similar fashion at the branching of a stout limb, 1.5 m under the leafy canopy of the tree. Apparently this nest had been constructed and used 1 or 2 years before 1964. Its lining was almost all gone, but the substantial frame of the nest remained.

Nest no. 4 was a remnant old nest found on April 4, 1964, about 60 m south of nest no. 1. Height above ground was approximately 6 m. No detailed description was made of the nest or its site.

Nest no. 5 was discovered on January 30, 1965, in the upper branches of another 'ohi'a killed by the 1960 burn. This site was about 60 m west of nest no. 1 and some 350 m west of nest nos. 2 and 3. It was more in the open than the others, about 30 m from the denser tree clusters, beside a grassy kipuka near the western edge of the nest area. The nest was supported by three branches diverging from a limb below the twiggy canopy of the tree, 6.5 m above the ground.

#### Nest Construction

Construction of nest no. 2 was well advanced when it was discovered on March 26. Both members of the pair were active in carrying twigs and in adding them to the nest platform. Nest-building was a desultory affair, frequently interrupted by foraging expeditions, resting, and other diversions. It is likely, as in other corvids, that Corvus tropicus builds its nest over a protracted period of several weeks rather than in just a few days. Indeed, the 1964 pair was off foraging some 600 m from the nest when first encountered, but, when again in view about an hour later in the vicinity of the nest, they were probably in the general process of building. At 10:04 A.M., as we identified the nest tree, a bird flew toward us and into the crown of an 'ohi'a only about 10 m from the nest. The second bird came to a nearby snag and then flew to the top of the same 'ohi'a tree.

The lower bird plucked a dead, branching twig about 30 cm long and hopped out of sight into the dense foliage. The second crow flew off and the first one reappeared without its twig, picked a smaller one, dropped it, and flew off after its mate. Obviously, the birds had been disturbed by our presence but we now settled down some 20 m away from the nest tree and waited. The crows were heard calling occasionally from a distance of about 60 m, off among the trees.

After 27 minutes one bird came directly to the nest tree, and was followed immediately by the other. Each bird carried a twig and lit among the branches below the nest. One fluttered and climbed to the nest platform, followed by the other, and both worked their twigs into the nest structure. As one continued to work after 7 minutes, the other flew to the adjacent 'ohi'a and lit 2 m below the old nest no. 3. From there it took a perch directly beneath this nest and tugged at a stick. When the stick did not come free the crow worked its way up beside the nest, was able to wrestle a different twig from the rim, carry it in flight to the new nest, and work it into the nest structure. Meanwhile its mate had stopped working and had flown to the old nest but did not attempt to dislodge a twig. After a period of about 2 minutes of rest and preening beneath the new nest, both birds flew off silently, low among the trees, at 10:47 A.M. The work session had extended for 16 minutes.

The birds were away from the nest for 13 minutes before they returned and soon continued work. Apparently they had been foraging, because one bird carried food which it ate or dropped, out of our sight. At 11:02 one bird flew to the nest with a twig, and the other seemed to be plucking one from the adjacent tree. In our observations the birds plucked clean, dead twigs and sticks from the trees and did not take any material from the ground surface. After 4 minutes, this bird also flew to the nest tree, made four leisurely hops from limb to limb, and finally climbed to the nest taking about a minute. Both birds then worked at the nest, but at 11:08 one flew to a nearby perch and looked about. Then it flew to the crown of a lama 12 m away,



plucked a leafy cluster, and returned to the nest. At 11:11 one bird flew off as the other continued to arrange nest materials, but when the nest bird was called by its mate after 3 minutes, it also flew off. After 6 minutes one crow returned with a twig, but the other remained perhaps 60 m away. Occasional calls were exchanged as one bird worked at the nest for about 3 minutes; then it left to join its mate. At 11:25, after an absence of 2 minutes, a crow arrived at the nest with a twig, again hopping from limb to limb from below to reach the nest rim. It soon left the nest in response to calls from its mate, and the birds apparently left the area or were quietly at rest. This session of building with only one bird, perhaps the same one, at the nest lasted 16 minutes. The entire second session, from 11:02, extended for 23 minutes. When there was no further sign of the birds after 20 minutes, we quietly left the area without attracting their attention.

On April 4, with one observer, I searched the region in and about the nest area for nearly 3 hours, but found no signs of crows other than the remnant nest no. 4. At 11:00 A.M. we went near nest no. 2 and settled in a makeshift blind at the base of an 'ohi'a approximately 18 m from the nest tree. At 11:30 the crows arrived in file, passed low among the trees with an audible rush of wings about 5 m from our blind, and proceeded directly to the nest tree. The first bird carried a small object in its bill (presumably lining for the nest) and immediately mounted to the nest rim. The other bird perched first about 2 m below the nest; it then hopped and flew up to join its mate. One bird was in the nest forming the lining and the other remained on the rim. After 3 minutes the birds rested for about 2 minutes in their respective positions. Then one flew off to a lama about 10 m away, followed by the second bird. Here they perched, facing one another, on horizontal branches about 2 m above the ground and quietly preened themselves and one another. This action was leisurely. Presently one bird moved to join its mate on the same perch. Here they sat side by side and the grooming continued. The rest period ended at 11:49 A.M., after 14 minutes, when one bird roused and hopped into a dense portion of the tree, out of sight. After 2 minutes it flapped against the foliage of the tree in launching and flew to the nest. The second bird followed the same route, carrying a piece of soft nest material, such as a curled blade of grass. One bird worked in the nest and the other was on the rim, but we could not discern details of their activity. After 7 minutes both birds were quiet, then both were on the nest rim, one walking about. At 12:02 P.M., after 12 minutes at the nest, one bird swooped away and disappeared. The second bird continued to rest for another 10 minutes, then it walked up a branch from the nest, spread its tail, stretched, and flew off after its mate.

When an observer began to climb to the nest at 12:15 the birds returned, one clutching a curled, dry grass blade which it immediately dropped from a perch 4 m from the nest; the other, responding to the alarm calls of its mate, carried nothing. The nest lining appeared to be ready for reception of the eggs even though the birds were still adding materials to it. Included were both green and dry items. It was especially obvious that some unbleached blades of grasses had been incorporated. We soon retired from the area in order to minimize disturbance to the birds.

To be continued

\*\*\*\*\*

Syngamus trachea: A First Report in Hawaii  
By H. Eddie Smith

"Except for psittacine and gallinaceous birds from foreign countries, pet store birds are not subjected to any quarantine regulations at all. More than 20 species of cage birds (primarily weaverfinches) have been released accidentally or intentionally in the Honolulu area since 1965" (Berger, 1972, WILSON BULLETIN, 84: 212-222). In an effort to increase our knowledge of the cause and effect of parasitism of Hawaii's avifauna due to these introductions of pet store birds, I have undertaken a project which includes a parasite analysis of birds on the western slopes of Diamond Head crater.

During routine procedures I found the gapeworm (Syngamus trachea) in a juvenile Red-crested Cardinal (Paroaria coronata). I first detected the gapeworm ova in a fecal smear; an autopsy revealed a male and female nematode in the upper half of the cardinal's trachea.

I have not found in the literature any reports of incidence of the gapeworm in



Hawaii. Petrak (1969. DISEASES OF CAGE AND AVIARY BIRDS, pages 410-411) wrote that "in severe cases, birds refuse to eat, lose condition, and die as the result of starvation and anemia caused by the blood-sucking habits of the parasites. ...Geneally speaking, treatment is unsatisfactory, especially in small birds." This program is still in progress and is being funded by NSF grant GB-23230 to Dr. Andrew J. Berger, Department of Zoology, University of Hawaii.

\*\*\*\*\*

#### BIRDING IN SAMOA

By Charles G. Kaigler

Birding in Samoa can be extremely rewarding and at the same time quite frustrating. Recently my wife and I spent a week (February 1-8, 1972) in Eastern and Western Samoa looking for birds and whatever else we could find. We totaled 35 species and 21 were new to us. In all we found the Samoan islands hot, comparatively expensive, frustrating, entertaining and interesting. We had wonderful weather, but for the week preceding our arrival it had poured rain all day every day. Our only references were Ernst Mayr's BIRDS OF THE SOUTHWEST PACIFIC (1945) and Myrtle Ashmole's GUIDE TO THE BIRDS OF SAMOA (1963) prepared for the Pacific Scientific Information Center of the Bishop Museum. Our only contact was Jeff Teall of the Educational Television Station in Pago Pago. He was quite helpful in aiding us in finding the birds of American Samoa, but in Western Samoa we were entirely on our own.

The first problem was accommodations. There are not many choices and they are in demand. The Intercontinental in Pago Pago was full, but we did get in the Malaeimi near the airport. This was actually a break, as we found almost all of the birds of the American Samoan island of Tutuila within two miles of the motel, some from the motel garden itself. Our first new bird was the olive-green Wattled Honey-eater (Foulehaio carunculata), a noisy and pugnacious bird with the typical curved bill and with yellow patches on either side of the head. Our second was the small (5 inches) Cardinal Honey-eater (Myzomela cardanilis) scarlet and black and fully as spectacular as our 'I'iwi. Fairy Terns (Gygis alba), White-tailed Tropicbirds (Phaethon lepturus), and Common Noddys (Anous stolidus) were almost always in sight overhead as were the White-rumped Swiftlets (Collocalia spodiopygia). The Samoan Starling (Aplonis atrifusca) is also quite common. Interesting to us was the ease with which one finds the Banded Rail (Rallus philippensis). In contrast to our experience elsewhere, here it is impossible not to see them darting across the roads. The Purple Swamphen (Porphyrio porphyrio samoensis) similar to our gallinule, is not so common, but is not difficult to find near the lagoon next to the airport. Neither is the Reef Heron (Demigretta sacra), at least on the island of Tutuila. A walk on a trail next to the motel which leads to a mountain waterfall produced the Barn Owl (Tyto alba lulu), the White-collared Kingfisher (Halcyon chloris), the Pacific Pigeon (Ducula pacifica), the Crimson-crowned Fruit Dove (Ptilinopus porphyraceus) and the introduced Red-vented Bulbul (Pycnonotus cafer) which is quite common now both in Eastern and Western Samoa. We also saw the Pacific Golden Plover (Pluvialis dominica), the Wandering Tattler (Heteroscelus incanus), and the Ruddy Turnstone (Arenaria interpres) along the shoreline.

Transportation was somewhat of another frustration. All rental cars were taken so we got about by foot, by imposing on Jeff Teall's good nature, by taxi and by flagging local busses which are cheap, unreliable and most fun. The Samoan open way of life is extremely interesting to observe, the people themselves seem generally friendly, open and helpful, but the information one receives on any particular subject, and particularly information that involves schedules of any kind, is in my limited experience, incorrect in some degree at least four times out of five. This naturally means either lots of waiting around or being in the right place at the wrong time and vice versa and lots of missed connections. But it all works out one way or another if you check and recheck often enough.

One of the most interesting trips, as well as the best bargain in American Samoa, is the one-day round trip on the government boat that supplies the villages of Tutuila that are not reachable by road. For only \$2.00 each, it was a fascinating experience. The boat pulls into the village lagoon, blows its whistle and the small boats and outriggers come out to take any cargo ashore as well as any passengers. They also bring out anything to be delivered to Pago Pago, usually produce. A small outrigger



that seems barely big enough to carry the boatman heading toward shore through the surf loaded with a cargo consisting of a crate as large as the kitchen stove is something to see. The trip also affords observation of a number of sea birds, primarily terns. In addition to Fairy Terns and Common Noddies, we saw the Blue-gray Noddy (Procelsterna cerulea), the Great Frigatebird (Fregata minor), the Red-footed Booby (Sula sula) and a great number of Brown Boobies (Sula leucogaster).

We wanted to take one of the small ships from American to Western Samoa, an eight hour trip, in order to try for shearwaters, storm petrels and other terns, but it didn't arrive when it was supposed to so we flew via Polynesian Airlines rather than struggle to find a room again that night.

The island of Upolu is several times larger than Tutuila and there are over twice as many resident land birds to look for. Naturally a number are found on both islands. We repeated on the Golden Plover, Wandering Tattler, Fairy Tern, Common Noddy, White-tailed Tropicbird, Reef Heron (although Ashmole does not list this species for Upolu), Banded Rail, Crimson-crowned Fruit Dove, Pacific Pigeon, White-rumped Swiftlet, Wattled Honeyeater, Cardinal Honeyeater, Samoan Starling, and Red-vented Bulbul. The most conspicuous new bird was the Polynesian Triller (Lalage maculosa) a medium sized cuckoo shrike, black above and white below with a white eye stripe. The most colorful was the Blue-crowned Lory (Vini australis), a small, brilliant green lory with red cheeks, throat and belly and a blue crown. We found them feeding in the tops of coconut trees. Almost equally colorful and even more appealing was the Scarlet Robin (Petroica multi-color), a small, sooty black flycatcher, white forehead and wingpatch and scarlet underparts and with a beautiful short song.

The Tiavi Falls on the main road across the island was the one most productive area for us. A side road to a dam on the same highway and the Fagaloa Bay lookout road were also good. Many of the birds are found only in the high forest, but at least here we were able to rent a car. We also found the large, black White-throated Pigeon (Columba vitiensis), the black, yellow-billed Island Thrush (Turdus poliocephalus samoensis), the entrancing Samoan Fantail (Rhipidura nebulosa), the Samoan Whistler (Pachycephala flavifrons) with golden yellow breast and belly, the small Polynesian Starling (Aplonis tabuensis), the small Flat-billed Kingfisher (Halcyon recurvirostris), the Many-colored Fruit Dove (Ptilinopus perousii), the Samoan Triller (Lalage sharpei) and, finally, the Samoan Broadbill (Myiagra albiventris).

In all we found nine of the eighteen sea and shore birds that Ashmole lists plus the Common Noddy; twelve of seventeen land bird species listed for Tutuila plus the Red-vented Bulbul (we did get two of those we missed there in Upolu); and twenty-three of twenty-nine species listed for Upolu plus the Reef Heron. We were unable to find the Grey Duck (Anas superciliosa) although we talked to Samoan boys who said that they had seen them on Upolu (Teall has never found them on Tutuila), the shy White-browed Rail (Poliolimnas cinereus), the Samoan Ground Dove (Gallicolumba starii), the Samoan Tooth-billed Pigeon (Didunculus strigirostris) which, if not extinct, certainly must be in an endangered status, the Mao (Gymnomyza samoensis) a large and rare honeyeater (Teall thinks the species is extinct on Tutuila) or the Red-headed Parrot-finch (Erythrura cyanovirens). Except for the Grey Duck, all are birds of the high forest and all are listed for the island of Savaii as well as for Upolu. Savaii is even larger than Upolu and less developed. There is a ferry connection, but no accommodation at all, so we didn't try it on this trip, but I would like to on our next excursion. Savaii is the only island reportedly inhabited by the Samoan White-eye (Zosterops samoensis). Two more species are reported possibly in American Samoa in the Manua islands where Margaret Head lived and studied for her book COMING OF AGE IN SAMOA (1928). These are the Fiji Shrikebill (Clytorhynchus vitiensis) and the Sooty Rail (Porzana tabuensis). There is a government ship that makes the trip periodically, and we do understand that one can fly. The local chief can possibly provide accommodation. That, too, is for our next trip, and despite our occasional frustrations there will probably be a next trip. The snorkeling is absolutely fantastic; the Samoan villages, too. One must get away from Apia or Pago Pago and see something of the countryside, and it is spectacular. In Western Samoa the best birding and the best beaches are away from Apia. In Apia itself I would really recommend only Aggie Grey's Hotel. You can put up with the Apian Way if you have to, but you probably won't like the Casino (cheaper,



but soon to be torn down). If Aggie puts on a fia fia (Samoan luau), and she will if a cruise ship is in, do attend. It outdoes any luau you have seen in Hawaii and the Samoan entertainment is authentic and good. Do listen to the choir at a church service. You probably won't recognize any of the music, but the singing is magnificent. And see a woman's cricket match. You never saw such enthusiasm or so many people having fun at what I have always, and probably mistakenly, considered a rather slow and sedate game.

Western Samoa is not rushing into modernity. Even Avis isn't trying harder. Nevertheless any enthusiastic birder should enjoy the experience. Most of it anyway.

\*\*\*\*\*

#### SOME FIELD NOTES FROM MOLOKAI

By Noah Pekelo, Jr.

The wild cattle eradication program recently conducted by the State Department of Agriculture for the purpose of wiping out the known reservoirs of bovine tuberculosis ended on December 1, 1972. The area covered by the hunt extended from the east fork of Kawela gulch eastward to Waiialua valley, from the forest reserve line on the south slope to the rim of Pelekunu and Wailau valleys.

In general, the eradication hunt designated as "Operation Hui", consisted of an operations base called "Base Command" and four hunting teams. A Hawaii National Guard and 25th Infantry Division helicopter were used for reconnaissance and transportation. The actual hunt was conducted as follows:

- A. At daylight a helicopter reconnaissance was conducted of the hunting area, plotting the location of cattle sighted on a map; on board the aircraft were Fish and Game, Forestry and Agriculture personnel from Molokai to verify the locations.
- B. After the reconnaissance the helicopter would return to Base Command and pick up the hunting teams; the hunters were lifted to the mountain and deployed in clearings or on ridge tops downslope of the cattle. At times because of the terrain hunters had to hike as much as a mile to reach the cattle. Each team had a handie talkie radio and was in constant contact with the helicopter, base and other teams.
- C. After shooting the cattle, the State veterinarian in charge of a hunting team would perform autopsies on the downed animals checking for signs of disease. Animals that were not suspect were then placed in a cargo net dropped by the helicopter and the load hooked up to a sling attached to the aircraft; the carcass was then transported to base and put on a truck for hauling to the slaughterhouse.

Although an active participant in the hunt, as time permitted I observed and recorded conditions in the forest from Mapulehu valley to the flats at Kaimumano which in my opinion is of significant importance. Because of the deterioration of fences along the designated Forest Reserve line, for many years cattle have had unrestricted vertical movement along the ridges into the rain forest. The presence of unlimited food and water along with the inability of owners to capture the animals allowed the stray cattle to reproduce into a herd numbering about 375 wild individuals.

The uncontrolled grazing of cattle in the forest has left most of the flat land once covered with native rain forest devoid of native trees and shrubs. Only the twisted dead stumps of trees and tree ferns remain standing. The open ground is covered with a mat of introduced grasses--Setaria verticillata /bristly foxtail, mau'u-pilipili/, Digitaria spp., Melinis minutiflora /molasses grass/, with an occasional clump of native Eragrostis sp. The only other plants growing in these areas are the pestiferous Psidium guajava, Lantana camara, Stachytarpheta cayennensis, Eupatorium riparium /joe-pye weed/ and Schinus terebinthifolius /Christmas-berry tree/. Along the lee sides of ridge tops and in shallow gullies one finds large patches of eroded bare ground, these are the areas where cattle constantly bed down protected from the prevailing weather. Other significant types of damage caused by cattle included deep trail ruts, trampling of vegetation, feeding on vegetation and pawing large depressions in the ground while in the process of throwing dirt to chase flies off of their hides.

Only in the steep gullies inaccessible to cattle one finds large stands of native



vegetation, although these plants have not been overrun or disturbed by cattle, the Christmas berry is taking hold. Plants identified in these areas are listed in the order that they were enumerated from my notes: Sphenopteris chusana /lace fern, pala'a/, Sadleria cyatheoides /fern, 'ama'u/, Cibotium spp. /tree fern, hapu'u/, Dicranopteris linearis /false staghorn fern, uluhe/, Musa spp. /banana/, Osteomeles anthyllidifolia /'ulei, ehuehu (Holoakai)/, Rauvolfia sp. /hao/, Dubautia sp. /na'ena'e/, Clermontia spp. /lobelia, 'oha/, Pittosporum spp. /ho'awa/, Euphorbia sp. /'akoko, koko/, Dodonaea sp. /'a'ali'i/, Canthium odoratum /alahe'e/, Cordyline terminalis /ti/, Hibiscus sp. (red flower), Metrosideros collina (smooth & hairy leaf) /'ohi'a-lehua/, Eugenia molokaiana /nioi/, Myrsine spp. /kolea/, Scaevola sp. /naupaka/, Aleurites moluccana /kukui/, Diospyros ferrea /persimmon, lama/, Styphelia tameiameia /pukiawe/, Perrottetia sandwicensis /olonea/, Alyxia olivaeformis /maile/, Freycinetia arborea /'ie'ie/, Osmanthus sandwicensis /olopua/, Tetraplasandra spp. /'ohe/, Dracaena aurea /hala-pepe/, Dianella sp. /'uki'uki/, Pritchardia sp. /loulou/, Elaphoglossum sp. /tongue fern, 'ekaha/, Rhynchospora sclerioides /Hawaiian breakrush/, Cyanea horrida /haha-nui/, Touchardia latifolia /Olona/, Piper methysticum /'awa/, Gouldia sp. /nanono/, Colocasia sp. /taro/, Pipturus sp. /mamaki/, Hibiscus tiliaceus, Dioscorea sp. /yam, uhi/, Broussaisia arguta /kanawao/, Ilex anomala /holly, kawa'u/, Polypodium spectrum /fan fern, pe'ahi/, Lycopodium spp. /club moss, wawae-iole/, Peperomia spp. /'ala'ala-wai-nui kane/.

Throughout Operation Hui I counted a total of 16 'Apapane, 7 'Amakihi and 1 native Pueo. Other birds observed but not counted included the white-eye, mynah, large and small doves, sparrows, house finches and plovers. Large game animals included 2 pigs in Napulehu valley, 14 deer along the Wailau trail, 3 deer on the ridge north of the triangulation station Akahi and 1 deer on the west slope of Honomuni gulch. Only 6 goats were seen on a flat west of Honomuni gulch. Game tracks throughout the area indicated that more deer and goat were present. The lack of additional sightings was due to the eradication activities; the rifle reports and reverberations of the helicopter engine and rotor blades along the gullies and ridges were enough to scare any game animal into hiding.

#### Some additional notes

The Osprey that took up residence in the Kamalo area continues to baffle Molokai residents. I receive many calls from people seeking identification of the bird. Most frequently the bird can be observed resting on a large tree trunk in the ocean at the mouth of Kamalo stream. I first observed the bird on Molokai during March of this year.

This month marks one year that I have been observing what appears to be a resident flock of stilts on Molokai, there are 13 birds in the flock which inhabits the vicinity of Ooia fishpond and estuary, during low tides the birds can be observed feeding on the mudflats from Palaau to Kalamaula.

\*\*\*\*\*

HONOLULU STAR-BULLETIN, 3 August 1972, State Intensifies Eradication Efforts - AXIS DEER TB REAPPEARS ON MOLOKAI by Helen Altonn

A new case of Axis deer tuberculosis has been confirmed on Molokai, and the State is intensifying efforts to sample deer, cattle and other animals on the Island for infection. Molokai is the only place in the nation which has not eradicated cattle tuberculosis, despite a continuous program by the State Department of Agriculture.

...It is believed the deer are contracting tuberculosis from the cattle, since they had the disease long before deer were introduced there.

The last diseased deer was found five miles farther west than any previous cases reported--moving closer to the center of the Island. Up to now, the disease has been restricted to the east end.

...The stray animals in the hills have created one of the major obstacles to the tuberculosis eradication effort. They have to be rounded up and either confined for testing or sent to slaughter.

...Clarence Coelho, who has a farm at Kamalo captured the latest infected deer. It was a big animal with huge antlers.

Dr. Ernest Willers, head of the Division of Animal Industry at the State Agriculture Department, said so far there have been no cases of tuberculosis in pigs or goats on Molokai. Goats usually are more resistant to the disease, he said. But since the animals are popular with hunters, they will be included in the investigative



program.

...All of the infected animals have been on private lands. There was one in March 1970, another in October last year, and the latest case was last month.

\*\*\*\*\*

Field Notes from Lorin T. Gill: ...'Apapane are "common" on the pali of Hanu'uwai at the head of Wailua Valley, Molokai. I saw several on 10 January 1973 as we climbed out of Wailau.

\*\*\*\*\*

Field Trip to Salt Lake, Sand Island, Waipio, 12 November 1972 by William Wingfield

The November 12 field trip was attended by seven enthusiastic birders and produced several unusual shorebirds. We first went to Salt Lake, not knowing whether to take our golf clubs or binoculars! The lake is still there, however, and we were able to count 36 pintail duck, 29 shovelers, 34 coot, 15 golden plover, 10 ruddy turnstone, 4 wandering tattlers, 15 black-necked stilt, 1 sanderling, and 1 magnificent frigatebird circling high overhead.

We next went to Waipio Peninsula to the settling basins, where we saw 150 cattle egret, 3 pintail, 6 shoveler, 30 golden plover, 1 black-bellied plover, 75 ruddy turnstone, 40 black-necked stilt, 1 pectoral sandpiper, 40 sanderling, 2 sharp-tailed sandpiper, 1 short-billed dowitcher, and 1 greater yellowlegs. Walking back to the car we were lucky to get a brief but good look at a beautiful osprey flying overhead.

Lastly we made a stop at the end of Sand Island where we saw 4 pomarine jaegers flying among the brown boobies over the sewer outflow. Overall it was a beautiful day with four unusual shorebird sightings for Hawaii.

One is impressed with the impermanence of the sites we visited. Salt Lake may soon no longer be. There is no guarantee that the Waipio Peninsula settling basins will always be here. If we are to continue to see our Hawaiian birds and migrants, their habitat must be preserved.

\*\*\*\*\*

Excerpts of the minutes of the Hawaii Audubon Society general meeting 17 July 1972:

...William Mull gave an informal report on a ten-day birding trip he and his wife made to Koke'e and the Alaka'i Wilderness Preserve in early July. He spoke of incursions deep into the Alaka'i by introduced birds, such as the Japanese white-eye, spotted dove and ricebird, and by exotic vegetation. In some bog areas there is extensive evidence of pig rooting and churning the soil. The presence of feral goats is also evident. There is apprehension that the black-tailed deer, introduced to West Kauai drylands, will extend their range to the rain forests and become an additional threat to the unique ecosystems of Kauai's high country. Mr. Mull spoke of the necessity for united action by conservation groups to gain permanent protection and conservation of the unique natural resources of Koke'e and the Alaka'i and to prevent further encroachments such as the proposed Koke'e Dam and depletion of streams from draw-down water systems.

William Mull presented the program, "Hawaii Close-Up", a series of slides and commentary on the component parts of different kinds of Hawaiian ecosystems. He included both exotic and native elements in discussing some flora and fauna of off-shore islets, the seashore and strand vegetation, lowland drylands, dry forests, wet forests and bogs. The point was stressed that in order to appreciate and understand what makes nature tick in Hawaii you have to look at its components "close-up"--and try to sort out their relationships and functions.

=====

21 August 1972: ...The President reviewed the August 10th field trip to Manana Island to observe the seabird nesting colonies. Meg and Bill Brown, resident on the island for ornithological studies, guided the group and gave useful interpretation of the nesting sequence and bird behavior.

On Oahu on August 3rd, early returning migrants were observed--ruddy turnstones and golden plovers.

...Bill and Mae Mull reported on some of their observations on a recent trip to the Big Island in late July and early August. They had good observations of three rare honeycreepers in the upper Kilauea Forest Reserve: male Hawaii 'Akepa (bright orange color), Hawaii Creeper (straight bill, dull color, foraging in 'ohi'a bark),



and 'Akiapola'au (long, curved upper mandible). They heard 'Oma'o singing regularly and saw several in this forest. They saw feral pigs in the forest in different locations and once watched 5-6 young pigs rooting and churning the rain forest floor. The National Park Service is beginning an area-by-area fencing project, by segments as funds are available, to eliminate permanently in Hawaii Volcanoes National Park the feral goats that are so damaging to native flora and fauna. Volcanoes Park is starting a Nene Research Project adjacent to the newly-acquired Ainahou Ranch property at the elevation of 2500'.

Wayne Gagne spoke briefly of a recent trip to Waihoi Valley, next to Kipahulu Valley in Maui. Investigating an old lava tube with Frank Howarth, they found some bones of a bird with articulations resembling those of a rail. Dr. Alan Ziegler of the Bishop Museum is now studying these bones.

Dr. John Maciolek, Fisheries Biologist, with the Department of Zoology, University of Hawaii and U.S. Bureau of Sport Fisheries and Wildlife, presented the program on "Hawaii's Aquatic Habitats", with slides and discussion on fresh water environments throughout the State. He described various fresh water habitats including Hawaii's few lakes, standing waters, marshes, ponds and streams. Lake Waiau, at 13,020' on Mauna Kea, is the highest lake in the United States. Hawaii has 200 perennial streams. Dr. Maciolek raised the question of what happens to stream life with some of man's activities such as intake structures for water diversion, development projects, stream channelization, and mill waste dumping. Hawaii has no primary native fresh water fish that live wholly in fresh water. The four native species of goby, or o'opu hatch in fresh water streams. The fish larvae travel downstream to the sea where they mature. The adult o'opu return to the inland streams to reproduce, traveling upstream against rocky cascades and sheer waterfalls. Some species of o'opu have been depleted or are endangered on some islands because of man's destruction or modification of fresh water streams. In response to a question, Dr. Maciolek spoke of the lava ponds at Ahihi Bay (Cape Kinau), Maui, where five new species of native shrimps have been discovered. The lava ponds also serve as feeding grounds for the Hawaiian stilt and migratory shorebirds. Dr. Maciolek recently saw 13 sanderlings and 5-6 wandering tattlers at these lava ponds. Ahihi Bay and the shore area including the ponds have been recommended for inclusion in the Natural Area Reserve System. Of the newly-discovered shrimp species, one species that is blind, having only an eye spot, is placed in a new super-family.

---

11 September 1972: ...Congratulations were extended to the U.S. Bureau of Sport Fisheries and Wildlife upon announcement of the acquisition of the Hanalei taro fields in Kauai as a refuge for four endangered Hawaiian waterbirds. The purchase price quoted in the press was \$1.3 million dollars.

...The Society has been invited to attend the Third Annual Wildlife Symposium (conducted by the Hawaii Chapter of the Wildlife Society) and the Annual Forestry Conference in Kauai, October 3-6. Bill Mull will present a talk on "Audubon Viewpoints on Wildlife Conservation Problems in Hawaii."

...Mr. Mull announced the death of Dr. Daniel Lehrman, widely known authority on animal behavior from Rutgers University. Dr. Lehrman was scheduled to be the speaker at the September meeting, but he died suddenly just before his departure for Hawaii. Dr. Lehrman was keenly interested in bird behavior, and had made significant contributions to the knowledge of animal behavior.

Two films were shown for the substitute program. "Cloud over the Coral Reef" showed how coral reefs are formed and described the marine life associated with coral reefs. The film graphically portrayed the death of the coral reef in Kaneohe Bay on Oahu by the excessive pollution of the Bay waters by siltation and man using the bay as a dump for waste.

The second film, "Succession on Lava", described the sequence and process of the re-establishment of plant and animal life on land that has been covered by lava flows. The film was based on lava flows from Kilauea and Mauna Loa volcanoes on the Big Island. Gradual succession on the lava from the first algae to the mature forest was described. Included was the problem of man's interference in the natural process by his introduction of exotic mammals, including the feral goat.



THE ELEPAIO

Expenses from 1 January through 31 December 1972:

Envelopes and stamps	\$ 163.78
Paper .....	234.93
Stencil .....	23.18
Miscellaneous .....	65.09
Total .....	486.98

## Miscellaneous

Addressograph plates	35.38
" ribbon	7.56
Photo prints	19.16
Rubber bands	2.99

Mimeographing Gratis (Bishop Museum)

Typing ..... Gratis (members)

Mailing ..... Gratis (members)

## Mailing list as of 31 December 1972:

Honolulu	141	Mainland	119
Rural Oahu	28	(29 states & DC)	
Hawaii	22	Canada	5
Kauai	11	New Zealand	3
Maui	7	England	1
Molokai	4	France	1
Guam	2	Copies	347
APO	2		
FPO	1		

Please send in suggestions to make Hawaii better, so that the people can live harmoniously with the great outdoors. Any volunteers to take over the publication? Please write to Kojima, 725-A 8th Avenue, Honolulu, Hawaii 96816.

\*\*\*\*\*

## ALOHA to new members:

J. Henri Bos, Box 1019, DSRD, Bio-Medical Research, Kamuela, Hawaii 96743

Dr. & Mrs. Fred Dunn, PO Box 10514, Honolulu, Hawaii 96816

Andrew J. Keizer, 780 Amana St, PH-4, Honolulu, Hawaii 96814

Lionel Stephan, Makaha Valley Towers, Apt 930, Waianae, Oahu 96792

\*\*\*\*\*

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

\*\*\*\*\*

Reprint permission is granted if credited as follows: from THE ELEPAIO, Journal of the Hawaii Audubon Society.

\*\*\*\*\*

## MARCH ACTIVITIES:

- 11 March - Field trip to Manoa Cliff 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. Leaders: Charles van Riper and Dr. William Wingfield, telephone 732-5884.
- 12 March - Board meeting at McCully-Moiliili Library, 6:45 p.m. Members welcome.
- 19 March - General meeting at the Waikiki Aquarium Auditorium at 7:30 p.m. Speaker: Dr. John Porter, Lecturer in Botany, University of Hawaii. Topic: Birds and the Blooming of Hawaiian Trees

\*\*\*\*\*

## HAWAII AUDUBON SOCIETY EXECUTIVE BOARD:

President: William P. Mull

Vice Presidents: Wayne C. Gagne (Programs)  
Julia K. Yoshida (Education)

Secretaries: Laura C. Casey (Recording)  
Mae E. Mull (Corresponding)

Treasurer: C. Florence Hendrycy

Board Members: Steven L. Montgomery (Conservation)  
Dr. William Wingfield (Books)  
Charles van Riper, III (Field Trips)

THE ELEPAIO: Editors--Charlotta Hoskins & Unoyo Kojima

MAILING ADDRESS: P.O. Box 5032, Honolulu, Hawaii 96814

DUES for 1973 are now payable: Regular - \$3.00 per annum

Junior (18 years and under) - \$1.00 per annum

Life - \$100.00

Members whose dues have not been paid by March 31st will be dropped from the membership roll and THE ELEPAIO mailing list.