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THE NEST AND EGGS OF THE ANIANIAU

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THE Anianiau (*Loxops parva*) is a small (about 4½ inches in total length), yellowish bird with a short and slightly curved bill. This member of the Hawaiian honeycreeper family (Drepanididae) is limited in distribution to the Alakai Swamp region of the island of Kauai, the northwesternmost of the main "high" Hawaiian Islands.

The Anianiau inhabits the rain forest where ohia (*Metrosideros collina*) is the dominant tree. Over 600 inches (*50 feet*) of rainfall have been recorded in a single year on Mt. Waialeale only a few miles from the forest where we studied the Anianiau.

Very little has been published on the breeding biology of the Hawaiian honeycreepers, and the eggs of the Anianiau have never been described or photographed.

Richardson and Bowles (1964) devoted 3 months to intensive field work on Kauai during the summer of 1960 and found several species thought to be extinct. About the Anianiau they wrote: "Breeding also appeared to be completed in the anianiau for we heard no singing during the summer and saw little evidence of pairing or territories. However, on June 30 three birds were seen together; one, apparently immature, was fluttering its wings and being fed. The testis of a male collected July 21 was small (about 1 millimeter)."

In his discussion of the Anianiau, Munro (1944) stated: "There seems to be no data on its nest, eggs, or young." This turned out not to be true, but insofar as we have been able to determine, only one published reference exists to the nest of the Anianiau. Bryan and Seale (1901: 134) told of finding a nest with "three young birds in the pin feather" on 18 April 1900.

Bryan and Seale presented a photograph of the nest and stated that the nest is composed "externally of coarse moss and lichens, into which are loosely placed weed stems, skeletons of leaves, and a few roots. The inside lining is made up almost entirely of stiff black hair-like rootlets." They

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NEST OF THE ANIANIAU, *Loxops parva*

Kokee, Kauai, H. I. 26 April 1968

(We believe this to be the first published color photograph of the nest and eggs of any member of the Drepanididae.—Ed.)

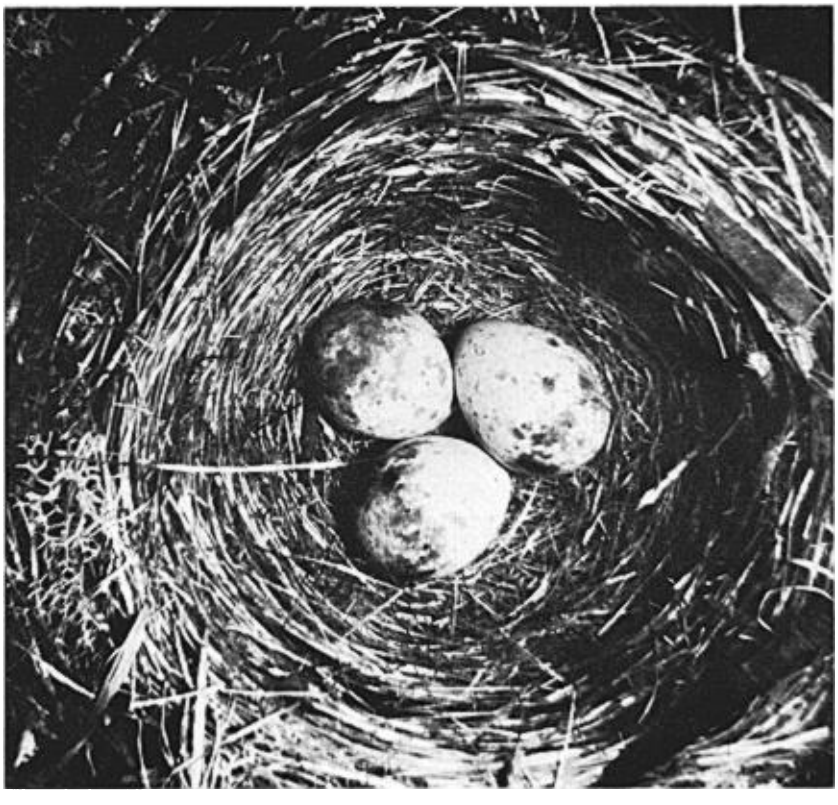

Figure 1. Nest No. 1, 1968, and its three eggs. Photographed 15 April 1968.

stated further that they were unable to find any "fragments of the egg shells."

Berger found his first Anianiau nest a short distance from the Geological Survey cabin on the banks of the Koaie Stream in the Alakai Swamp region of Kauai on 23 February 1964. This, apparently the second nest found for the species, was about 40 feet above ground in an ohia tree. It looked complete but at least one of the adults was carrying nest material, presumably for the nest lining. It began to rain very hard at 10:00, and the birds stopped coming to the nest. Berger had watched a pair of Anianiau in courtship feeding behavior near the nest the previous day. Nothing more was learned about this nest because he had to leave the swamp area the day he found the nest.

On 20 April 1967 Berger took Eddinger and Mrs. Frings to the Kokee region of Kauai to introduce them to the endemic birds there, with special reference to the honeycreepers and the Elepaio (*Chasiempis sand-*

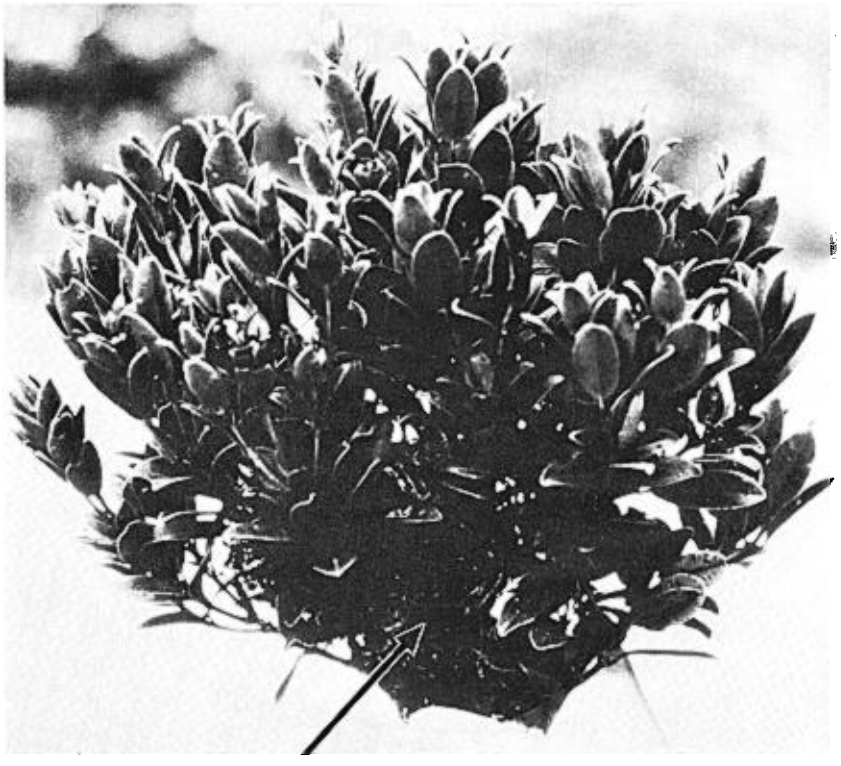

Figure 2. Terminal branch of an ohia tree containing Anianiau nest No. 4, 1967. The black arrow points to the nest.

wichensis sclateri), the latter being an endemic genus of the Old World flycatcher family (Muscicapidae). We found two Anianiau nests under construction on 22 April, both in ohia trees.

Berger returned to the area 6 May 1967. Anianiau nest 1-1967, built 17.2 feet from the ground in an ohia, contained four eggs. The nest was so near the end of a small branch that it was impossible to photograph the nest and eggs *in situ*, and several eggs were broken when attempting to cut the nest branch.

Anianiau nest 2-1967 had not been finished and was deserted. Berger found nest 3-1967 under construction on 6 May but the nest, about 25 feet above the ground in an ohia, was on a completely inaccessible branch.

Mrs. Frings returned to the study area 10 June 1967 to continue her observations on the Elepaio. She found Anianiau nest 4-1967 with three eggs that day. This nest, too, was built in an ohia tree about 15 feet above the ground. The eggs in this nest hatched between 16:30 12 June and 09:30 14 June.

Berger spent 10 and 11 February 1968 in the Kokee region, but found no evidence that the Anianiau had begun to nest. He and Eddinger returned 14 April and found two Anianiau nests the following day.

Nest 1-1968 (Figure 1) was built 24.4 feet up in an ohia tree and contained three eggs. This nest, still containing three eggs, we found deserted on 26 April.

Nest 2-1968 (Frontispiece) was located 21.3 feet up in an ohia and was under construction on 15 April. The female was incubating four eggs in this nest on 26 April, but the eggs were broken when we visited the nest again 18 May.

DESCRIPTION OF NESTS

A main branch of an ohia tree divides into multiple, small vertical branches about 2 feet below the end of the branch. The small branches are thickly covered with leaves, which provide a dense cover for the nests (Figure 2).

Most of the Anianiau nests we have found have been constructed between and woven around four or more of the small vertical branches and have been placed from 12 to 18 inches below the tip of the main branch, which puts the nest near the bottom of the dense terminal cluster of leaves. The nests also are difficult to see because they are covered on the outside with a relatively thick layer of green lichens.

The nests vary considerably in outside dimensions; they also tend to be asymmetrical in their circumference. The rim of one nest (1-1967) varied in thickness from ⅜ to 1⅜ inches. The outside diameter varied from about 3¼ to 3¾ inches. The nest measured 3 inches from the top rim to the bottom of the nest. The inside diameter of the nest cup varied from 1¾ to almost 2 inches; the nest cup was 1¼ inches deep.

A second nest (2-1968) measured 4 inches from the nest rim to the bottom of the nest, and green lichens hung irregularly downward several inches from the bottom. The rim of the nest varied from about ¾ to 1¼ inches. The outside diameter varied from 3¼ to 4¼ inches. The inside diameter of the nest cup varied from 1¾ to 2⅜ inches; the nest cup was approximately 1⅜ inches in depth.

Analysis of nest 1-1968 revealed that the bulk of the body and the lining of the nest was composed primarily of unidentifiable fine plant fibers. Woven among these, but primarily in the outer wall of the nest, were thin flat strips 4 to 5 mm wide, probably strips of bark; these strips were a dark reddish-brown on one side and a much lighter tan color on the other side. Also embedded in the outer wall of the nest were several dead branchlets of pukeawe (*Styphelia tameiameiae*). The outer surface of the nest was covered by a layer of lichens (*Usnea* sp.). In addition to these

nest materials, seven species of mosses and one liverwort were found woven among the other constituents of the nest: *Acroporium fusco-flavum, Aerobryopsis longissima, Campylopus purpureoflavescens, Homaliodendron flabellatum, Leucobryum gracile, Macromitrium owahiense, Thuidium plicatum,* and *Bazzania* sp. (a liverwort).

The Eggs

The eggs have a whitish background with irregularly-shaped markings, which vary in color from tan to reddish-brown. Three clutches of eggs show considerable difference in the color, amount, and pattern of the spotting (Frontispiece and Figure 1).

Because of the difficulty in reaching the nests and the high nest mortality, only two eggs were measured. Two eggs from different clutches measured 17.6 × 13.1 mm and 17.9 × 13.5 mm respectively. Clutch size in two nests was three eggs; in two other nests it was four eggs.

Summary

The first nest of the Anianiau, containing three nestlings in pin feathers, was found 18 April 1900 by Bryan and Seale. Berger found the second nest, under construction, on 23 February 1964. Four additional nests were found in 1967 and two in 1968. Data thus far obtained suggests a nesting season extending from about the middle of February until the end of June.

All nests found to date have been built in ohia trees. The measured height above ground of three of the nests ranged from 17.2 to 24.4 feet and averaged 20.9 feet. Three other nests were estimated to be 15, 25, and 40 feet above ground. The nests tend to be asymmetrical in circumference and variable in other dimensions.

The eggs have a whitish background and irregularly-shaped markings, which vary considerably in the amount and pattern of the markings. The clutch was four eggs in two nests and probably three eggs in two other nests.

We are indebted to Charles H. Lamoureux and William J. Hoe for identifying the plant materials in the nest.

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