

from May to October inclusive. No records were obtained from November to April.

10. The usual set of eggs is two. A few cases are cited where there were three eggs or young in one nest.

11. Descriptions of various ages of the young and a table of weights and measurements of the young and adults are given.

12. A dipterous parasite, *Philornis pici*, was the cause of death of two young.

LITERATURE CITED

- HARROWER, D. 1936. The habits of the passerine birds of Central America with particular reference to their breeding. (Diss. on file at Cornell Univ., Dept. Ornith.)
- RIDGWAY, ROBERT. 1901. The birds of North and Middle America. Bull. U. S. Natl. Mus., No. 50 (1): xxx + 715.
- RIDGWAY, ROBERT. 1912. Color standards and color nomenclature. (Washington, D. C., publ. by author), pp. ii + 43, 53 pls.
- SKUTCH, ALEXANDER F. 1945. Incubation and nestling periods of Central American birds. Auk, 62 (1): 8-37.
- SKUTCH, ALEXANDER F. 1948. Anting by some Costa Rican birds. Wilson Bull., 60 (2): 115-116.
- SKUTCH, ALEXANDER F. 1950. The nesting seasons of Central American birds in relation to climate and food supply. Ibis, 92 (2): 185-222.

Bowdoin College, Brunswick, Maine, January 7, 1952.

THE HAWAIIAN COOT

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Distribution and Abundance.—The Hawaiian Coot, *Fulica americana alai* Peale or "alae keokeo," is one of the few native birds of Hawaii that has maintained itself in sufficient numbers to be fairly common on most islands at the present time. In the past, it was abundant on all the major islands, particularly Oahu, Maui, Molokai, and Kauai, which possessed coastal brackish and fresh-water ponds or marshes, reservoirs, or large streams (Wilson and Evans, 1890-1899; and others). In 1891 Munro (1944) saw from 500 to 600 coots on a "lagoon" near Lihue, Kauai. Perkins (1903) reported that the coots gathered in flocks of considerable size and from 50 to 100 occurred together on a "fair-sized pond."

The Hawaiian Coot lives from sea level to 500 feet elevation in both arid and semi-humid regions wherever there is some open fresh or brackish water bordered by emergent aquatic vegetation or heavy stands of grass. It is non-migratory and has no obvious seasonal

movements. It still occurs on all the major islands except Lanai and Kahoolawe which lack suitable habitat.

On Hawaii, the Hawaiian Coot is rare, occurring only occasionally on some of the few reservoirs or ponds, and in the lower part of Waipio Stream and flooded taro patches. On Maui, the only area with any concentration was the Kanaha Pond near Kahului where we saw 300 coots on August 12, 1946. On Molokai, coots inhabit the few coastal ponds and 250, recorded on one pond on September 5, 1946, represented the greatest number we observed there. The population is very scattered but abundant on Kauai and birds were found on practically all the lowland portions of streams, reservoirs, and irrigation ditches. Fifty birds represented the most observed at any one time on this island and this was on the Grove Farm Reservoir on October 24, 1946. On Oahu, the Hawaiian Coot is common. On April 6, 1947, we counted 500 coots and estimated an additional 500 in one flock on the 300-acre Kaelepu Pond. This was the maximum concentration we saw anywhere. On this island coots were observed on nearly all the reservoirs, coastal marshy areas, and "fish ponds." Fisher (1951) did not observe this species on Niihau in 1947 and believed it only occurred there periodically because of the temporary nature of the aquatic areas on that island.

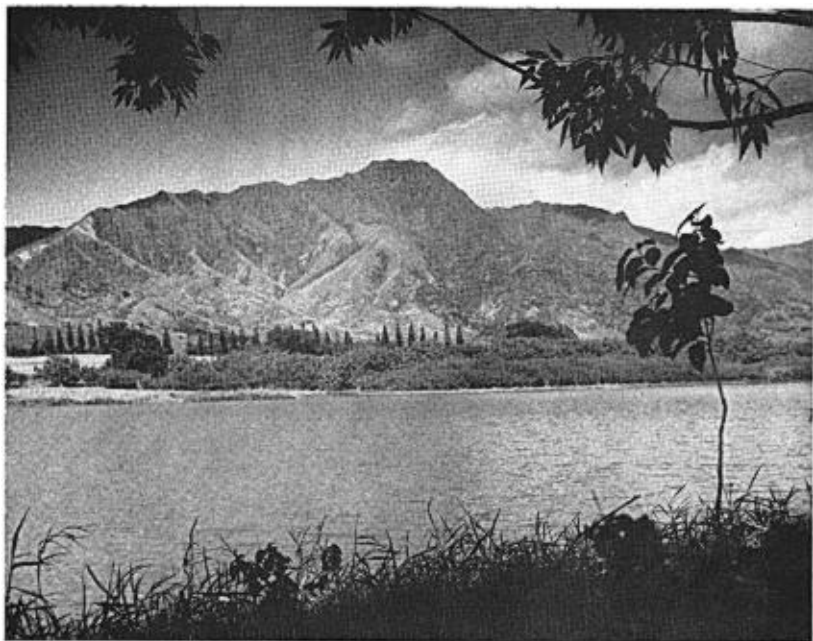
Breeding.—We do not know the span of the coot's breeding season, but we observed or had reliable reports of nests and young in April, May, June, August, and September. Henshaw (1902) reported nesting of the Hawaiian Coot as early as February and half-grown young were observed by him on April 30. He also saw a nest with two eggs on August 17. On July 20, two nests were found on Niihau by Palmer (Rothschild, 1893-1900); these contained three and five eggs, respectively.

On April 6, 1947, during a brief visit to Kaelepu Pond, Oahu, we observed eight coot nests in a very limited examination of part of the marshy cover of bulrush (*Scirpus validus*), beach akulikuli (*Batis maritima*), and the submerged grass (*Paspalum vaginatum*) comprising the shoreline. Two of the nests were examined. One, containing six eggs, was located in a sparse clump of bulrushes growing in water 1.5 feet deep. The nest was about two feet by 1.5 feet in diameter and consisted of a partially floating platform of bulrushes; the basal portion was made of rush stems about one-half inch in diameter while the upper portion and lining consisted of somewhat thinner stems. The nest bowl, which was clean and without droppings, measured six inches in diameter by two inches deep, and was about three inches above the water's surface. The eggs were not covered with vegetation.

They were light buffy tan speckled with tiny flecks of dark brown or tan and measured as follows: 49 x 35 mm.; 46 x 35 mm.; 48 x 36 mm.; 46 x 34 mm.; 46 x 34 mm.; and 49 x 35 mm. The basal platform of another nest, located in a stand of partially submerged grass, was made chiefly of grass stems and blades strengthened with bulrush stems. Grass formed a scant lining. The nest was approximately 1.5 feet in diameter; its bowl was two inches deep and three inches above the water's surface. A small open zone of water surrounded this nest. It is likely that this clearing represented the area from which grass blades and stems were gathered to build the nest. There was one egg in the nest and it measured 50 x 32 mm.

On May 14, 1947, we again visited the Kaelepulu Pond and during an examination of the outer margin of the marsh vegetation along approximately one-half of the shore, counted 48 coot nests. Of these, 3 were in the process of construction, 30 were vacant and appeared to have fulfilled their function, and 15 had clutches. More nests probably would have been found had we inspected the denser plant growth bordering the pond. Most of the nests we observed were located in the open water along the margin of the bulrush stand, and were often within 10 or 15 yards of each other. However, some were within the thinner portion of the bulrush bordering the pond. The nests were similar in size and construction to the two described above but varied slightly in the amounts and kinds of materials used. Certain nests were built of beach akulikuli alone or in combination with bulrush. (Perkins, *op. cit.*, reported nests to also consist of branches and twigs of algaroba, *Prosopis chilensis*, and sometimes the leaves of *Pandanus* sp.) In some nests a definite landing stage was apparent from which the occupant entered and left the nest. The clutch size in the 15 nests which contained eggs on this date varied from 4 to 10 with an average of 6.1. However, we did not ascertain whether all of these represented complete clutches. At the time of this visit we counted 400 coots in the open water of the pond and doubtless many birds were not observed because they were engaged in nesting activities. Sample counts from the flock showed a 6 : 1 ratio of adults to recognizable young. Some of the young were capable of flight and later easily eluded us in this manner when we pursued them in our kayak.

In June, 1946, coots were reported to be commonly nesting on Molokai, and their young were numerous there during August. On this island on September 5, 1946, we observed three coot nests in the periphery of a four-acre shallow coastal pond. The three nests were occupied by incubating adults. In the open water 250 coots were assembled in a rather compact flock.



(*Top*) RESERVOIR OF THE TYPE OCCUPIED BY HAWAIIAN COOTS ON KAUAI ISLAND, T. H. FEBRUARY 7, 1947. ALL PHOTOGRAPHS BY C. W. SCHWARTZ. (*Bottom*) EDGE OF KAELEPULU POND, OAHU, SHOWING HABITAT USED BY HAWAIIAN COOTS FOR NESTING. CIRCLE SHOWS POSITION OF ONE NEST. APRIL 6, 1947.



HAWAIIAN COOT ENTERING ITS NEST BY WAY OF A "LANDING STAGE". KAELEPULU POND, MAY 14, 1947.



INCUBATING HAWAIIAN COOT. KAELEPULU POND, OAHU, MAY 14, 1947.



NEST OF HAWAIIAN COOT WITH FULL CLUTCH OF EGGS. NOTE THE AREA TO THE LEFT, WHICH IS FREE OF BEACH AKULIKULI AND SERVES AS A "LANDING STAGE" FOR ENTERING AND LEAVING THE NEST. KAELEPULU POND, OAHU, MAY 14, 1947.

Measurements.—An adult male Hawaiian Coot was found dead and floating on the Koloa Reservoir, Kauai, on March 8, 1947. It measured as follows: total length, 385 mm.; culmen, 45; extent of wing, 650; closed wing, 185; tail, 35; and longest toe, 80.

Lice.—A heavy infestation of lice occurred on this specimen. The following species were identified by Dr. E. W. Stafford of the U. S. Fish and Wildlife Service: *Pseudomenopon pacificum* (K.), *Incidifrons pertusus* (Nitz.), *Fulicoffula lurida* (Nitz.), and *Raillicola advena* (K.).

Food.—An examination of the crop contents disclosed that this bird had fed upon guava seeds, *Psidium Guajava*, and fibrous plant stems. On the Koloa Reservoir, other coots were observed feeding beneath guava trees growing next to the water and foraging upon the ripening seed heads of grass bordering the reservoir.

Future.—At present the Hawaiian Coot appears sufficiently numerous to insure its survival; however, the current reclamation program of the large marsh areas on Oahu will certainly disperse the species to less desirable habitats on that island and in all probability, drastically alter its status there. Barring some unforeseen adverse factor, coot numbers will doubtless remain relatively stable on other islands as long as the present land-use pattern continues.

LITERATURE CITED

- FISHER, H. I. 1951. The avifauna of Niihau Island, Hawaiian Archipelago. *Condor*, 53 (1): 31-42.
- HENSHAW, H. W. 1902. *Birds of the Hawaiian Islands, etc.* (T. G. Thrum, Honolulu), 146 pp.
- MUNRO, G. C. 1944. *Birds of Hawaii.* (Tongg Publ. Co., Honolulu), 189 pp.
- PERKINS, R. C. L. 1903. *Fauna Hawaiiensis: Vertebrata.* (Univ. Press, Cambridge), 1 (IV): 365-466.
- ROTHSCHILD, W. 1893-1900. *The avifauna of Laysan, etc.* (R. H. Porter, London), 320 pp.
- WILSON, S. B., AND A. H. EVANS. 1890-1899. *Aves Hawaiiensis: The birds of the Sandwich Islands.* (R. H. Porter, London), 257 pp.

Conservation Commission, Jefferson City, Missouri, May 1, 1952