

REDISCOVERY OF THE NESTING OF THE DARK-RUMPED PETREL  
IN THE HAWAIIAN ISLANDS

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The Galapagos and Hawaiian races of the Dark-rumped Petrel (*Pterodroma phaeopygia*) constitute the only forms of a little known species. Murphy (1936:697-699) gives a description and records of the oceanic distribution of the Galapagos race (*P. p. phaeopygia*) but little on its breeding habits. He describes Beck's discovery of a nesting burrow in a humid, thickly vegetated zone at about 1000 feet altitude on Indefatigable Island and the collection of one of the only two known eggs preserved of the species.

The Hawaiian race of the Dark-rumped Petrel, or Uau (*P. p. sandwichensis*), was well known to the ancient Hawaiians, who took both adults and young for food, but apparently little was learned or recorded about it by collectors and observers of the last century. When Bryan (1908:50) collected adult birds from their nesting burrows on Molokai in 1907, the species already seemed to be much reduced in numbers. It was almost unheard of after this until 1948 when Baldwin and Hubbard (1949:231) obtained a live adult on Kilauea on the island of Hawaii. These authors summarize much of the meager knowledge of the species in the Hawaiian Islands.

During the fall of 1953 and the spring of 1954 sufficient new information was obtained on the Hawaiian subspecies to justify a review of its present status and presentation of additional notes on its habits. On October 22, 1953, an Uau was obtained on the Hawaiian island of Maui by Joseph Medeiros of the Territorial Division of Fish and Game. The bird was apparently the first from Maui, and, being in juvenal plumage, proved that the species was still breeding. The bird was fully fledged and had adult wingspread, but small patches of brownish down remained on the wing coverts and belly. It was found alive in a reservoir near Kahului, Maui, a low, agricultural region of the island, to which it presumably flew. The petrel died at the Honolulu Zoo on October 25, and it was prepared by George C. Munro, Associate in Ornithology of the Bishop Museum of Honolulu, who noted that the bird was very fat. The skin was given to the Bishop Museum.

In the spring of 1954 five more records of the Uau, all remains of dead birds, became known from the island of Hawaii. On April 29, Woodside found the complete remains (now a skeleton in the Bishop Museum) of one of these petrels, dead at least several weeks, near Kanahaleonui at over 9000 feet altitude on the east slope of Mauna Kea. He also then found some of the feathers and part of the beak of another individual recently killed by a cat at about 10,000 feet on the south slope of Mauna Kea. Harry Fergerstrom, Forest Ranger for the Territorial Board of Agriculture and Forestry, obtained the remains of three more Dark-rumped Petrels, all from above 9000 feet on the east slopes of Mauna Kea. One was killed early in June, probably by a cat. All these records suggested that the petrels might still be coming to a breeding area high on Hawaii, even though 50 years had elapsed since they were reported doing so.

In 1951, Bonsey wrote (1951:32) of hearing nocturnal bird cries, perhaps of petrels, in Hawaii National Park in the crater of Haleakala on Maui. The possibility of petrels occurring and breeding on Haleakala had not been investigated in the ensuing years. Accordingly, the authors undertook a search in the crater from June 5 to 9, 1954. Numerous bird calls and other notes were heard from the first night on, both above the Holua Cabin region near the west floor of the crater and above the Kapalaoa Cabin which is below the south rim of the crater. However, in spite of search both night and day, no bird was found until the night of June 8. At this time, several petrels were seen

in flight and an adult Dark-rumped Petrel was obtained from one of two freshly used burrows that had been found about a quarter of a mile south of the Holua Cabin. The bird was on an egg, thus establishing the fact that the species is still breeding in the Hawaiian Islands and in a mountainous habitat heretofore undescribed.

The general breeding habitat (fig. 1) can be described as the steep slopes and cliffs making up the walls of the crater of Haleakala. The rim of the crater runs from about 8000 feet in elevation to 10,025 feet, and the floor below the rim is chiefly between 6750 and 7250 feet. The crater walls are old and eroded and so have a good deal of soil and vegetation. The drier, soil-bearing slopes are largely covered by the grass

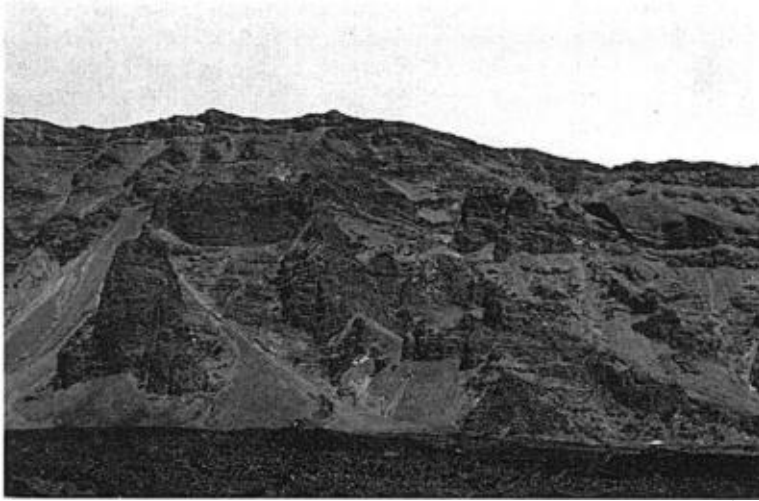


Fig. 1. West wall of Haleakala Crater, Maui, from floor of crater. Occupied petrel burrows were found in lower center, near white cliffs.

*Deschampsia australis* and bracken fern, *Pteridium aquilinum*. The dominant plant on the rocky, usually more moist slopes, and around cliffs, is the Pukiawe bush (*Styphelia tameiameia*).

The location of the two occupied petrel burrows we found was at the base of small cliffs. The entrances were in dirt; these led into deep natural cracks between buried rocks. Both burrows went in over six feet. The petrel obtained was more than five feet within its burrow, beyond two right-angled turns. Nesting material consisted of about double handfuls of dry grass in each case and was placed about four feet from the entrances. The entrances were small (less than 6 by 8 inches) and showed almost no sign of recent digging. Probably the burrows had been used for many years, a surmise substantiated by finding the aged partial skeletons of two adult Uau in one burrow.

Bryan describes the Uau as nesting in 1907 in partly natural burrows beneath tree trunks in the wet, forested region at some 3500 to 4000 feet altitude on eastern Molokai. These conditions seem comparable to those associated with the nesting of the Galapagos form, for Murphy describes a burrow dug through dense soil and roots. In view of these records it was the more surprising to find the petrel nesting in a high, rocky, relatively barren area. The digging ability of the bird must lie chiefly in the heavy head and beak rather than in the legs. As an indication of this, the tarsi are relatively short and light compared to those of the Wedge-tailed Shearwater (*Puffinus pacificus*) which actively

uses its legs in digging a large burrow. The Uau cannot fly readily, if at all, from a level, vegetated area, so the steep, open nesting sites on Haleakala must be especially suitable for taking flight. Presumably when the bird nests in an overgrown region it must walk to an exposed steep slope for taking off.

The egg found in the burrow with the Dark-rumped Petrel on June 8, 1954, was collected, since it had been accidentally cracked. It measured 62 by 44 mm. (larger than the two known eggs from the Galapagos Islands which are 61.4 by 44.1 mm., and 61.5 by



Fig. 2. Site of occupied burrow in crater. Burrow was in lower center next to block of rock some 6 feet high.

39 mm.) and was pure white and bluntly ovate. It contained an embryo, still alive 18 hours after incubation had been stopped and the egg had been carried many miles. The embryo was judged to be about three weeks old, indicating a laying time in mid-May. This is much earlier than the July laying thought typical by Bryan of the Uau on Molokai but agrees with the laying dates of April and May given by Munro (1944: 26). Interestingly, the related Bonin Island Petrel (*Pterodroma leucoptera*) of the western Hawaiian Chain lays in the fall.

Bryan (1907:48) appears to have been the first person who attempted to describe the vocalizations of the Uau, and he speaks of a "long, drawn out *u-a-u*, suggesting the wail of a lonesome cat" and an answering "*uau, ka-ka-ka-ka-ka* . . . combining such a number of . . . sounds as to render it both indescribable and unforgettable." Although thinking they were from Bulwer Petrels (*Bulweria bulweri*), Bonsey (1951:32) describes the calls: "*o-o-o-we*—drawn out on the first syllable and rising to a short bark on the second, and moans, short barks, and rumblings like a tractor engine."

Although we agree that it is difficult to describe adequately the numerous and often eerie sounds made by the Uau, some further attempt seems worthwhile. The most frequent call, usually starting soon after dusk, is a repeated *ä-ōō* with an inflection on the *ä* often making it a sharp note, and the *ōō* lasting about a second. The *ōō* may sound, especially if heard nearby, like a complex of growling squeaks, and may be followed by a sharp *kee-kee-kee*. Additional notes are a nasal, drawn-out *ē*, a croak-like note, and a high-pitched *witch* note.



Fig. 3. Adult Dark-rumped Petrel taken from burrow at Puu Kole on Mauna Kea, Hawaii, June 13, 1954.

Adding greatly to the observations made on Maui, Woodside and Fergerson discovered, on June 12, 1954, five fresh Uau burrows near Puu Kole just over 9000 feet altitude on the southeast slope of Mauna Kea on Hawaii. All the burrows were located under old lava flows and all were over six feet long. Two of them contained birds (fig. 3), and at least one an egg. The nesting material in one was dry bracken and a little grass. The habitat (fig. 4) was similar to that at Haleakala but there were no cliffs. The Mamani (*Sophora chrysophylla*) tree line extends to about the elevation of the burrows on Mauna Kea. The shortest distance to the sea is 20 miles from this nesting area, compared to five to nine miles for the nesting areas at Haleakala.

Predation, probably the limiting factor in the number of petrels, appears to be at a minimum in the high nesting regions. Cats seem to be a serious predator on Mauna Kea and some sign of them was seen high on Haleakala. They probably would not enter deep petrel burrows and so are unlikely to wipe out populations. Mongooses would not hesitate to enter burrows but, fortunately, they seem to be rare in the high, rocky areas. Goats are abundant on the crater walls of Haleakala, and pigs on Mauna Kea, but their activities would not be likely to affect the petrels. Human predation, although significant in past centuries when petrels were eaten by the Hawaiians, is now negligible.

In addition to the parts of Uau skeletons found in one burrow at Haleakala and at one spot in the central crater area, many Uau bones were found in Hopukane Shelter

Cave, some 10,000 feet high on the south side of Mauna Kea. Artifacts indicate the cave had been used by ancient adze-making and hunting Hawaiians, and many of the bones from at least four Uau appear to have been chewed by man. Dr. Kenneth P. Emory, anthropologist of the Bishop Museum, believes this cave was used at least 150 years ago, testifying to a breeding Uau population of long standing in this area. Emory has heard of the old Hawaiians going to the crater of Haleakala to obtain petrels, so it appears that this breeding area has also long been used.



Fig. 4. Site of petrel burrow at Mauna Kea. Lava flow is old and lichen-covered; Mamani trees are in background.

Although our observations establish the fact that the Dark-rumped Petrel is breeding in at least two areas in the Hawaiian Islands, many more records will be necessary to estimate the size of existing breeding populations. On Haleakala, even though the crater rim is only about 10 miles long, canyons and ridges below it make an extensive potential breeding area. Moreover, tracks of petrels apparently exploring for burrows were found next to lava flows in the floor of the crater. The Haleakala area combined with the great potential breeding area around Mauna Kea suggest that present numbers of the petrels are at least in the hundreds and may be in the thousands.

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