

Harlan's Hawk from Utah: first record for the Great Basin.—The Harlan's Hawk (*Buteo harlani*) is known to breed chiefly in Alaska and Northern British Columbia and winter chiefly in the Great Plains region south to Louisiana (A.O.U. Check-list 1957: 106). On 4 November 1967 Everett C. Peck collected a single Harlan's Hawk at a farm located 6 miles west of Delta, 4600 feet elevation, Millard County, Utah (lat 39° 21' N, long 112° 41' W). The area is typical open farm community interspersed with occasional windrows of several species of deciduous trees: principally boxelder (*Acer negundo*), cottonwood (*Populus fremontii*), siberian elm (*Ulmus pumila*), and white poplar (*Populus alba*). The bird was shot from a large white poplar in one of the windrows.

The specimen, now in the University of Utah collection (No. 20931), was a bird in little-worn juvenal plumage with an ossified skull. The sex of the bird could not be positively determined, but it was thought to be a female. Its identification as a Harlan's Hawk was corroborated by Dr. Richard Banks of the U.S. National Museum.

This specimen constitutes the first record for the Harlan's Hawk in Utah, as well as the Great Basin as a whole; and although the status of the Harlan's Hawk is at present equivocal (Mayr and Short, Publ. Nuttall Ornithol. Club, 9:38, 1970), the specimen presents data on the vagrancy of a morphologically distinct form.—GARY L. WORTHEN, *Museum of Natural History, University of Kansas, Lawrence, Kansas 66044, 1 May 1972.*

Status and habits of *Megapodius pritchardii*.—The Malau (*Megapodius pritchardii*) lives only on the small, isolated island of Niuafu'ou in the Tongan archipelago. Due to its isolation and the volcanic nature of the island there has been some concern as to the future of this species. My wife and I were on Niuafu'ou from November 1967 through August 1969 and were able to spend some time observing these birds. Friedlander (Ornithol. Monatsber., 7:37-40, 1899) and Kellers (Smithsonian Inst. Publ., 3111:71-74, 1931) reported briefly on observations on *Megapodius pritchardii*, but the species remains poorly known.

The Malau appears to be in no immediate danger of extinction. There is a limited amount of natural predation from Barn Owls (*Tyto alba*) and feral cats but the most significant predator is *Homo sapiens*. There is a law in Tonga which prohibits the taking of Malaus or their eggs or chicks but this law is generally disregarded in the frontier area of Niuafu'ou. The birds are not being decimated by this human predation because of the difficulty in reaching the majority of their nesting sites. Since Malaus are only taken in the vicinity of nests they generally lead a relatively unmolested life. I suppose that there would be a definite increase in pressure if the human population were to increase significantly above its present limit of 800 or so. Prior to the 1946 evacuation there was a human population of roughly 1500 and the Malau was said to be more numerous at that time than it is at present.

Niuafu'ou is roughly circular in outline with a land area of 13.5 square miles. At least 3.5 square miles are unsuitable habitat for the birds due to extensive lava flows. The Malaus seem to be concentrated around the inner slopes of the caldera and the central lake. There also are a few breeding areas on the southwest seashore. The birds seem to prefer the steep, wooded slopes to the more level areas of the island.

Malaus lay their eggs only in certain specific areas. Six of these areas are regularly visited by egg collectors and there are several other areas which are known but are seldom visited due to the extreme difficulties involved. These sites are quite different. Some are near the lake shore on cinder slopes with little vegetation, others are on the caldera rim in dense forest, and some are between these extremes. The common factors are loose soil composed mainly of volcanic ash and proximity to a volcanic heat vent.



FIG. 1. A man digging for Malau eggs. Each depression in the foreground is a nest site which may have entrances to several tunnels.

We observed Malau eggs throughout the year and saw newly hatched chicks in January, June, July, August, September, and December. The residents report an increase in the numbers of eggs in the burrows during April and May. This observation coincides with our observations. It is also corroborated in the sightings of the chicks since the incubation period is probably in the neighborhood of three months.

The birds lay their eggs in burrows six to eight inches in diameter and three to five feet long. The burrows are carefully filled in after each excavation. The burrow extends more or less diagonally downward into the earth and there may be several burrows in any given nest site (Fig. 1). The people report up to twelve eggs in a burrow during the peak nesting season. This accumulation is over an approximate two-week period and almost certainly is not the work of a single female. I have seen two and three birds digging at one time within a few feet of each other in one nest site. It is believed that only female birds visit the burrows and then only to lay eggs. Twelve birds taken in the vicinity of nests while we were there all had either laid an egg or did subsequent to their capture.

Each egg laying trip probably requires a full day for the female. The work begins in the early morning before sunrise and may last until almost noon. She begins by digging a shallow depression in the floor of the nest site and as she gets into firmer sand that doesn't collapse and slide she begins digging a tunnel. She digs first with one foot for several strokes and then takes a few with the other. From outside a tunnel I have watched soil flying out in five to eight bursts followed by a pause of 10 to 20 seconds before the next series of bursts. Ejected soil may land more than three feet from the tunnel entrance.



FIG. 2. A successful egg collector. This being the off season one egg is not unusual.

Eggs are light brown in color occasionally having scattered white flecks. The eggs tend to lighten with age but this is not a reliable indicator of age since there is a great variation in color at the time of laying. The eggs average about three inches in length with diameters of about one and a half inches. They are equally rounded at both ends rather like a rugby ball (Fig. 2). Temperatures recorded in the vicinity of incubating eggs ranged from 29° C to 31° C and remained stable despite fluctuating ambient temperatures. I hatched two eggs in a crude incubator after determining that the embryos were well advanced. One hatched after 11 days and the other after 26 days. Temperatures varied from 28° C to 34° C during this period. Several of the local people have told of having Malau eggs hatch in their cupboards and in their homes. I regard these stories as true since the average air temperature is only slightly lower than the optimum incubating temperature. I observed one chick that had emerged from a hole in which the eggshell fragments were only six inches from the surface. Apparently a landslide which had occurred about three weeks previously had left the egg in the exposed position and allowed it to suffer rather extreme day-night temperature variations. From these observations it can be assumed that the more mature embryos can withstand substantial temperature changes which would kill most species.

I noted an egg tooth on one newly hatched Malau which was given to me but failed to see any on the two birds which hatched in my incubator. Three of the newly hatched birds I observed had shriveled external yolk sacs which persisted for up to three weeks before falling off. Young Malaus have a distinct natal and juvenal plumage before attaining the definitive adult aspect. Although the young can fly at hatching, they are slow to develop feeding habits. After the third day they begin occasionally to scratch the ground but do not look at the area they have been scratching. It is not until the

fourth or fifth day that they really look for food. Their initial pecking efforts are inaccurate. They do not appear to judge distances accurately nor do they readily consume such food as is picked up. By six days after hatching they recognize and peck normally at ants and small insects and worms. During the first few days the birds rested for long periods; their balance was imperfect and they wobbled when standing. Movement during this period tended to be in bursts rather than continuous. The young I kept for periods up to two weeks never did become tame although adults I had usually were fairly quiet after one week.

Malauus are difficult to observe in the field due to their secretive behavior and dull brown color, but I was able to watch a few adults in addition to those that I kept in captivity. Wild birds spend much of their time searching for food by scratching with their feet in the leaves and forest litter. Birds were not easily approached in the wild but if approached from downslope they tended to be less wary. When frightened they usually ran off rather than flying unless the intruder was very close or above them. A flushed bird commonly landed in a nearby tree and looked back at the source of disturbance. If no further danger was apparent after some minutes the bird would then return to the ground near its original location and carry on its activity. I rarely saw birds in flapping flight unless they had been frightened. They tend to move by walking, occasionally using their wings as an aid in climbing steep slopes. Going downslope they will sometimes glide without flapping.

Captive birds ate grated coconut supplemented daily with worms, ants, roaches, centipedes, and similar foods. The Malauus would not eat a species of yellow wasp common to the island. The captives on this artificial diet lost the bright yellow color of their legs. Captives vigorously defended their food from chickens on the outside of the cage. Twice in July 1969 I saw Malauus of unknown sex (presumed to be male) fighting. These scenes occurred on the big island in the lake where the population is quite dense. The fighting was characterized by wing beating, kicking, pecking, and shoving. In one case the combatants separated only after they had fallen into the lake. On emerging they went in opposite directions each emitting a call I had not previously associated with the Malau although I had heard it rather frequently. Malauus scratch their heads directly under the wing and after feeding commonly bill-wipe on sticks.

I would estimate that the present population is above two thousand adults and is close to the carrying capacity of the island.

Acknowledgment.—I thank G. A. Clark, Jr., for suggestions on the manuscript.—
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Black-bellied Plover incubation and hatching.—The Black-bellied Plover (*Squat-
arola squatarola*) has been little studied on its nesting ground in the Arctic. There has been some confusion about its usual incubation period, and so far as I am aware no one previously has watched the bird from a blind for any considerable time during incubation and hatching. Therefore, I am summarizing observations made in 1970 and 1971 mainly on two nests located in the interior of Bathurst Island, N.W.T., Canada.

The climate of Bathurst is high Arctic, and its shores remain in the grip of sea ice all summer. The terrain is rolling and mostly below 200 m in elevation. The pebble-strewn earth of the hilltops and slopes are nearly bare of vegetation, but the wettest of the lowlands often form sedge-moss flats that are almost completely covered with vegetation and look in the distance like a mowed meadow. The biological research camp of the National Museum of Canada where I worked overlooks an extensive meadow of this