THE PALILA AS AN ENDANGERED SPECIES

The Palila is found at elevations between about 7000 and 9500 ft, the approximate elevation of the present treeline. The forest extended to nearly 10,000 ft before feral horses, cattle, and sheep destroyed it. The last wild horses and cattle were not exterminated from Mauna Kea until the 1930's. At the present time feral sheep, especially, are a serious threat to any significant regeneration of this interesting native forest (see R. E. Warner, Pacific Discovery 13:6, 1960). Hordes of pigs and smaller numbers of goats add to the problem.

Much of the Palila's habitat lies within the Kaohe Game Management Area and the contiguous Mauna Kea Game Management Area, both of which are owned and controlled by the State of Hawaii. The two areas contain about 10,000 acres of mamane-naio forest. Unfortunately, political pressure by a small group of hunters and other uninformed people have made it impossible for the professionally trained personnel of the State Division of Fish and Game to set adequate hunting seasons and bag limits, or to put into practice other wise management practices. Consequently, sheep and pig populations build up to the point where it can be stated emphatically that the Palila do, indeed, inhabit a dying forest, as Warner pointed out several years ago. Contributing to the public's lack of awareness of such conservation problems is the fact that the State Legislature has never granted the State Division of Fish and Game any funds to carry on an education program on the State's unique biological heritage. The State Division of Fish and Game also has been directed by the State Legislature to release Axis Deer in the Game Management Areas at the earliest practical date, which presumably will be during 1970.

The last remaining extensive native mamane-naio forest in Hawaii also faces a new threat because of a proposal to build a new road to the summit of Mauna Kea, a road that would pass through the Game Management areas and, consequently, through the heart of the Palila's habitat. Hunting restrictions for some distance on each side of the proposed new road would complicate further the continuing problem of controlling the populations of both sheep and pigs. This would be unfortunate in the extreme, not only because this unique Hawaiian ecosystem is the only known habitat for the Palila, but also because it is the only one in which the rare Akiapolaau (*Hemignathous wilsoni*), a peculiar honeycreeper with woodpecker-like habits, has been found in recent years.

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THE WHITE-EYE AS AN INTERSPECIFIC FEEDING HELPER

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Skutch (Condor 63:198, 1961) defines a helper as "a bird which assists in the nesting of an individual other than its mate, or feeds or otherwise attends a bird of whatever age which is neither its mate nor its dependent offspring."

In my work on the White-eye (*Zosterops palpebrosa japonica*) I reported on the role of immature White-eyes as intraspecific feeding helpers (Eddinger, Condor 69:530, 1967). I have since observed nonbreeding mature White-eyes feeding nestlings and fledglings of two other species, the House Finch (*Carpodacus mexicanus frontalis*) and the House Sparrow (*Passer domesticus*).

I hand-raised five White-eyes in the indoor aviary (Eddinger op. cit.). These birds fledged between 27 April and 28 July 1966. All five White-eyes were independent by 15 August 1966. The White-eyes were caged with an adult female House Finch that I caught in a mist net on 4 February 1966.

On 9 April 1968 I collected three half-feathered nestling House Finches. The birds gaped readily, revealing a bright pink color inside the mouth with bright yellow around the tip of the bill. The three nestling House Finches with their nest were placed inside the cage containing the five adult White-eyes and the adult female House Finch.

Within 5 min after the House Finch nest had been placed in the cage, the White-eyes flew down to the nest. The finches gaped when the White-eyes approached. The White-eyes flew directly to the food containers and carried papaya and mixed cereal to the gaping nestlings. I provided papayas, avocados, egg yolks, and mixed cereal with vitamins in the cage feeding cups. The adult female House Finch made no attempt to feed the nestlings at this time.

The three House Finches fledged on 16 April and flew to the White-eyes to be fed. On 29 April I saw one fledgling fly to the adult female House Finch and the gaping fledgling was fed, but this was the only time that I observed feeding by the female finch. The White-eyes continued to feed the three House Finches until they became independent on 10 May 1968.

On 2 May 1968 I collected four nestling House Sparrows. The feathers were about half unsheathed on the nestlings. Because the nest was dome-shaped, I cut the top off so that the nestlings would be exposed. The nest and the nestlings were placed in the cage with the White-eyes. The White-eyes were still carrying food to the House Finch fledglings, but again the White-eyes flew to the newly introduced nest and, when the nestlings gaped, carried food to them. The White-eyes continued to feed the sparrows until they became independent on 3 June 1968.

From 2 May to 10 May the five White-eyes fed the three fledgling House Finches and four nestling House Sparrows. I noted at this time that the five White-eyes showed little discrimination in food selection. On five occasions I saw the White-eyes pick up fecal material from the floor of the cage and feed it to the sparrows.

The interspecific feeding behavior observed here may well be the result of aviary conditions, but it has provided me with an easy and efficient way of hand-rearing nestling birds.

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