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NOTES ON THE STATUS AND NATURAL HISTORY OF MICRONESIAN BATS

by Phillip L. Bruner and H. Douglas Pratt

Most of what is known about bats in Micronesia is in pre-World War II, technical, taxonomic publications (Miller 1911; Andersen 1912; Thomas 1915; Kuroda 1920, 1939; Tate 1934; Tate and Archbold 1939) that contain little information on natural history. Such information has appeared on the fruit bats of Palau (Perez 1968) and Guam (Perez 1972). In 1976 and 1978, we visited Micronesia and made the observations on bats presented herein. Our expeditions were primarily for ornithological research, and thus our observations and collections of bats were incidental to our work with birds. Nevertheless, Micronesian chiropterans are so poorly known that even such limited observations can be of value.

From 31 May to 22 July 1976 we visited Guam, Rota, Tinian, and Saipan in the Mariana Islands, and Palau, Yap, Truk, and Ponape in the Carolines. We spent an average of seven days on each island. Between 10 June and 22 July 1978 we revisited all islands except Rota and Tinian, and again spent about one week on each.

Few specimens of bats have been collected in Micronesia. A summary of collections from Ponape and of *E. palauensis* from Palau is given by Johnson (in Storer 1962:22-25). We obtained individuals of *Pteropus* and *Emballonura* at Truk and Ponape and these have been deposited in the collections of Brigham Young University-Hawaii Campus and Louisiana State University. Measurements of these specimens are summarized in Table 1. Our collections greatly increase the number of specimens on *Emballonura sulcata* in existence. Further comparison of these additional specimens with previously collected ones may help to determine whether subspecific differences exist between the populations on Truk and Ponape, as suggested by Sanborn (1949). Our collections

indicate that *E. sulcata* from Ponape is distinctly lighter brown in overall coloration than its relatives on Truk.

Megachiroptera

All the islands we visited have at least one species of fruit bat (Fig. 1) of the genus *Pteropus*. At present, full species are recognized for the Marianas (*P. mariannus*), Yap (*P. yapensis*), Palau (*P. pelewensis*), Truk (*P. insularis*), and Ponape (*P. molossinus*), (Tate 1934; Storer 1962). These allopatric forms might well be components of a single polytypic species, but present knowledge is insufficient to support such a conclusion. In addition, a rare and little known second species, *P. tukudae*, has been described from Guam (Tate 1934; Perez 1973). Another fruit bat, *Notopteris macdonaldi*, was taken on Ponape at least a century ago (Storer 1962:23). Presumably, none of our observations pertain to these two species.

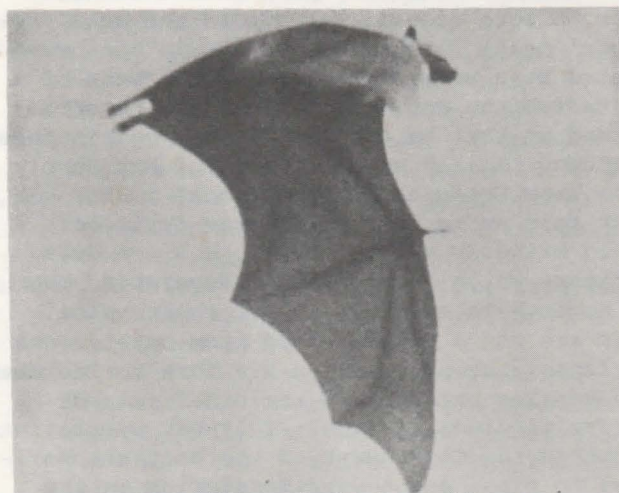


Fig. 1. Micronesian fruit bat, *Pteropus yapensis*, in flight.

TABLE 1. - Measurements of specimens of Micronesian *Pteropus* and *Emballonura* (mm).

Specimen	Sex	Age	Total Length	Tail	Hind foot (excluding claw)	Ear (from notch)	Forearm	Weight (g)
<i>P. molossinus</i>								
BYU-HC 246	F	ad.	140	0	30	18	97	124
BYU-HC 247	F	ad.	148	0	31	17	102	129
<i>P. insularis</i>								
BYU-HC 248	M	ad.	168	0	40	20	99	148
BYU-HC 249	M	ad.	186	0	45	22	106	200
BYU-HC 253	F	ad.	131	0	28	21	101	150
BYU-HC 254	F	juv.	110	0	28	20	83	68
LSUMZ 20877	F	ad.	150	0	34	23	122	170
<i>E. Sulcata</i>								
BYU-HC 245*	F	ad.	70	20	5	12	50	5
BYU-HC 255	F	ad.	74	18	8	12	54	6
BYU-HC 256	M	ad.	63	18	8	12	47	4
LSUMZ 20878	F	ad.	62	14	9	12	46	4
LSUMZ 20879	M	ad.	60	14	6	11	46	4
LSUMZ 20880	F	ad.	72	19	9	10	43	(alcoholic)

*Collected on Ponape. All other *Emballonura* were taken on Truk.

In 1976, we saw only one *Pteropus* on Saipan and two on Rota, and in 1978 we saw only four on Guam. Of the latter four, one individual in an area known as Andersen South near Yigo was being vigorously harassed by five Black Drongos (*Dicrurus macrocercus*), an introduced bird now abundant in northern Guam. The attacks were so severe that the bat had considerable difficulty flying. Perez (1972) also reported attacks on fruit bats by these birds. The drongo is present only on Guam and Rota, and while the bird may be a threat to fruit bats, a more significant one is the local residents' taste for bat flesh. Fruit bats were listed at a very high price on the menu of a restaurant on Rota in 1976. The manager informed us that he could no longer obtain this delicacy locally and that most of his supply came from Palau and Yap. A local hunter on Truk told us in 1978 that large fruit bats could bring as much as \$25.00 U.S. on Guam, a figure which is probably exaggerated, but is nevertheless indicative of their value. Bats are not a popular food item outside the Marianas, but such prices are sure to increase the hunting pressure on the other islands. Severe declines in local fruit bat populations prompted the Government of the Northern Marianas to place a one-year moratorium on the taking of bats in 1977, and a proposed list of Endangered Species from Guam (leeke 1977)

includes *P. mariannus*. Federal protection may be necessary to prevent the depletion of fruit bats throughout Micronesia. Owen (1977) has noted recent declines in *P. pelewensis*, and we found *P. yapensis* (Fig. 1) to be less common than other species outside the Marianas. Fruit bats probably could sustain well-regulated hunting, but such concepts as seasons and bag limits are presently quite alien to most Micronesians.

Most species of the genus *Pteropus* habitually gather in large roosts. Where bats are hunted, as at Yap, Palau, and the Marianas, such roosts are easily disturbed by a human intruder. Natives on Yap informed us that the bats can be secured by a hunter only when he disguises the smell of his body with oil or perfume. However, in the Truk group a large roost of over 100 *P. insularis* in the native forest near the summit of Tol Island seemed oblivious to our presence. Even on the heavily populated island of Moen, Truk group, fruit bats were less wary than at Yap and Palau. We found no roosts on Moen, but often three or four fruit bats could be seen flying together. Among our specimens of *P. insularis* was a female carrying a well-developed young about half her size. Truk fruit bats have a prominent buffy breast and mantle that contrasts with the brown of the head, back, and belly. The eyes are brown.

The Ponape fruit bat, *P. molossinus*, differs from the other species in several respects. Although these animals are not commonly hunted, we did not find any large communal roosts. Instead many solitary individuals and pairs of fruit bats were seen throughout the island. *Pteropus molossinus* is smaller than its Micronesian congeners and lacks the buffy mantle and breast. It is mainly dark blackish-brown with the lower back slightly paler and the face washed ochraceous (Fig. 2). The eyes are yellowish-brown. In flight, Ponape fruit bats have quicker wing beats and are more graceful than the larger species. Our two specimens came from the district of Sokehs.

As the name implies, fruit bats are frugivorous. We noted them feeding on fruits of a variety of trees including *Pandanus* and endemic palms. Micronesian fruit bats are probably opportunistic feeders. We saw all species fly distances of several kilometers, and thus they probably take full advantage of the fruiting seasons of various plants.

Microchiroptera

The small, insectivorous bats of Micronesia all belong to the genus *Emballonura*, commonly called sheath-tailed bats. The subspecies known from Rota, *E. sulcata rotensis* (Yamashina 1943), has not been seen for many years and may be extinct. Small bats of this genus have been seen on Guam (Perez 1972), but none have been collected. At Palau, *E. palauensis* is abundant and can be seen hawking insects at dusk over the streets of the District Center at Koror. The porous limestone substrate of the southern Palaus provides many caves and crevices that serve as roosting sites for sheath-tailed bats.



Fig. 2. Distinctive facial markings of *P. molossinus*.

Emballonura sulcata is abundant on the Truk Islands, but less numerous on Ponape. We visited a large colony of several hundred of these bats in the man-made caves above the Truk District Center on Moen. We saw no such congregations on Ponape, but Jackson (*in* Storer 1962:19) reported them in an artificial vault on that island. These cave-roosting bats gathered in small groups in side tunnels of the light, but were easily disturbed during the day, and were not particularly reluctant at such times to leave the confines of the tunnels. When agitated, these bats produced an audible chatter distinct from the clicking sounds of the swiftlets (*Collocalia iniqueta*) with which they share the caves. We heard a similar chatter during the day from a pair of *Emballonura* flying about beneath the canopy in dense native forest on Ponape. We saw many sheath-tailed bats in the air over town streets on Moen at dusk, but on Ponape we did not see any in heavily populated areas. Most of our sightings on the latter island occurred during the day in forests, but we saw a few bats in open areas along the road in Kittiti at dawn.

Acknowledgments

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PALILA TRIUMPHS IN COURT

On Wednesday, June 6, 1979, federal judge Samuel P. King ordered the State of Hawaii to work out an eradication program for the wild sheep and goats on Mauna Kea. The sheep and goats are destroying the mamane-naio forests that constitute critical habitat for the endangered Palila (*Psittirostra bailleui*), a Hawaiian honeycreeper. The plaintiffs in the suit were the Sierra Club, the Hawaii Audubon Society, the National Audubon Society, and Dr. Alan Ziegler. Big Island Representative Mae Mull has published commentary on the issues involved ('Elepaio 38:54-55, 117), and readers will be kept abreast of future developments in upcoming 'Elepaio issues. Judge King's decision was welcomed with elation by environmentalists, including Hawaii Audubon Society members, who have waited for over a year and a half for resolution of the case. Mike Sherwood, attorney for the Sierra Club Legal Defense Fund handled the case for the plaintiffs.

HAWAIIAN PLANT COMMEMORATED ON POSTAGE STAMP

An endangered Hawaiian plant, *Vicia menziesii*, found only in the Ka'u District of the Big Island is being honored nationally on a 15-cent commemorative postage stamp that went on sale at post offices throughout the country on June 8.

The sheet of "Endangered Flora" stamps features four U.S. plants -- three from mainland states and the fourth is the Hawaiian wild broadbean that is a relative of the garden sweet pea.

The Hawaiian name for this rare native plant has been lost since the arrival of continental man in the islands. Hawaii *Vicia* was first seen by a western naturalist, Archibald Menzies, on the Vancouver voyages in 1794 in the upper Kapapala forest in Ka'u. Later botanists found *Vicia* on only three occasions in upper Mauna Loa forests despite extensive searching. It was considered extinct for fifty years until Dr. Wayne C. Gagne, entomologist with the Bishop Museum, rediscovered a *Vicia* clump in the Kilauea Forest Reserve at 1,600 meters (5,200 feet) elevation on February 8, 1974.

The 'ohi'a-koa forests of upper Keauhou Ranch and Kilauea forest are the last remaining *Vicia* habitat, shared with four endangered species of Hawaiian forest birds: 'Akiapola'au, Hawaii 'Akepa, Hawaii Creeper and 'Io, the Hawaiian Hawk. The survival of this attractive climbing vine with colorful deep-pink and white flowers is threatened by logging, cattle grazing and wild pigs. This crucial habitat for endemic birds and plants, on lands owned by the Bernice P. Bishop Estate, has been proposed for acquisition and protection under the Unique Wildlife Ecosystems Program of the U. S. Fish and Wildlife Service.

Hawaiian wild broadbean is the only Hawaiian plant so far to be given official federal and state recognition of its endangered status.

*Mae E. Mull
Island of Hawaii Representative*



BIBLIOGRAPHY OF KAULA ISLAND, HAWAIIAN ARCHIPELAGO

by George H. Balazs

Kaula is an isolated and uninhabited volcanic island in the Hawaiian Archipelago located 20 nautical miles west-southwest of Niihau at 21°39'N, 160°33'W. Situated on a 27 square mile shoal, the island consists of 136 acres with a maximum elevation of 540 feet. Relatively little information exists on the natural history of this area. In contrast, considerable knowledge has been accumulated for the other small oceanic islands that extend for 1100 miles to the northwest of Kaula and are commonly known as the Northwestern Hawaiian Islands. Although similar to these islands in terms of rich avifauna and other environmental characteristics, Kaula was nevertheless not included in the Presidential Order of 1909 that established most of the Northwestern Hawaiian Islands as a sanctuary for seabirds. This historical absence of refuge status for Kaula has been the principal factor responsible for the low level of research over the years and the present scarcity of ecological information.

The significant aspects of the known history of Kaula can be summarized as follows. At the time of Captain Cook's arrival in 1778, Kaula was familiar to the Hawaiian people both in folklore and as a place to gather seabirds for food and ornamental feathers. In 1924 the Governor of the Territory of

Hawaii formally established Kaula as a Light-house Reservation under the jurisdiction of the U.S. Department of Commerce. An automatic navigation light was subsequently constructed on the island and remained operational from 1932 to 1947. In 1939 the Light-house Service, along with jurisdiction of Kaula, was assigned to the U.S. Coast Guard. In 1952 the U.S. Navy and Marine Corps started using the island as a target for bombing and other ordnance practice. Opposition to this use was initiated in 1961 by some of Hawaii's residents and public officials due to a concern for the nesting seabirds. However, in 1965 the Coast Guard officially transferred control of Kaula to the Navy, thereby continuing its use as a target. In 1971 the Navy consented to periodically allow fishermen to enter the three mile restricted zone surrounding the island when bombing exercises were not taking place. In 1976 an Environmental Impact Assessment was filed by the Navy indicating that the bombing activities did not represent a significant adverse impact to the island. Since 1977 the controversy over this bombing has intensified due in part to the unilateral designation of Kaula as a seabird sanctuary by the Department of Land and Natural Resources of the State of Hawaii. Additionally, concern has been expressed for the endangered humpback whales that are known to seasonally frequent the island's shoal area.

My objective in publishing a bibliography of Kaula is to make available for the first time a comprehensive list of references that can be useful to researchers of various disciplines interested in advancing the knowledge of the island-area. This information source should also prove valuable to state, federal and military agencies having an interest in the administration and monitoring of the island.

The research involved in preparing this bibliography was in conjunction with literature reviews I am conducting of green sea turtles and other natural history aspects of the Northwestern Hawaiian Islands. This work is current as of January, 1979, and is supported in part with grants from the State of Hawaii, Office of the Marine Affairs Coordinator, and the University of Hawaii Sea Grant College Program (04-7-158-44129). I also gratefully acknowledge the assistance provided by Alan K.H. Kam, Lee S. Motteler and Dr. Edward W. Shallenberger.

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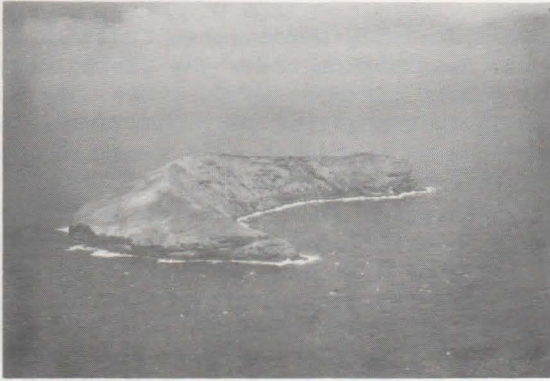


Fig. 1. Kaula Island viewed from the south-east. The curving crest of the island is 5,500 feet long with a maximum width of 1,650 feet.

Photo by G. H. Balazs

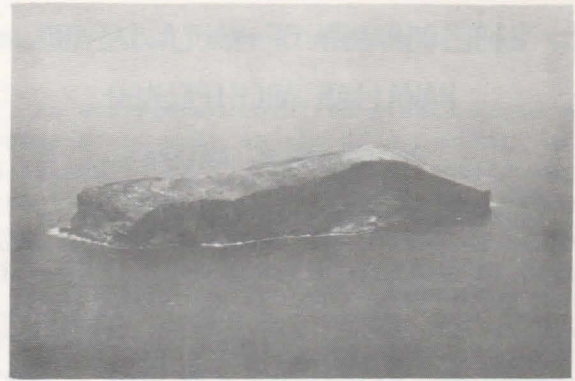


Fig. 2. Kaula Island viewed from the north-west. The large sea cave present in the precipitous coastline is described as being the home of the mythical Hawaiian shark god Kahaimoana.

Photo by G. H. Balazs

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TWO OBSERVATIONS OF INTEREST FROM CANTON ISLAND

by Paul R. Julian

During the two weeks I spent on Canton Island, in the Phoenix Islands, in late August and early September 1978, two entire days and some time on other days were spent birding. The most notable observation, of a migrant sandpiper, was entirely unexpected, but other than that one individual, the birds sighted were familiar and/or expected.

I did enjoy a ten-minute study of a single Phoenix Petrel (*Pterodroma alba*), which circled about me, occasionally approaching to within twenty meters or so. The throat and chest of this bird were a solid blackish-brown, the same color as the back and upper parts. The opportunity of size comparison with accompanying Gray-backed Terns, the smallish, all-dark bill, all dark wing lining, and only slightly wedge-shaped tail, would seem to eliminate all other possibilities save one--the Tahiti Petrel (*P. rostrata*). Alexander (1963) indicates that *alba* shows a white throat, with a resulting dark breast band. More modern references (King 1967, Harper and Kinsky 1978) indicate that the amount of white on the throat is variable. I could see none at all, even at close range. Except for this variable mark, the descriptions of these two petrels are identical, and separation in the field would be difficult. I assume that because the bird was flying near the atoll's surface that it was, or had been, a or had been, a breeder, and therefore *P. alba*.

On Monday, August 28, while walking along the atoll's ocean side, just north of the airstrip, I flushed an obvious shore bird. With good light and 8x40 binoculars, I was able to make the following notes in the field: "brownish back with black vermiculations on wing coverts; white shoulder crescent; legs dark yellow or yellow-orange; eye ring prominent; bill light with dark tip; teeters; wing stripe when flying; characteristic spotty flight." Being quite familiar with the Spotted Sandpiper (*Actitis macularia*) on the mainland, after checking my literature, it occurred to me that the bird might possibly be a Common Sandpiper (*A. hypoleucos*). I found the bird a few days later, in the same area, and re-examined it. Aside from noting the clear, whitish underparts (which I had neglected to note down previously, I could see nothing which did not agree with what I then thought the North American *A. macularia* should be.

Consultation of Prater et al. (1977), after returning to the mainland suggested only that I was probably correct in my original

identification. These authors state that in winter plumage the adult (and juvenile) *macularia* tend to be "rather greyer with coverts more boldly barred" than *hypoleucos*. Although obviously no comparison was possible, I did note, with no prompting, the markings on the coverts. It seems likely that I would not have noted them had the Common Sandpiper been involved.

According to Pyle (1977), this species pair is included on the list of Hawaiian birds. The bird was still in the same location on September 4, two days before I left the island.

I thank R.L. Pyle for review and pointing out and supplying me material from the King and Harper and Kinsky references.

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ALOHA TO NEW MEMBERS

The Society welcomes the following new members and hopes that they will join in our activities to further the protection of Hawaii's native wildlife:

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ARTIFICIAL NEST STRUCTURES USED BY WEDGE-TAILED SHEARWATERS AT KILAUEA POINT, KAUAI

by G. Vernon Byrd

Nesting Wedge-tailed Shearwaters (*Puffinus pacificus*) on Kauai have been decimated by introduced predators, and construction of predator-proof fences around existing colonies has been proposed to preserve populations (Byrd and Boynton 1979). Since fencing is costly, it would be desirable to increase the potential nesting sites within protected areas. The construction of artificial nest burrows in shallow or sandy soils which are poor natural burrowing areas would increase nest sites. Artificial burrows have been used successfully in the management of Bermuda Petrels (*Pterodroma cahow*) (Wingate 1977); Puerto Rican Parrots (*Amazona vittata*) (Snyder 1977); and Burrowing Owls (*Speotyto cunicularia*) (Collins and Landry 1977). Wedge-tailed Shearwaters are known to nest under boards and other debris (Amerson 1971), so I suspected they would use artificial burrows.

In February 1978, 18 artificial nest structures were installed within the Wedge-tailed Shearwater colony at Kilauea Point, Kauai to test acceptance of the structures by birds and the success of shearwaters using them.

Methods

Artificial burrows consisted of two 1 x 8 x 18-inch boards nailed together at right angles along their longest sides. The open side of the structure was placed against a hillside so that the burrow's top and outer wall were wooden and the floor and inner wall were earthen. To facilitate viewing by investigators, a 5-inch plexiglass window with a removable plywood cover was placed in the outer wall of each structure. The end of the structure opposite the entrance and the top board were covered with soil (Fig. 1). The size of the structure was similar to natural burrows, except the artificial burrows were slightly deeper than most natural burrows. Artificial nests were located near the central part of the Kilauea Point colony. All artificial structures were within 2 m of natural burrows, but no natural burrows were disturbed during installation.

Results and Discussion

From March to June 1978, the courtship and laying phase of the nesting season, every

artificial burrow was visited by shearwaters. Plywood covers blew off the plexiglass windows of two structures, exposing potential nesting cavities to direct sunlight. One of these structures was not used for nesting, but a pair nested in the other near the entrance, away from the "open window". Overall, eggs were laid in 15 of 18 (83%) artificial structures, and all the eggs hatched. One chick died of unknown causes at about 5 days of age; the other 14 chicks fledged.

Using a "t" test, I determined that significantly ($p=.01$) more chicks per burrow were produced in the artificial structures (.78) than in natural burrows in the entire Kilauea Point colony (.53, Table 1). Birds using artificial burrows also produced more chicks per nest than birds using natural burrows in a sample plot near the artificial structures (.72), but this difference was not significant. A comparison of chicks produced per egg, however, reveals that artificial burrows (.93) were significantly more productive ($p=.05$) than natural burrows (.80) in the sample plot.

These results are surprising because most Procellariiformes return to the same area of the colony, usually to the same burrow, annually to breed (Lack 1968, Shallenberger 1973). If experienced breeders returned to the burrows they used the previous year at Kilauea Point, birds using the new burrows would presumably be young, inexperienced breeders nesting for the first time. However, if this were true, the success rate should have been lower than that of birds using natural burrows in the sample plot nearby since older, more



Fig. 1. Artificial nest structure used by Wedge-tailed Shearwaters. Note the viewing window at left.

Photo by G. Vernon Byrd

TABLE 1. Fledgling production in natural and artificial Wedge-tailed Shearwater burrows at Kilauea Point.

	Entire Kilauea Pt. Colony	Study Area Near Artificial Burrows	Artificial Burrows
Total active burrows ¹	1344	103	18
Burrows with eggs		93	15
Eggs/burrow		.90	.83
Total fledglings	712	74	14
Fledglings/burrow	.53	.72	.78
Fledglings/egg		.80	.93

¹Determined by the presence of fresh droppings, molted feathers, nest material, adults, eggs, or chicks.

experienced breeders are generally more successful than young birds (Shallenberger 1973). Therefore, the high success rate in artificial burrows indicates that the sites were probably used by experienced birds which either switched to new locations from established burrows or were displaced from previously used sites by other pairs or by natural destruction of sites (e.g. caving during the winter). In either case it is apparent that a sexually mature, non-breeding population, which is limited by the lack of nest sites, is present at Kilauea Point. When nest sites become available (i.e. artificial structures are provided), some of these birds are able to nest.

Above-average nesting success by birds using artificial burrows may be attributed to burrow depth. Shallenberger (pers. comm.) found that birds using deeper burrows were more successful than birds with shallower burrows on Manana Island. He speculated that chicks with shallower burrows might be more prone to wander outside the burrows, thus increasing the chances of mortality. At Kilauea Point, where egg predation by Common Mynas (*Acridotheres tristis*) is severe (Byrd 1979), deeper burrows may offer better protection for eggs. No eggs were lost from artificial burrows, while about 21 percent of the eggs laid in natural burrows at Kilauea Point in 1978 were taken by mynas (Byrd 1979).

Conclusions and Recommendations

Artificial nest structures were readily accepted by Wedge-tailed Shearwaters at Kilauea Point. High success rates in these structures indicate they provide above-average nesting sites. Use of artificial nesting structures to enhance breeding in areas protected from predators seems feasible.

I recommend that additional artificial structures be constructed from an 8-inch diameter plastic, clay, or concrete pipe instead of wood to increase their longevity. Bottoms

of pipes should be removed so that birds may dig in the earth; digging may be an important part of courtship behavior for shearwaters (Shallenberger pers. comm.). Artificial burrows should be installed in selected Wedge-tailed Shearwater colonies on Kauai to enhance production.

Additional research should be conducted at Kilauea Point involving several hundred artificial structures and marked shearwaters to compare long-term production, durability of burrows, nest site tenacity, and nest site preferences between artificial and natural sites.

Acknowledgements

Thomas C. Telfer and John L. Sincock provided useful advice on the design of the artificial structures. Hiromu Seshiki and the Young Adult Conservation Corps personnel helped construct and install the structures. Cameron Kepler, C.J. Ralph, Carol P. Ralph, and Robert J. Shallenberger offered particularly useful suggestions during preparation of the manuscript.

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FIRST RECORDS OF LAVENDER FIRE-FINCH ON HAWAII

by Philip Ashman and Peter Pyle

The Lavender Fire-finch (*Estrilda caerulescens*), a native of West Africa, is a popular cage bird, approximately nine cm long, gray with crimson lower back, rump, sides of the tail, undertail coverts and ventral area (Bates and Busenbark 1970). It has been recorded in the wild on Oahu since December 1965 (Berger 1977) with all observations coming from the Kapiolani Park and Diamond Head areas. No nests have been reported, nor has any breeding activity been observed. The Lavender Fire-finch has not been reported from any of the other Hawaiian Islands.

On 28 May 1978 at 0750, Ashman saw a single Lavender Fire-finch at an elevation of 634 m approximately 3.6 km SW of Puu Waawaa on the island of Hawaii. It gave a soft, plaintive *see-teeer* call. The bird was perched on a snag approximately 10 m above the ground. It remained perched, calling frequently, for about 3 minutes before flying off. In flight, it gave a *tik-tik* call. The habitat in which it was found is dry, disturbed land (grazed and plowed) with trees 10-15 m tall. The predominant tree species were wili wili (*Erthrina sandwicensis*) and mamane (*Sophora chrysoylla*) forming an open tree canopy, with lesser amounts of hala pepe (*Pleomele aurea*) and koa haole (*Leucaena leucocephala*). Vegetation in adjacent areas consisted of kukui (*Aleurites moluccana*), kauila (*Colubrina oppositifolia*), lama (*Diospyros ferrea*) and silky oak (*Grevillea robusta*) with an understory of lantana (*Lantana camara*) interspersed with native and introduced grasses.

In addition to the sighting in May, Lavender Fire-finches were reported on Puu

Waawaa Ranch as follows: one bird on 5 June 1978 at 631 m, approximately 4.1 km NNE of Puu Waawaa in an open-canopied *Metrosideros*-dominated forest (T. Burr, pers. comm.); 3 birds in this same habitat on 8 June 1978 at 762 m elevation, 2.3 km NNE of Puu Waawaa (P. Pyle); and 5 birds on 8 June, and a flock of 10 birds on 9 August 1978 in a closed-canopied forest co-dominated by *Metrosideros* and *Grevillea* on the north slope of Puu Waawaa (P. Pyle)

The habitats in which we found Lavender Fire-finches continue for several km to either side of Puu Waawaa. However, based on the results of the U.S. Fish and Wildlife's Hawaii Forest Bird Survey, which sampled this area along transects spaced 3.2 km apart in the summer of 1978, Lavender Fire-finches were found only in an area estimated to be 40 km² which extends 1.8 km east and 5.3 km west from Puu Waawaa, and between the north slope of the puu itself and Mamalahoa Highway. The species was probably released at Puu Waawaa Ranch, where a number of exotic species have previously been recorded (Lewin 1971, van Riper 1973, 1978), but apparently it has not erupted in the manner of the Warbling Silverbill (Berger 1975) and Yellow-fronted Canary (van Riper 1978).

Acknowledgements

These field observations were made while the authors were participating in the U.S. Fish and Wildlife Service's Hawaii Forest Bird Survey. Jim Jacobi, J. Michael Scott, and Charles van Riper III read and commented on this manuscript.

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HAWAII BIRD OBSERVATIONS

AUGUST 1978 THROUGH FEBRUARY 1979

by Robert L. Pyle

The normally dry trade wind regime of summer and fall ended abruptly in the last week of October, when a good kona storm brought drenching rains to the state. It was particularly heavy on the northern islands of Kauai and Oahu, where more than 10 inches fell on October 30 and 31 at Honolulu. The rainy period lasted nearly a week and dispersed shorebirds and waterfowl from their usual areas of concentration. Continuing frequent rains through the winter resulted in the first above-average winter precipitation totals in 7 years. One big storm in January and another in February brought copious amounts to Hawaii Island and considerable flood damage. The major noticeable effects of the wet winter on birds were the continuing dispersal of shorebirds and ducks to scattered, temporary wet areas, and noticeably lower counts at the traditional ponds.

Pied-billed Grebe--This was a year for the Pied-billed. One was at Waiakea Pond in Hilo, H., on November 19 and 23, and again on January 11 and 23 (CJR, CPR, et al.). One at Lokoaka Pond near Hilo on November 23, seen one-half hour after the one at Waiakea (CJR, et al.), was probably a second bird. One was found at Kii Pond, JCNWR, O., December 19, and 2 were seen there January 3 and 4 and regularly through at least February 23 (GB, et al.).

Albatross--At Sand I., Midway Atoll, Black-footed Albatross arrived back on October 14, and Laysan Albatross on October 31 (BG). The Short-tailed Albatross returned there October 25 and was seen again January 16-20 (CH), marking the seventh consecutive year that one of these rare, spectacular birds has wintered at Midway.

Newell Shearwater--In an unusual rescue operation, 857 shearwaters were picked up from coastal highways of Kauai during the fall and released alive (VB, TT, see 'Elepaio 39:71).

Hawaiian (Dark-rumped) Petrel--*en* At Haleakala Crater, M., a petrel chick found in a burrow September 25 (CK, PS) was estimated to be about 8 weeks old. Three recently fledged birds were found at widely scattered locations and elevations on Kauai between November 23 and December 2, strongly suggesting at least a small nesting population on this island (VB).

Bulwer Petrel--Although these small petrels nest sparingly on several of the small islets off of Oahu, they are seldom seen, since they normally spend the daytime at sea except when incubating. Thus it was satisfying as well as significant when the HAS trip to Manana I. on August 13 found two adults in one nest crevice

and three other nests, each containing a downy chick. A bird thought to be an adult Bulwer Petrel was found alive on the water outside Manele Bay, Lanai I., September 3. It was brought to shore and placed in a shaded recess in a nearby cliff. The bird was weak and did not struggle (PC.)

Leach Storm-Petrel--A bird with a feathered brood patch was found alive on Kauai and turned in to State Fish and Game personnel on November 23 (fide VB). It was photographed, banded, and released. Its measurements fit those of the California race (beali). A year earlier on November 3, 1977, a bird probably of this species was found near the mouth of Waimea Canyon, K., and was banded and released (D.Boynton, fide VB). Photographs of both birds have been deposited in the Society's Rare Bird Documentary Photograph File.

White-tailed Tropicbird--A juvenile bird seen on December 27 flying from Manoa Valley out to sea, stopping to circle the summit of Diamond Head (MS), is an interesting locality record for Oahu.

Red-tailed Tropicbird--The HAS trip to Manana I. on August 13 recorded 5 adults and, more significantly, one nearly full-grown chick on a ledge in the near sheer cliff face at the west end of the island. Although this species nests commonly in the Northwest Hawaiian islands, the two or three nests reported on Manana since 1967 are the only known instances of its nesting in the main Hawaiian islands. An adult sighted at Kahuku at the north tip of Oahu September 23 (RP, PS) helps confirm the impression that these birds are now being seen more frequently around Oahu and possibly Kauai.

Blue-faced Booby--This summer, as usual on Ulupau Head., O., observers with good scopes could usually see two or three birds on Moku Manu, apparently nesting. An interesting winter record was obtained on February 18, when two were seen on Moku Manu during the HAS trip to Ulupau Head.

Brown Booby--A heavily oil-stained bird was found dead at Kamalapau Harbor, L., February 6 (PJC).

Little Blue Heron--One was sighted October 23 at Waipio, O., where all of the very few known occurrences of this species in the past several decades have been. This bird was in fine plumage, and was described (CJR,CPR) as follows: "20% bigger than (Cattle) egrets, grey-blue all over, head and neck slightly darker (with) a hint of chestnut or rusty; bill with dark tip, rest grey-blue as was the bare skin around and over the eye; and legs grey-blue. It fed delicately, walking carefully, picking at the muck with the tip of its bill."

Cattle Egret--One on Midway Atoll October 19 (CH) following reports of single birds on French Frigate Shoals and Laysan I. in 1977, documents the wanderings of this ubiquitous species from introduced populations on the main Hawaiian islands virtually all the way up the northwestern chain. Closer to the main islands, 9 large white birds were sighted with cattle at Puu Alala, Niihau I., on January 20 (TT). The sighting was made from a small plane at about 250 feet elevation. The birds almost certainly were Cattle Egrets, and represent the first known report of this species from Niihau, an island very rarely visited by ornithologists.

Black-crowned Night Heron--One seen October 8 at about 1300 m elevation in the Kilauea Forest Reserve H., (RW) is further evidence that this species does occasionally appear in high elevation forests. This individual was sitting in an 'ohi'a tree at the edge of the forest next to a frog-filled stock pond on the Carl Meyer ranch. The ranch is a cleared portion of the Forest Reserve. At a far different locality, another was reported in mid-channel flying from Maui toward Lanai February 27 (PJC), for an interesting instance of inter-island movement.

White-faced/Glossy Ibis--This bird, seen regularly in the West Loch area of Pearl Harbor, O., for the past two years, is still holding on. It was sighted several times during the fall and winter to at least January 31 (GB, et al.). On October 23, at Waipio, O., it was reported to have had a "cherry-red eye" (CJR, CPR).

Canada Goose--A single bird of a medium-sized race was seen by many observers at Kii Pond from December 5 until well beyond the end of February. Another individual (small) was reported at Kealia Pond, M., on December 4 and again on the 23rd (CK). One was seen at Waiakea Pond, Hilo, H., November 23, December 31, and into January (CJR, DP, et al.).

Mallard--Sightings of this species are difficult to evaluate because of the great many domestic-descendent "mallards" inhabiting parks and canals in residential areas. Birds in wild wetland areas, associating with Pintails and Shovelers, and acting just as "flightly", are more likely (but not guaranteed) to be wild migrants from the north. Reports that may be in this category include: 2 at Kii Pond, O., November 5 (CJR, CPR); 3 at the south pond complex of Waipio, O., January 1 and 7 (RP), and 4 there January 28 (MO, RS); and 2 at Lokoaka Pond, H., January 27 (CJR).

Pintail--Seldom do we have observational documentation for the actual arrival in Hawaii of ducks or shorebirds making the long over-water trip from their arctic breeding areas.

But on October 18 a Pintail was seen landing at the Hawaii National Park Research Center, near 1200 m elevation. It "appeared to be exhausted, and initially flew to the glass-roofed greenhouse, which may have resembled a pond from a distance. It appears to be an initial landfall." (RW, WM).

Garganey--A bird at Waiakea Pond in Hilo, H., November 8 was described as: "same size (as drab bird nearby identified as a Green-winged Teal), but a whitish superciliary stripe, dark crown, dark line through the eye to the top of the bill and another, less distinct line from the base of the bill back to behind the eye. A clear spot was located just behind the bill, which was a drab, but not dark, color. There appeared to be a light-colored stripe about 1/4 inch wide along the side of the bird. The breast was spotted" (CJR). The same bird was there November 19, 23 and January 27 (CJR, et al.). Another Garganey at Waipio, O., November 18 was reported to have a "face pattern slightly duller than the Hilo bird, but with the same white patch behind the bill (more strongly marked on one side) and the same line from base of bill back" (CJR, et al.).

Blue-winged Teal--A pair at Kakahaia NWR, Molokai, January 23 (CK), and one male at Kanaha Pond, M., December 26 (JW) and February 22 (EK) were only an echo flight compared to the many that reached the state last winter.

Cinnamon Teal--One fine male was at Kanaha Pond, M., December 4 (CK) and was still there with a male Blue-winged Teal on February 22 (EK). A male was reported at Hanalei NWR, K., December 28 (DP).

European Wigeon--A bird thought to be this species in female plumage was studied at Waipio, O., December 3 and again January 28, in close association with several American Wigeon for comparison (MO).

American Wigeon--This duck appeared in unprecedented numbers this winter at Kii Pond, O., (32 on January 1, RL), and on the South Pond at Waipio, O., (23 on November 18, RP). Smaller numbers were seen elsewhere, including 5 coming into the little, wet pasture on Hamakua Drive, Kailua, O., for the Honolulu Christmas Count December 17 (RP).

Redhead--Two fine males were studied well at Kakahaia NWR, Molokai, January 23 (CK), and one drab bird in female plumage was with other diving ducks at Waiakea Pond, Hilo, H., January 27 and February 7 (CJR, et al.).

Ring-necked Duck--One pair was at Waiakea Pond on November 19, and two pairs on January 23 (CJR, et al.). Eight Ring-necks were reported at nearby Lokoaka Pond January 1 (DP), and two pairs were seen there January 27 (CJR, et al.). Two were found on Aimakapa Pond, H., on November 26 (JL).

Canvasback--One male coming into good plumage was reported at Waiakea Pond, H., November 23 and also in late January and early February (CJR, et al.). A male also was found across the island at Aimakapa Pond on December 30 (DP).

Scaup--One bird in female plumage at Salt Lake, O., from December 17 into March was seen well by several observers and identified as a Greater Scaup by the rounded head and long wing stripe (RL, et al.). Another bird in fair male plumage at Kaluapuhi Pond, KMCAS, O., was identified as a Greater Scaup on January 15 (LH) and January 23 (TB, DW). It was seen there again February 11 (RS, RP). At Waiakea Pond, H., where Greater Scaup have turned up with the Lessers in the past, 2 Greaters and 6 Lesser Scaup were found on November 23 (CJR, et al.). Other counts of scaup during December and January included 17 at Kealia, M., 16 at Kii, O., 15 at Lokoaka, H., and Waipio, O., and 8 for one day at Waiawa Unit, PHNWR, O. Most of these were Lesser Scaup.

Tufted Duck(?)--A diving duck was seen on Kealia Pond, M., on December 4 at a considerable distance, silhouetted in poor light (CK). It showed a slightly crested head profile, and seemed to be exactly like the Tufted Ducks the observer had been familiar with in Europe. The profile was different from a scaup or Ring-necked Duck's head.

Bufflehead--A bird in female plumage was at Lokoaka Pond, H., November 23 (CJR, et al.), and another at Aimakapa Pond, H., November 26 and December 1 (JL). One turned up at Waipio, O., December 10 (RP), and stayed around for the Waipio Christmas Count December 16 (MO).

Hooded Merganser--One was found at Kii Pond, O., during the statewide waterfowl count on January 15 (BB, GB, RP) and was studied again carefully on January 20 (MO, RL). Two were recorded there January 26 through February 27 (TB, BB). Although both were in female plumage, one with a developing fan crest and distinctive head shape was probably a male in eclipse or first year plumage.

Red-breasted Merganser--A bird in female plumage found at Kakahaia NWR, Molokai, January 23 (CK) is the only report of this species in Hawaii since 1893, when two were collected at Hilo. CK is familiar with mergansers, and writes: "Told from Common because of its definite lack of a clean line of demarcation between gray of flanks and sides of breast and the rusty of head, neck and throat. Seen in excellent light about 150 feet away with 10x40 Leitz binoculars. The bill color (reddish) was clearly noted, and it was a very thin, delicate-looking bill, which is sometimes useful in separation from the more heavy-set bill of the Common Merganser. Bill redder and pro-

portionately longer than female Hooded...we watched it about 15 minutes."

Hawaiian Hawk (En)--Two were reported August 2 at 9900 feet elevation near Wailuku Gulch on Mauna Kea, H., several hundred feet above tree line (WM). On December 27 two circled over Halawa overlook, H., (DL). In both instances, the birds were exchanging screeching calls.

Golden Eagle--The legendary bird still survives on Kauai. It was reported (fide VB) to have been sighted October 25 at the head of Hanapepe Valley.

Osprey--The only Osprey reported this winter was one at Waiawa Unit, PHNWR, seen in flight and perched on a prominent dead tree, on Jan 11-12, Feb 20 and 22 (GB, EK).

Chukar--Four were flushed along the jeep road to Wailuku Gulch, above 3000 meters (9000 ft) elevation on Mauna Kea, H., Aug 2 (MM).

Hawaiian Coot (En)--Coot numbers at Hanalei NWR, K., this winter were down 75% below the fall population, perhaps because the birds dispersed to new wetlands created by the winter rains. Counts of coots in Hawaii occasionally undergo large and unexplained fluctuations, more so than any other wetland breeding species, leading to the suggestion that some influxes and departures of coots from North America may be the cause. The mainland subspecies, when in good plumage, can be told from the Hawaiian Coot by the size and shape of the frontal shield (see 'E.38:73). One bird with the typical mainland shield was studied at close range and photographed Feb 4 alone in a ditch at Waipio, O., well away from other coots (RS et al.). Since mainland coots sometimes migrate with ducks, Hawaii observers should be aware of the field marks of the mainland form and be alert for its possible occurrence here.

Common Snipe--One was found at Waipio, O., Dec 9 (RL), and 5 were counted at the South Pond there on Jan 7 (MO, RP). One was at Kanaha Pond, M., Dec 29 (JW). Two birds

"of the Asiatic race, *C. g. gallinago*, were carefully observed for a total of over 20 minutes in good light by three people as close as 20 meters with a 40x scope Dec 6 and 10 at Hanalei NWR, K. The overall buffy appearance of the head, neck and back compared to the white and black dorsum of the N.Am. race, left no doubt of the birds' identity (see 'E.38:8). VB is familiar with *C. g. gallinago* from the Aleutian Islands, Alaska." (VB).

Bristle-thighed Curlew--An early Bristle-thigh was reported at Kii Pond, O., Aug 5 (RL). The peak count was 9 on Sep 17, dwindling to

one on Nov 8. One also was seen nearby on the BYU campus Nov 7(PB). A bird at Kii Jan 11(GB) and Jan 20(MO,RL,GB,RP) was the only winter report this year.

Greater Yellowlegs--One at Hanalei NWR,K., Nov 21(VB) and another at Mana Pond, K., Jan 16(TT,VB), both identified carefully, are noteworthy records.

Lesser Yellowlegs--Six in two groups at Honouliuli Unit, PHNWR, on the Waipio Christmas Count Dec 16 was an extraordinarily large number for Hawaii. Single birds

number for Hawaii(RP,G,GC). Single birds were noted through the fall at Kanaha, M., Hanalei NWR, K., and Waipio, O.

Sharp-tailed Sandpiper--The first Sharp-tail appeared at Waipio, O., Sep 4, and counts of 4 to 22(on Nov 18) were recorded regularly through the fall by numerous observers. Four remained on Dec 9, and single birds were seen Dec 26 and Jan 7. Single Sharp-tails also were recorded at Kealia Pond, M., Sep 24(CK,PS) and at Kii Pond, O., Oct 14(RL).

Pectoral Sandpiper--Three to six were seen at Kii Pond, O., Sep 17 through Oct 14(RL,RP,PS), and up to 4 were seen at Waipio Sep 16 through Nov 11(CPR,CJR). One to three were present at Hanalei NWR, K., through the fall(VB), and one was found Nov 25 near South Point, H.(JL).

Least Sandpiper--A lone bird was found regularly at Waipio, O., from Dec 9(RL) through Jan 28(MO,RP).

Dunlin--Two to six birds were at Waipio from Nov 4 until at least Feb 4(Many observers).

Dowitcher(sp)--Up to 6 dowitchers were recorded at Waipio from Oct 10 through at least Jan 7(DJ,MO,RP). Two on Nov 11 were thought to be probable Long-billed Dowitchers by barring and call(CJR,CPR), and 3 on Jan 1 gave the Long-billed call(PP,RP). One dowitcher was at Hanalei NWR,K., Dec 6(VB) and Feb 4(JE), and one was at Aimakapa Pond, H., Nov 26(JL).

Buff-breasted Sandpiper--The bird found at Kii Pond Sep 10(CPR,HAS) and seen there again Sep 23(RP,PS) was the first known record of this species in Hawaii (see 'E.39:140).

Bar-tailed Godwit--Three birds appeared at Waipio Oct 23(CJR,CPR) and were still there Oct 26(DS,RP). Despite subsequent visits by numerous observers, they were not reported again. The previous records known from Hawaii have all been of single birds. One was found at Aimakapa Pond Nov 26(JL).

SOCIETY TESTIFIES ON MAUI HARBOR PROJECT

Recently, on Maui, the Army Corps of Engineers conducted a public hearing regarding the proposed construction of a boat harbor on the south shore of Maui adjacent to Kealia Pond. Although the H.A.S. had already submitted a letter stating its opposition to the project, Dr. Cameron B. Kepler, of Kula, appeared for the Society at the hearing and made a brief summary statement of the Society's position. At the same time, he asked that the letter be made part of the public record of the hearing. Dr. Kepler emphasized the following points in his statement:

1. Kealia Pond is a crucial habitat for the endangered Hawaiian Stilt and Hawaiian Coot, both of which are endemic to Hawaii. At times up to 40% of the entire population of Hawaiian stilts can be found in Kealia and Karaha Ponds, and on some occasions up to 25% of the population has been reported using Kealia Pond. The Society opposes any action that might render Kealia Pond unsuitable for these two species, as the proposed harbor is likely to do.

2. Kealia Pond, which acts as a silt trap for water run off from urban and agricultural development in the Maui isthmus, is essential to the maintenance of water clarity in Maa-laea Bay. Increased silt run-off would adversely affect coral growth in the Bay and could adversely affect Humpback Whales that use the Bay intensively for calving and nursing.

3. Increased boating and shipping activities facilitated by the proposed harbor construction would significantly reduce use of the Bay by Humpbacks, which seek out protected leeward shores during their stay in Hawaii. This contention is supported by the scarcity of whales found along the leeward shores of Oahu, where shipping and boating activities flourish.

4. The proposed development would have the undesirable effect of spoiling the rural and agricultural character of Kealia-Kihei shoreline area.

Dr. Rob Shallenberger of the Environmental Resources Section of the Corps of Engineers noted that it is likely that the Corps' feasibility study will be terminated because the project does not appear to be economically justified and because of overwhelming public opposition.

HAWAII AUDUBON SCHEDULE OF EVENTS

FOR DETAILS, SEE INSIDE BACK COVER

- July 10 (Second Tues.) Board meeting at the home of Rob Shallenberger, 169 Kuulei Rd., Kailua, at 7 p.m. (261-3741)
- July 22 (Fourth Sun.) Field trip from Tantalus to Lyon Arboretum via 'Aihualama and Manoa Falls Trails. Meet at 7 a.m. on the Punchbowl Street side of the State Library downtown.
- July 24 (Fourth Tues.) Regular meeting. "Colors, Patterns, and Postures--The Visual Signals of Birds," by Dr. Jack Hailman. 7:30 p.m. at the McCully-Moiliili Library, 2211 S. King Street.
- July 28 (Sat.) Big Island Field Trip with Sierra Club to Kahinahina on Mauna Kea. Meet at 7:30 at Hilo College, Kapiolani Street parking lot.
- August 12 (Sun) Tentative date of annual field trip to Manana Island.

TABLE OF CONTENTS

Number 1, July 1979

Notes on the Status and Natural History of Micronesian Bats
Phillip L. Bruner and H. Douglas Pratt . . 1

Hawaiian Plant Commemorated on Postage Stamp
Mae E. Mull 4

Bibliography of Kaula Island, Hawaiian Archipelago
George H. Balazs 5

Two Observations of Interest from Canton Island
Paul R. Julian 9

Artificial Nest Structures Used by Wedge-Tailed Shearwaters at Kilauea Point, Kauai
G. Vernon Byrd 10

First Records of Lavender Fire-Finch on Hawaii
Philip Ashman and Peter Pyle 12

Hawaii Bird Observations--August 1978 Through February 1979
Robert L. Pyle 13

Society Testifies on Maui Harbor Project
Sheila Conant 16

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