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THE EGGS AND YOUNG OF THE PALILA, AN ENDANGERED SPECIES *

By Andrew J. Berger

The Palila (Psittirostra bailleui) is one of the few surviving "finch-billed" members of the Hawaiian honeycreeper family (Drepanididae). The Palila is a large-billed, large-headed, colorful bird about 6.5 inches in total length. In addition to its large cardinal-like bill, the Palila has a bright yellow head and throat, a soft gray back, and a whitish abdomen. There is little sexual dimorphism but the yellow tends to be richer in the males.

The Palila is endemic to the island of Hawaii. Although the species had a wider distribution on this island in the past, available information indicates that the Palila is presently restricted to the mamane (Sophora chrysophylla)-naio (Myoporum sandwicense) forest on the slopes of Mauna Kea, a mountain which towers 13,784 ft. above sea level. This, too, is the only large extant mamane-naio forest on any of the Hawaiian Islands. Here the Palila subsists largely on the seeds and flowers of the mamane.

The nests and eggs of the three species of "Kona finches" (genus Psittirostra, all of which are presumed to be extinct) were never described, and presumably never were discovered. I am pleased, therefore, to be able to present the first photographs of the nest, eggs, and newly-hatched young of the Palila, especially in view of the precarious future for this species.

The first mention of the nest of the Palila was made in the work by Wilson and Evans (AVES HAWAIIENSIS: THE BIRDS OF THE SANDWICH ISLANDS, R.H. Porter, London, 1890): "On June 14th I found a nest from which I saw the bird fly; it was placed in the topmost branches of a NAIIO tree (Myoporum santalinum), about 35 feet from the ground, but contained no eggs, and when we subsequently revisited it we found it deserted. It may be briefly described as cup-shaped, 4 inches in diameter, and very loosely constructed of dry grass, among which is interwoven a considerable quantity of grey lichen; the inside being composed of the same lichen, with a few slender rootlets added."

The only other reference to the nest of this species is a very odd and misleading one. W.A. Bryan (Occas. Papers Bernice P. Bishop Museum, 1905, p. 59-60), described two deserted nests (one of which "was evidently a year or more old") found in October as being those of the Palila because Mr. Blacow "was fairly convinced that the egg is that of the Palila, since it was not only a fairly common bird in the locality, but one found usually frequenting Mamani." On the following two pages of the same journal, however, Bryan reported that the two nests were not those of the Palila but has been "originally erroneously identified by the collector,

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through circumstantial evidence." He quotes Mr. Blacow as writing: "So the Palila that I saw fly out of the tree that I found one of the other nests in was probably feeding and did not have any connection with the nest whatever."

Field work in Hawaii is, for a variety of reasons, very difficult. I saw my first Palila in the Kaohae Game Management Area on 13 June 1966. I did extensive field work there on 32 different occasions during the following two years, but did not find the first Palila nest until 6 July 1968.

I had discovered earlier that the Hawaii 'Amakihi (Loxops v. virens) had begun to nest on Mauna Kea by mid-October in 1966. Consequently, I began again to make periodic field trips to the study area on 17 October 1967, making 14 additional visits during the following eight months. Although I had no difficulty in locating the Palila on each field trip, nor in finding the nests of nearly all other species, I could not find the Palila's nest.

There was no adult at the nest I found on 6 July 1968, and, from the ground, the nest looked as though it might be that of the Hawaii 'Amakihi, the most common honeycreeper in this habitat. Although the nest was only 15.3 feet above the ground in a mamane tree, it was placed in a small branch so near the top of the tree that I could not climb high enough to look into the nest. I knew as soon as I picked up one of the two eggs, however, that they were too large to belong to any of the species whose nests I had already found on the study area, and, as I held the egg carefully in my finger tips, I hear a bird fly into the tree behind me. The bird was a female Palila. The bird began to give its melodious callnote, and a male answered from a short distance away. The male did not, however, come to the vicinity of the nest. I climbed down the tree and moved off a short distance, whereupon the female returned to the nest to incubate the eggs.

I returned to the study area on 15 July. No Palila was singing, nor did I hear any callnotes. Nevertheless, I discovered that the Palila nest contained one egg and one nestling less than 24-hour old, and, as I was examining the nest, again a female Palila flew into a nearby tree and began to give her alarm notes.

This Palila's nest was irregular in shape, being about 5x7 inches in maximum outside diameters. The nest rim varied from about 1-1.25 inches in thickness. The nest cup itself varied from 2.25-2.5 inches in diameter, and was about 1.25 inches in depth.

The bulk of the body of the nest was composed of unidentifiable grass leaves, stems, and roots, with large dead mamane twigs woven into and around the exterior. Among these larger twigs there were mamane leaflets, fine strips of bark, and several dead flower stalks of a composite. The nest was lined with lichen.

Reddish-brown markings formed a dense cap around the larger end of each egg and lighter markings were scattered thinly and irregularly over the remaining surface. The two eggs were virtually identical in coloration.

The skin of the newly-hatched nestling was a bright reddish-orange. The lining of the oral cavity was only slightly redder than the general skin color. Long black down feathers in discrete tracts were conspicuous on the top of the head, back, and thighs. Photographs of the nest with eggs (6 July) and with egg and nestling (15 July) are shown in figure 2.

THE PALILA AS AN ENDANGERED SPECIES

The Palila is found at elevations between about 7000 and 9500 feet, the approximate elevation of the present treeline. The forest extended to nearly 10,000 feet before feral horses, cattle, 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 'Akiapola'au (Hemignathous wilsoni), a peculiar honeycreeper with woodpecker-like habits, has been found in recent years.

The work reported in this paper was supported by NSF Grant GB-5612.

THE CONDOR, Volume 72, No. 2, April 1970, page 240 has additional information on the White-eye as an interspecific feeding helper by C. Robert Eddinger.

The following is an excerpt from the article: ...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, reprinted THE ELEPAIO, Volume 29, No. 2, August 1968, pages 15-16). 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).

...On 9 April 1968 I collected three half-feathered nestling House Finches.... 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 minutes 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....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 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 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....

(Any comments? Please share your experiences with other members by writing to Kojina, 725-A 8th Avenue, Honolulu, Hawaii 96816.)

HUI MANU

On 9 July 1968 through the Honolulu Star-Bulletin, page C-1, the public was notified of another vanishing species by Lois Taylor. Following is an excerpt from that article:

Hui Manu, the Island society for the importation and appreciation of birds, has worked for nearly 40 years to preserve species threatened to vanish from Hawaii. Now the hui itself is about to vanish.

Members were notified by a letter...that the executive board passed a unanimous resolution to dissolve the Hui Manu. "This action," the letter explained, "was precipitated by several factors such as: increasingly strict regulations to control the importation of birds for deliberate liberation; the lack of younger members; diminishing funds; and the feeling that, since its founding, the Hui Manu has served its purpose."

Hui Manu...was founded in 1930 to increase the number of song birds and birds native to the islands which could then be usually found only high in isolated mountain areas.

During the past 38 years, the organization has imported Kentucky and Brazilian cardinals, doves, sparrows and linnets into the Islands.

Thousands of school children have heard the charming, gentle and highly informative illustrated lectures by "The Bird Lady," Mrs. Anne Powlison. Hui Manu employed Mrs. Powlison for this project for many years.

For the past 12 years, Hui Manu has celebrated the birthday of John James Audubon...by conducting a bird-drawing contest at Punahou's junior school. The winner is awarded an illustrated book on birds. Other books have been presented to the Library of Hawaii....

Following are magazine and news articles about Hui Manu:

THE ADVERTISER CENTENNIAL, 7/1-7/56 Sect 7-A 8:1: Hui Manu Bird Society, Helped Save Island's Feathered Friends by Charles E. Hogue

This is an avian society dedicated to the restoration of Hawaii's bird life in the open.

This organization, which owes its success to the selfless endeavors of the public-spirited women and men in its membership, had unusual beginnings. Native bird life in Hawaii had been disappearing for a long period of years.

In the late 1920's a modest, unassuming man named David Johnson came to the Islands. He was an artist of sorts, and a devotee of the beauty and music of wild birds. So he began a crusade for the restoration of bird life here emphasizing the need for the importation of songsters and birds of bright plumage that could withstand modern conditions.

He talked to Will McInerny and to Mr. & Mrs. Walter F. Dillingham, and Clarence Cooke and Lester McCoy and to other men and women of substance who commingled a sense of the esthetic with their business and financial acumen. They were intrigued by the enthusiasm of this malihini, who took time out from his gainful employment to promote a public interest in bringing bird life once more into its own in the Islands. Being practical men, they recognized the need for money with which to purchase and import outland birds, and supplied it in considerable sums.

Johnson was gratified by this measure of success, but he realized that the enterprise could rely for permanency only if there was widespread public interest

in it. So he came to the Advertiser office one day in 1929 with a sheaf of paintings of birds under his arm.

Editor Raymond Coll listened to Johnson's story sympathetically. The paper was not prepared at that time to reproduce the Johnson paintings in color, so the editor suggested a cooperative effort to bring the bird situation to public attention. The Advertiser would publicize the restoration enterprise in its news columns, the late Mrs. E.A. Langton-Boyle would be requested to present the color pictures in her magazine, *The Paradise of the Pacific*. Winifred Scott then editor of *Paradise* asked this writer to supply text to accompany the pictures in the magazine's issue of June 1929. The piece was called "Lost Chord in Paradise" and so enthused Mrs. Boyle that she brought it to the attention of members of the Outdoor Circle.

Restoration of the bird life was a natural corollary to the activities of the Circle, devoted to beautification of the Islands and the preservation of their natural charm, but did not fit exactly into its program. It would be more effective, it was decided, to form a separate organization devoted exclusively to wild bird introduction and protection.

Mr. Coll's promise of cooperation was fulfilled. The Advertiser gave widespread publicity to the proposed society, and when a pre-organization meeting was held early in 1930, Dillingham Hall on Punahou campus was filled to capacity with enthusiastic men and women. Mrs. Frederick J. Lowrey presided at that meeting and was elected first president of Hui Manu.

ADVERTISER, 27 November 1941, page 4: This Realm of Ours by N. Benyas

To restore rapidly vanishing bird life to Hawaii and to find the lost chord in our paradise, Hui Manu was organized in 1930....

These islands had at one time a large population of native birds, famous for song and plumage, but now many of the native species have become extinct and others, with a few exceptions, have become extremely rare.

Except in forests and isolated places the only birds seen or heard today are foreigners—birds that have come from abroad as immigrants, accidental refugees from captivity, or as deliberate introductions.

These foreign birds may be classed into two great groups: the song birds and their allies, and the game birds. The introduction of song birds has been, in recent years, under the control of the Board of Commission of Agriculture and Forestry. They have been extremely cautious in their recommendation and with few exceptions the birds imported have been of the insect and seed eating varieties.

Birds outside of the bird of prey class are a distinct aid to crops of many varieties, as experiments have proven. They feed on harmful parasitic insects.

1. Enlisting school children as friends of the birds is a Hui Manu objective. Plans are now underway for the organization of Junior Hui Manu groups in all schools. Attractive membership buttons have been designed and are being distributed—a red cardinal sitting on a green twig against a white background with red lettering: "Junior Hui Manu." Children will be taught birdlore and the manner of protecting birds against thoughtless boys, slingshots and air guns.

2. Making war against the mongoose and wild cats is another objective. Although fewer in number than the mongoose, the cats, especially the semi-wild cats, are far more deadly. Whereas the mongoose is restricted in his hunting to the birds he can capture on the ground, the cat can and does climb trees after them; and as his hunting is nocturnal, the birds are easy prey. May we make a plea to the owners of even the lovely tame pet house cats to please put a tiny bell around their necks to give the bird a better chance? It has been difficult as well as expensive to import these birds.

3. Forty butterfly buntings were recently flown from Mexico and more are expected shortly after the first of the year. With clipper service, our losses are practically nil and the birds are much stronger than any shipped by boat....

4. The HSPA in upper Manoa Valley, headed by E. Caum, are building some new cages which they are kind enough to allow Hui Manu birds to use while regaining strength and awaiting favorable weather conditions before being liberated....

5. Hui Manu's chief source of funds come from the garden tours.

PARADISE OF THE PACIFIC, November 1942, pages 13-15: ...Before the organization of the Hui Manu, however, private individuals had imported a few varieties of birds. For example, Mr. William H. McNerny had introduced between 300 and 350 Kentucky and Brazilian cardinals, 84 mockingbirds, the white-eye (mejiro), the small gray dove and another dove with a crest, a "red-breast" probably the linnet, and a bird which Mr. McNerny calls a "Willie wagtail." This latter was from Australia and was supposed to eat the flies from the back of horses and cows.

Mr. McNerny expressed a regret for having brought in the white-eye, for he believed it to be destructive to fruits, but he was reassured on that point—for now it is felt that the white-eye has done a great deal toward ridding the Islands of insect pests, especially the scale insect.

Since that day of the founding of the Hui Manu, more than 12 years ago, many other birds have been liberated by the society. A list of these follows: Kentucky cardinals, Brazilian crested cardinals, Japanese flycatcher (Oruri), Japanese red robins, Japanese bush warblers, Japanese tits, Mongolian larks, yellow-breasted buntings, Narcissus flycatchers, Pope cardinals, mockingbirds, Dayal thrush, Shama thrush, Sunbirds, Mandarin ducks, Indigo bunting, non-pareil buntings, Japanese tumblers, butterfly or Mexican buntings.

ADVERTISER, 7 June 1939, page 14 and 8 June 1939, page 22: Reports on Bird Life in Hawaii

Mrs. Alfred L. Castle, past president of the Hui Manu society, presents the following annual report for the year 1938-1939:

During this last year, from May 1938 to May 1939 the Hui Manu has had to face very different circumstances in regard to the importation of birds. Whereas before it was always possible to obtain birds such as the Red Cardinal, the crested cardinal, the nonpareil bunting, and Indigo bunting, and the mockingbird from the American mainland, such importations are no longer possible. The separate states have closed down on all trapping of birds in their limits. For instance, it is not possible to obtain the Anna hummingbird from California, which is there in such numbers.

A special federal permit is necessary to catch any bird, and then the persons catching the bird must be named. We were not able to obtain more nonpareils or indigo buntings, so we cannot feel that we have followed up our original releasing of these birds with the necessary number to assure of establishing them. As a matter of fact, no sign of these birds has been reported since they were released three springs ago. Like the Japanese bluebird, they were released in the HSPA reservation in upper Manoa.

The Bluebird on the other hand—due perhaps to the large number obtained and released—has been reported in various instances this past winter and spring, in Woodlawn, Manoa Valley, at Kahala, Kaalawai on Diamond Head, in the Royal Hawaiian Hotel grounds, and on Lewers Road. At the last place it was a pair nesting on eggs that was reported, which would indicate an actual start in the establishing of the Bluebird. So far, all Bluebirds seen have been between Manoa Valley and the sea and towards Kahala; none on the other side of town. To clinch the establishing of the Bluebird, it is hoped that a final number—up to 50 pairs—may be introduced again next month from Japan. These should be released in a body at the same place in Upper Manoa.

It is the Bluebird, then, that we can feel has this year taken the place of birds formerly imported from the American Mainland. Another important importation from the Orient this spring has been the Shama Thrush.

...Mrs. Dora Isenberg brought it to Kauai fifteen years ago. It has increased and perhaps may be considered established there, the loveliest songster on the island. We knew that importation of this thrush had great difficulties; that the female bird is delicate and practically impossible to obtain, and that the male bird,

when sold as a cage bird in America, could demand a high price....Mr. Lewis started in November for the Orient to bring birds for other concerns, and by contributing our bit, the Hui Manu was able to have him obtain Shama Thrush in Calcutta and Java to be liberated here. Even with all possible care bestowed on the birds the loss between India and Hawaii was great; only 84 birds arrived in Honolulu. These, however, were in fine shape; with very few exceptions were all released at once, and seen, particularly at Miniko, Mr. Frederick J. Lowrey's place in Upper Nuuanu, to be happy and at home. There singing can be heard all through the forested ravine and mountainside back of Miniko. But more are really needed to insure their being established. Whether we can arrange for more later, is at the present moment indefinite....

Mr. Lewis also brought back 28 little sunbirds which he had obtained in Malacca. These little birds look like hummingbirds but have a gentler disposition and a little song. They are iridescent, lovely to see, and feed on the honey in flowers. The datura is a great favorite of theirs; also flowering honeysuckle and other vines. As Mrs. James R. Judd's garden offered many of the required flowering vines and bushes, most of these sunbirds were released at her place on Makiki Heights. The Hui Manu would like to see more of the sunbirds imported when possible, because, like the Shama thrush, more are needed to assure their becoming established.

...I can report only the successful importation of 84 Shama thrush and 28 sunbirds. No birds from the Mainland, but an order for 50 pairs of bluebird to be delivered this June from Japan. (The bluebird arrives in Japan from China by May so the late spring is when they can be caught and brought here for liberation.)

...This brings me to the schools. Our greatest help in contacting the schools this year has been Mr. Lewis who has been ready at all times with his own projection and equipment to give talks with pictures to the different schools. At the bird park he lectures and instructs school children, whose teachers frequently bring them in classes to see the birds.

...The Hui Manu is obliged to pay duty on the birds it is introducing from foreign countries. The law reads that only game birds are exempt from such a duty. Hawaii is the only American territory that does not have songbirds by natural migration, so its position is unique, and a special law would have to be passed to allow the entrance of songbirds to be free, as is that of gamebirds.

ADVERTISER, 29 April 1956, page A6:6: Hui Manu's Reginald Carter

This man's "Hobby" is Enlistment of Students in Junior Bird Organization.

...Changed land uses had all but destroyed Hawaii's wild bird life twenty-six years ago when Hui Manu was organized to restore "The Lost Chord in Paradise." This society set about the preservation of existing bird life in the islands, and the introduction of new songsters.

Good progress was made from the outset but strong impetus was given to the crusade some ten years ago when Junior Hui Manu fired the imagination of the children. Reginald H. Carter volunteered to carry the message of Hui Manu into school classrooms.

During the decade he has talked to some 60,000 youngsters, convincing them that it is more fun to see birds in flight and hear them sing than it is to destroy nests and shoot winged songsters with slingshots and pellet guns.

...Always he finds ready attention, and enthusiastic response when he calls upon his hearers to make the Junior Hui Manu pledge.

"I promise to protect all wild birds from harm, and will do my best to see that others do the same."

Gratifying thing about that is, it's not an empty promise. Time after time throughout the year he receives reports from Junior Hui Manu crusaders telling of instances in which they have themselves done something to protect Hawaii's wild bird life, or have persuaded others to do so.

With the youngsters on their side, Island wild birds will continue to have it good.

ADVERTISER, 24 May 1962, page A6:6: Guamanian Swiftlet

The latest addition to Hawaii's bird population are 150 Guamanian swiftlets released Tuesday in a valley near Koko Head. The birds imported by Hui Manu arrived Tuesday from Guam and were released soon after their arrival.

Mrs. Alice Spalding Bowen, Chairman of the Hui Manu's bird importation committee, said the organization has worked two years to import the birds. She said the species was brought here upon the recommendation of the Board of Agriculture and Conservation, which made a thorough study of its desirability and concluded that it will not harm island crops or do other damage.

The swiftlets live on insects, and since they fly at twilight and get their food on the wing may prove helpful in cutting down Hawaii's termite and mosquito population, Mrs. Bowen said.

A small bird with a wide wing spread for its size, the Guamanian swiftlet has a wing spread of about 8 inches. Its legs are so weak that it does not walk on the ground but feeds on the wing when it is not resting in the caves in which it lives.

The bird is light black or gun metal in color with a slight iridescence in the sun light. It chirps rather than sings.

The species is one of a number imported by Hui Manu over the years. Others included the Kentucky and Brazilian cardinals, the Shama thrush of India, the Dyal thrush, Mockingbird, Leiothrix or hill robin, Japanese bluebird and Cattle egret.

EDIBLE-NEST SWIFTLET

By David H. Woodside

The bird was introduced by the State of Hawaii and the Hui Manu. The reason for the introduction was to provide esthetic enjoyment to persons who would appreciate observing and studying this interesting species. The swifts and swallows are not represented in Hawaii and are considered to be beneficial birds in that they consume flying insects exclusively.

The first release of 175 birds was made in lower Niu Valley on Oahu on May 15, 1962. The second and last release totalling 200 birds was made on January 29, 1965 at Waimea Falls in Waimea Valley on Oahu.

All birds were trapped on the island of Guam in the Marianas Islands.

The edible-nest swiftlet is sooty black above, rump slightly paler. Smoky grey below. Length 4 to 4½ inches.

Voice--a variety of squeaks and chirps, rather musical when several birds are flying and calling together.

Food--small flying insects, including moths, flies, mosquitoes, termites and bugs. Feeds exclusively on the wing.

Nesting--nests in caves in colonies of few to hundred of birds. Nest is a small cup of twigs and saliva glued to the sides and roofs of caves where it is safe from predators. I found no instance of it nesting in buildings on Guam.

Natural habitat--widely distributed on Guam but most common in lower valleys and along the coastal areas of the western (leeward) side of the island. Apparently, individuals may travel considerable distance from roosting-nesting caves to favored feeding areas. No clear relationship to habitat types could be determined in the time available for observations.

The sightings reported by Donaghho in THE ELEPAIO of January 1970 are the first verified observations of the species on Oahu since the releases.

BIRDS OF THE SOUTHWEST PACIFIC by Ernst Mayr, page 292:

Edible-nest swiftlet (*Collocalia inexpectata*)--Small (4) sooty black above; rump slightly paler; smoky gray below. Two subspecies in Micronesia: *palewensis* Mayr 1935 (Palau), *bartschi* Hearn (Marianas). Nests in caves; most active at dawn and dusk.

THE BIRDS OF BORNEO by Bertram E. Smythes, page 282: Cave Swiftlets (*Collocalia*)

The Indo-Australia region is the centre of abundance of these small swifts, and they are common and widely distributed in Borneo. They fly over all types of habitat. Some nest in caves, and possess the remarkable ability of finding, not merely their way, but their own individual nest amongst hundreds of others in total darkness....A secretion of the salivary gland is used by many birds as a cement in the construction of their nests, but only some of the swiftlets make their nests largely or wholly of saliva. Marshall & Foley (1956) have recently confirmed that the salivary glands of these swiftlets are enormously enlarged in the breeding season. Soup made from these nests is believed by the Chinese to act as an aphrodisiac and this accounts for the large demand and high prices....

AUSTRALIAN BIRDS by Robin Hill, page 130: Apodiformes

...In spite of being rather similar in appearance and habits to swallows they are not related. The two groups of birds are, indeed, a good example of convergent evolution: unrelated species that have developed similar physical appearances because of similar habits. One of the main outward differences between swifts and swallows is that the latter perch and sing and are thus fairly typical passerine birds....

BIRDS OF THE WORLD by Oliver L. Austin, Jr., page 164-167: Swifts and Hummingbirds, Apodiformes

The unquestioned kings of flight, each in its own fashion, are the swifts and the hummingbirds. In achieving their superb aerial skill, their wings developed at the expense of their feet which, though tiny, are not missing as their ordinal name, "the footless ones," implies. The two groups are so different in appearance and action,...but the many structural characteristics they share show them more closely related to each other than to any other bird group. They doubtless shared a common ancestor very long ago.

Characteristic of the order are the relative proportions of the swifts' and hummers' wing bones. Their upper arm bone, the humerus, is short and stout, and their wings are formed mainly by the elongated elements beyond the "elbow." This gives their wings greater strength at their junction with the body, and their large flying muscles better leverage. They also show distinctive reproductive similarities. All lay long, pure-white eggs, equally rounded at each end. They lay small clutches, often 1 egg in tropical species, usually 2; though some swifts lay 6. The young hatch naked and blind, remain in the nest for relatively long periods, and are capable of extended flight when they leave.

...Last of the better-known swifts are the plethora of small cave swiftlets of the Indo-Australian region and the Western Pacific islands. Their saliva nests are used in the Orient for soup....The cave swiftlets are a bewildering group of little birds, from $3\frac{1}{2}$ to $6\frac{1}{2}$ inches in length, all assigned to the genus *Collocalia*. Most of them are dull grays and browns with lighter rumps and underparts, some tinged with metallic blues and greens. They are so varied and yet so similar that they are a systematist's nightmare....

The cave swiftlets are neither fast nor high fliers. They feed like swallows in forest clearings, often close to the ground, and flit about lightly in a most erratic manner. Their nesting habits provide one of the best clues to their relationships. All glue a cup-shaped bracket to a vertical surface, some on tree trunks, some on cliffs. Most nest in mountain or seacoast caves, sometimes in tremendous colonies. One group uses bits of bark, another favors lichens or vegetable fibers, a third mixes feathers with other nest material--but all use more saliva in their nests than other swifts. The gray and gray-rumped swiftlets of Malaya and Indochina make their nests entirely of saliva. These are the top-grade nests of commerce.

...The best nests come from the large seaward-facing limestone caverns in coastal Indochina, where the tiny birds breed in tremendous numbers. Native

gatherers use bamboo ladders and long poles to knock the nests down from the cave walls and ceilings as the birds finish them. The birds have enough saliva to build a second nest of pure hardened fluid, but their third one is apt to be mixed with impurities....The clean first nests are marketed as they are, and command the highest prices. The others are processed to remove the impurities, and the protein-rich gelatin is rehardened into chips which Chinese merchants sell as "dragon's teeth."
 ...Edible-nest swiftlet (*Collocalia inexpectata*), India to Indochina, Philippines, East Indies. 4-4½ inches.

Field Note from Hildegard Kaigler, 30 July 1970: Fairy Tern

There were eight fairy terns at DeRussy this morning about 11 o'clock--must have been visiting from Kapiolani Park. I think the usual number at DeRussy is four. As usual yesterday afternoon and this morning three of them were resting in the monkeypod tree to the right of the MP directing traffic into the beach area--the only street from Kalia to the beach, passing the officer's club. Chuck and I watched them for about an hour. They were sitting right above us--just beautiful. One came in with a three-inch fish crosswise in its bill and kept sitting with it for some time, and we had to leave before we could see the final disposition.

The following letter from Hawaii Wildlife Federation, P.O. Box 10113, Honolulu, Hawaii 96816 tells you how you can take immediate action against water pollution:

...Many of our nation's scientists have shown that the pollution of our water has cost the taxpayers millions of dollars in primary and secondary sewage systems which are not as effective as they could be. One of the major pollutants are the phosphate percentages in the soaps on the market....American housewives altogether pollute about sixty-five billion gallons of water each day with laundry detergents alone.

The Hawaii Wildlife Federation has therefore endorsed a non-pollutant line of products, because it is low in phosphate percentage....This soap breaks down in seventy-two hours, because it is about 96% bio-degradable where as the other types of washday products are only about 10%+ bio-degradable. The Hawaii Wildlife Federation solicits your assistance....

This project is also designed to help raise funds for the Hawaii Wildlife Federation to continue our fight for a better environment....The Federation will enjoy a 50% profit on every sale....To place your orders, and for further information please call Bernie Brown at 262-9600 or Shawn Kajiyama at 946-2362 and 941-9183.

Another immediate action is to set a good example by picking up litter wherever you go and to remind others to use the litterbags.

What are your contributions to improve the ecosystem? Please share your experiences or ideas with others by writing to Kojima, 725-A 8th Ave., Honolulu, Hawaii 96816.

SEPTEMBER ACTIVITIES:

- 13 September - Field trip to study shorebirds. Bring lunch, water, and if possible your car. Transportation cost (\$1.00) to be paid to the drivers. Meet at the State Library on Punchbowl Street at 8:00 a.m. Leader: William P. Mull, telephone: 988-6798.
- 14 September - Board meeting at the Zoo bldg at 7:30 p.m. Members welcome.
- 21 September - General meeting at the Waikiki Aquarium Auditorium at 7:30 p.m. Speaker: Dr. Walter Arnell Topic: Peoples of East Africa

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