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HISTORY OF ENDEMIC HAWAIIAN BIRDS

Part I. POPULATION HISTORIES--SPECIES ACCOUNTS
Forest Birds: Hawaiian Thrushes

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ABSTRACT

Phaeornis obscurus is a medium-sized (7-8 inch long) brownish thrush with light to dark gray underparts. It was first described in 1789. Exhaustive search uncovered some 517 observations, collection records, reports and related statements on relative abundance and geographical distribution from ca. 1778 to 1978. All data are arranged in order and systematically analyzed. Distributional records are shown by U. S. Geological Survey quadrangle. References and names of observers are cited. Completeness of data, bias, erroneous and doubtful records are addressed. Findings are summarized. It is concluded that all five subspecies have suffered catastrophic depopulations with only one subspecies (P. o. obscurus on the island of Hawai'i) given much chance of long-term survival.

Phaeornis obscurus
'Āmaui or Hawaiian Thrush

The 'Āmaui is a medium-sized (7-8 inch) brownish thrush with light to dark gray underparts. It is the only polytypic species of the endemic genus Phaeornis. Amadon (1950) agreed with Stejneger (1888) that the species apparently derived from the American solitaire genus Myadestes.

Five subspecies of the 'Āmaui are presently recognized. Numbers of specimens and principal repositories for the various island forms are as follows: Kaua'i, 47 (18 in American Museum of Natural History); O'ahu, 0; Moloka'i, 52 (22 in Bernice Pauahi Bishop Museum); Lāna'i, 44 (16 in American Museum of Natural History); Hawai'i, 180+ (58 in Bernice Pauahi Bishop Museum) (Banko 1978 ms.) . A sixth subspecies possibly existed. Perkins (1903) conducted a search for one on Maui based on description of a song by a native Hawaiian but found no evidence of its existence.

Henshaw (1902) and Perkins (1903) gave first-hand accounts of this forest bird from early observations. Berger (1972) summarized what little is known of its breeding biology.

3. Phaeornis obscurus myadestina
Kāma'o or Kaua'i Thrush

OBSERVATIONS, REPORTS, AND SPECIMEN RECORDS

Drawing conclusions from a large volume of historical information on relative abundance and distribution of Kāma'o required that data be geographically arranged and chronologically ordered in a systematic fashion, as outlined in the Introduction to Part I (CPSU/UH Avian History Report 4). Records presented in Appendix I satisfy criteria necessary for basic documentation and comparative analysis.

In the following descriptive account, sources of published information are cited by author and year in the usual style. One, two, or three digit numbers in parentheses refer to specific records in Appendix I. Sources of published and unpublished information listed in Appendix I may be traced to complete references in the bibliography.

Early Status and Distribution (1886–1903):

A single was specimen collected somewhere on Kaua'i by J. K. Townsend during the period 1835 to 1837 (Banko 1978 ms.). Nothing further of the existence of the Kāma'o was recorded until about 50 years later when V. Knudsen collected at least six specimens in undesignated localities from 1886 to 1889 and sent them to L. Stejneger at the U. S. National Museum of Natural History (1, 3). More than 25 specimens were taken from 1887 to 1895 by S. B. Wilson, H. C. Palmer, and R. C. L. Perkins in areas which were not noted at the time but which no doubt included their principal collecting localities of Halemanu, Kahōluamanu, above Olokele Sugar Mill near Hanapēpē Valley, and above Hanalei (2, 4, 7, 25a, 39a, 39b, 40, 42, 76a). Other ornithologists secured specimens a few years later. G. C. Munro collected two, one near Makaweli in 1899 (43); W. A. Bryan and A. Seale took four at Kahōluamanu in 1900 (45); and L. H. Miller obtained five or more somewhere near Kīpū Kai in 1903 (77, 78).

The various collectors left descriptive accounts of Kāma'o distribution and relative abundance during the 1886 to 1903 period. Rothschild (1893), the recipient of Palmer's specimens at Tring Museum in England, said the species was not rare (6). Munro (1944, 1947), Palmer's assistant and resident of Kaua'i until 1899, recalled years later from notes and memory that singing of the Kāma'o used to awaken members of the collecting party at Halemanu in 1891. Munro (1944) stated that in 1891 this species was "extremely common . . . the most common bird in the forest . . . ," from near sea level on the north side of Kaua'i, even on the outer edge of the forest, to the mountaintop, wherever they collected--even as late as 1899 (13, 16, 25, 25a, 39a, 39b, 76a). Perkins (1903), from equally extensive experience from 1894 to 1896, stated that the Kāma'o was "common . . . almost ubiquitous throughout the forest, wherever birds are found, from the lower limits to the .upper, not only in the densest parts of dense forests, but also in the more open woods" (14). Perkins recorded in his field notes that this species seemed less numerous on Kahōluamanu "plateau" above F. Gay's mountain house in 1895 than the previous year, and noted their presence in a mountainous area characterized by dense masses of uluhe (Dicranopteris linearis), an unspecified distance west of Līhu'e in 1896 (41, 79). Bryan and Seale (1901) stated that Kāma'o were fairly common- at and above Kahōluamanu in 1900. Miller found it quite abundant at about 200 feet elevation while working up through the lantana (Lantana camara), somewhere near Kīpū Kai in 1903 (78).

Later Observations (1904–1959):

Impressions of a declining Kāma'o population recorded by P. C. L. Perkins in 896 (41) seem to be supported by later observers. In a return collecting trip to Kaua'i in 1915, W. A. Bryan noted only two, possibly at Kahōluamanu (46). G. C. Munro searched in vain for it in 1928, 1931, and 1932, seeing only one

the last year (17, 18, 27, 47). Munro and W. R. Donaghho reported separately in 1936 that the Kāma'o was present around the Wai'alae Cabin, not uncommon on Kohua Ridge, and fairly common at Kahōluamanu (48-52). In 1941 Harker (1945) saw and heard it at an unspecified locality at about 4000 feet elevation in the rain forest (9), while Munro (1944) and Donaghho (1941) said that the species was not rare (53) and still doing well (54), respectively, in the Kahōluamanu area, both reports probably originating from a visit by Donaghho in October 1941. Pearsall (1947) saw one at the edge of the Kōke'e clearing and two along the trail to the Alaka'i in 1946 (28, 29). Woodside (1947) stated that the species was present in the Kahōluamanu and Wai'alae areas, but did not give his source of information (56).

No reports of Kāma'o were made in the 1950's, but Richardson and Bowles (1964) conducted a survey lasting several weeks in the Alaka'i area in July and August 1960. They saw 12 and estimated that they heard 15 between the upper Koai'e River at about 3750 feet elevation and Kawai Iki Ridge at about 4250 feet elevation to the southeast; they heard about 10 or more near the upper Kohua Ridge within a mile of Wainiha Pali; and they presumably recorded their presence in the upper Wai'alae River area at about 3750 feet elevation to about 2 miles east along the high forest country leading toward Wai'ale'ale (57-60). On his return trip in 1961 Bowles (1962) heard and saw several along Kawai Iki Ridge from Koai'e Cabin toward Wai'ale'ale Cabin, including near Koai'e Cabin (61).

Eight observers reported seeing and hearing a few Kāma'o near or at varying distances beyond the Koai'e Cabin from 1962 to 1968, as follows: Ord (1962) (62, 63); Walker (1964) (67); King (1964, 1965) (64-66, 68, 69); Hancock (1966) (73); Donaghho (1965, 1967a) (70-72, 74); and Gauthy, Atkinson, and Huddleston (1968) (75) but none recorded more than nine on any single day.

Kāma'o seem to have been recorded only three times from 1970 to 1978. Hart (1974, 1974a) noted that one was censused in east Alaka'i Swamp during the 29 December 1973 Christmas Count (23), and stated that this species was the least numerous of nine endemic birds seen during an undated four-day field trip into west Alaka'i Swamp, presumably a few months later (24). Sears, Kawahara, and Fujita (1975) reported that two were censused in the Waimea Christmas Count area (? near Kōke'e) 28 December 1974 (76). J. L. Sincock has been studying the status and distribution of endemic forest birds on the island of Kaua'i for the U. S. Fish and Wildlife Service since about 1967, but his findings have not yet been published.

Marshall (1975), apparently on advice from Sincock, noted that this species "probably does not number over a few hundred birds....now restricted to the deeper, more inaccessible portions of the Alakai Swamp..." (.1).

Atkinson (1977) stated that the Kāma'o survives in moderate numbers (12).

4. Phaeornis obscurus oahuensis
'Amaui or O'ahu Thrush

OBSERVATIONS, REPORTS, AND SPECIMEN RECORDS

Except for specimens collected and brief description given by A. Bloxam in 1825 (Wilson & Evans 1899, in Introduction), the existence of this subspecies would be unknown. Bloxam's specimens were ultimately lost and subsequent reports of the 'Ākaui on O'ahu have never been substantiated (80-87). No notes of its relative abundance or distribution appear to have been written. Atkinson (1977) believed it to be evidently common in 1825 (86, 87).

5. Phaeornis obscurus rutha
Oloma'o or Moloka'i Thrush

OBSERVATIONS, REPORTS, AND SPECIMEN RECORDS

Early Status and Distribution (1888-1907):

There is no deficiency of historical records attesting to the relative abundance and distribution of the Oloma'o on Moloka'i from 1888 to 1907; however, only Rothschild (1893) and Perkins (1903) seem to have made general statements on these subjects. Rothschild (1893) stated that it was "not rare," being found by his collector, H. C. Palmer, in 1892 and 1893 in the lowlands as well as at the highest elevations (97). Perkins (1903), from visits in 1893 and 1896, called it "common . . . almost ubiquitous throughout the forest, wherever birds are found, from the lower limits to the upper, not only in the densest parts of dense forests, but also in the more open woods . . . still lingers in remnants of forest from which all other native birds have disappeared" (98-100). Munro (1944) stated that it was common in the 1890's. Subsequent observations and collection records supported these statements.

In central Moloka'i, above Kaunakakai, in the vicinity of a "small romantic lake" (now probably Meyer Lake), Schauinsland (1900) recorded this thrush about 1895, though in less abundance than the 'Apapane (Himatione sanquinea sanquinea) or I'iwi (Vestiaria coccinea) (104).

Most of the specific locality records of Oloma'o originated from forests farther east, from Makakupa'ia to Brown's Ranch (Pu'u o Hoku) near the eastern tip of Moloka'i. In his diary, Perkins recorded the collecting of six specimens from May to August 1893, above and below the mountain house in Makakupa'ia where he camped, probably identified on contemporary maps at about 2900 feet elevation by the short name Kūpā'ia (105-114). On 13 May 1893 Perkins saw "plenty" of Oloma'o up from his camp

and on 2 August 1893 he heard several sing across from his camp near the head of Waikolu Valley (106, 111). Labels from specimens collected by W. A. Bryan in 1907 list the localities of Wailua (? Wailau), Pelekunu, Puualu (? Pu'uali'i), Kilohana Mtn. (? Kīlau), and Punalu (? Punalau), indicating the continued existence of Oloma'o in some abundance in forests contiguous to Makakupa'ia some 14 years after Perkins' observations (115-119).

Near the eastern tip of Moloka'i, H. C. Palmer, in collecting trips out of Pūko'o in late 1892 and early 1893, found the Oloma'o to be "not at all rare . . . much oftener heard than seen" and even more numerous in much higher forest in the hills above Hālawa (Rothschild 1893). Fourteen years later, in 1907, Bryan collected specimens in the forests of east Moloka'i, taking one at Moanui, two at Brown's Ranch (Pu'u o Hoku), and three at Hālawa where he, like Palmer before him, thought them to be more abundant than at any of the other localities visited (127-130).

Specimens taken in undesignated localities support the early statements that Oloma'o were relatively common, if not abundant, in the forests of central and eastern Moloka'i during the 1890's and early 1900's. S. B. Wilson obtained only one example in 1888, but Palmer secured a total of 17 in late 1892 and early 1893 (89, 90). Perkins collected six specimens in 1893 and secured four others later (91); M. J. Flood took three specimens in 1894 and 1895 (92); W. A. Bryan gathered 13 examples in 1907; and Munro collected another six that same year (94) (Banko 1978 ms.).

Later Observations and Reports (1936-1978):

No one apparently took any interest in the Oloma'o from 1907 to 1935, there being a 29-year gap in records of any kind. In 1936 G. C. Munro conducted an informal survey in both leeward and windward forests, seeing none but possibly hearing one (95) "along the Wailau crest," according to Donaghho (1963) (120). Donaghho did not find it in 1937 (102) and Munro (1944) reported the species to be in danger of extinction (103).

N. Pekelo, Jr., observed two for about 5 minutes along Kapulei Ridge on the southwest slope of Pu'uhaha about 300 feet from the top on 17 July 1963. Based on experience gained from over 10 years on Moloka'i, he stated that the species was rare in the dense rain forest of the central part of the island at Kamueli (121, 122). Pratt ('1973) said that Pekelo found Oloma'o in 1972 in the lee of the cliffs at Kamueli, east of Kuana Ridge, still further east of Pu'ukolekole Cabin (123). On the basis of surveys which resulted in two being seen at once and another observed in the same area on the same day above Pu'ukolekole Cabin at 4460 feet elevation, a mile east of Pekelo's 1963 sighting, Scott (Scott et al. 1977) called the Oloma'o "rare" (124).

Atkinson (1977) stated that the Oloma'o survives in very low numbers (96).

6. Phaeornis obscurus lanaiensis
Oloma'o or Lāna'i Thrush

OBSERVATIONS, REPORTS, AND SPECIMEN RECORDS

Early Status and Distribution (1888–1923):

Specimens of Oloma'o were collected on Lāna'i from 1888 to 1894, mostly in localities which went unrecorded at the time. S. B. Wilson took one in June 1888 (131); H. C. Palmer obtained 20 from 1 to 26 November 1892 (133); and E. Weiske is credited with one taken in February 1894 (144) although there seems to be no other record of his visit there. R. C. L. Perkins took at least 10 examples during two visits in 1893 and 1894: two at Lāna'ihale and undesignated numbers out from camp at "Haalepaakai" (Ha'alelepa'akai) near the head of the gulch behind Kō'ele (134–141).

Rothschild (1893) stated that the Oloma'o was "not rare" on Lāna'i and that Palmer saw it in the lowlands as well as at the highest elevation. Perkins (1903) interpreted Rothschild to mean "lowland forest" rather than simply lowland, and went on to state that like the other island races, the Oloma'o was "common . . . almost ubiquitous throughout the forest, wherever birds are found, from the lower limits to the upper, not only in the densest parts of dense forests, but also in the more open woods" (142, 143).

Munro (1944) believed that the Oloma'o was a common bird from 1911 to 1923, being frequently observed and constantly heard in all of the forest of Lāna'i, but especially in the north and south ends, and was perhaps even increasing in number (145, 147, 148, 156). After 1931 Munro (1944) noted a decline in population (149, 151) and reported its precarious state in correspondence with H. E. Gregory, Director of the Bernice Pauahi Bishop Museum in Honolulu. Gregory (1933) stated on authority from Munro that the Oloma'o was "still fairly common" and that a specimen had been found in a water tank on the highest point of the island (153, 154). Gregory (1935), apparently after continuing communication with Munro, wrote that the Oloma'o was "still not uncommon" (155)--the last report of the existence of this bird. Twenty-five years later, Hawaii State Division of Fish and Game (1969 ms.) acknowledged that it was thought to be extinct (156a).

7. Phaeornis obscurus obscurus
'Ōma'o or Hawai'i Thrush

OBSERVATIONS, REPORTS, AND SPECIMEN RECORDS

Early Status and Distribution (1888–1903):

Little was learned about the relative abundance and distribution of 'Ōma'o on the island of Hawai'i until the late 1880's. Cook's naturalists collected the type specimen in 1779 in an undesignated locality inland from Kealakekua (Stresemann 1950) (191). In 1834 D. Douglas described a bird which may have been the 'Ōma'o seen perched on a block of lava near the top of Mauna Loa (Wilson 1919) (198). A single specimen was collected on 16 November 1840 someplace along the route followed in the overland trek of the U. S. Exploring Expedition from Nāpo'opo'o to Kīlauea (168). Members of the Challenger Expedition collected four specimens within 8 miles of Hilo during a week's visit to that area in August 1875 (Sclater 1881) (478).

Ornithologists and naturalists active between 1888 and 1902 left much better records on the relative abundance and distribution of this subspecies. Wilson (1890) reported that it was "still fairly common," ranging from the lowest forest zone up to 5000 feet elevation (157). Later, perhaps from knowledge gained from his second visit to the Islands in 1896, Wilson (Wilson & Evans 1899) concluded that this bird was "fairly common" and was "perhaps the species most frequently met with" (158). Rothschild (1893) stated, apparently on authority from his collector, H. C. Palmer, that the 'Ōma'o was "not uncommon," while Palmer's assistant, Munro (1944), stated that it was "common" at about 2000 feet elevation and "not so common" at 4500 and 5000 feet elevations (159). Henshaw (1902) declared that it was to be found abundantly in the denser forests above 1000 feet elevation all over the island (163). Perkins (1903) called it "extremely numerous" in Kona District and elsewhere found it to be, like the other island races, "common . . . almost ubiquitous throughout the forest, wherever birds are found, from the lower limits to the upper, not only in the densest parts of dense forests, but also in the more open woods" (160–162).

In Kohala District at Waimea, Wilson collected four specimens in 1888, two near a place designated as "Punalala" (?) (184, 185). Palmer noted the presence of 'Ōma'o in January 1892 while camped in the Kohala Mountains "a day's travel from Kohala" (? Hāwī) (182). Munro (1944) later expressed the opinion that it was less common in the Kohala Mountains than in other areas (1974).

In Kona District, Wilson collected a specimen at Ka'awaloa and another at an undesignated location in 1887 or 1888 (192, 197). Rothschild (1893), informed by Palmer, called the 'Ōma'o "especially numerous" in Kona (186). Munro collected one on 19 September 1891 at an unrecorded location in Kona (193). It seems probable that many of the 20 specimens attributed to Palmer

were taken in Kona (172), although place-names were not recorded on specimen labels. Perkins located a nesting pair in an unspecified place in Kona in March 1896, calling it "so common" (194-196). Henshaw collected an 'Ōma'o on Pulehua Ranch sometime between 1898 and 1902.

In Ka'ū District, none of the early naturalists seems to have noted the abundance and distribution of 'Ōma'o during the 1888 to 1902 period. However, several collection records and comments establish its presence there. C. M. Walton collected two specimens about 1900 (279), probably near his place of residence at Pāhala, and Henshaw secured three birds sometime between 1898 and 1902 farther north, at 'Āinapō (273).

Near Kīlauea, in what is now Hawaii Volcanoes National Park, Perkins noted seeing 'Ōma'o on 23 July 1894 on a very long day's hike up Mauna Loa (324). A. Wolcott collected a specimen at Kīlauea on 2 April 1901 (325). On a return visit to the volcano in 1895, Perkins (1903) said that it was absent in the early summer months in the koa (Acacia koa) woods above Kīlauea on the Ka'ū side (presumably around Kīpukapuaulu), but he noted a large incursion in the same-area in August-that same year (326, 327). Perkins repeated this assertion later in a 19 September 1947 letter to O. H. Swezey (328). Henshaw took two specimens near Kīlauea sometime from 1898 to 1902 (329). McGregor (1902) saw 'Ōma'o in the Kīlauea area on more than one occasion (330). In addition to these records, Perkins collected three specimens in July 1895 in Ka'ū, but failed to note the locality (199).

The 'Ōma'o was notably abundant from 1888 to 1902 in the forests of 'Ōla'a immediately to the north of Kīlauea. Perkins (1903) said that this thrush was "numerous at all seasons" in the forests of 'Ōla'a during visits in 1895 and 1896 (428), noting in his diary that they were "very numerous" even farther north at about 1500 or 1600 feet elevation (near what is now the village of Mountain View), during his June to September 1895 trip (405). L. H. Miller recorded hearing 'Ōma'o in a journey from 'Ōla'a Mill (Kea'au) to the Volcano House on 18 December 1902 (397), but does not mention where along the 20-mile route he heard them. Henshaw collected some 54 specimens in 'Ōla'a, Kea'au, Kaumana, and Kaiwiki from 1898 to 1902 (175, 479, 480).

'Ōma'o were found along the eastern slopes of Mauna Kea as far north as Mānā, where Wilson collected two specimens in late 1887 or early 1888 (459). C. E. Blacow and Miller observed and collected 'Ōma'o in 1902 and 1903 at a number of locations on the northeastern slopes of Mauna Kea, including Pa'auilo, Horner's Ranch ('Umikoa), and Blacow's Ranch (near Pa'auilo) (457, 458, 460, 462, 463). Some specimens were taken by Miller as low as 800 feet elevation (461). Miller noted in his journal that in the Blacow Ranch area 'Ōma'o were "abundant at all points and in all sorts of timber" (463).

On the northern slopes of Mauna Kea, Munro (1944) found that it was less common than in some other areas in 1891 (174).

In addition to the foregoing records, five 'Ōma'o were collected from 1888 to 1902 by R. C. McGregor and Wilson in undesignated localities or areas which are unknown today (169, 170, 173).

Later Observations and Reports (1937-1978):

There seem to be no records of 'Ōma'o being seen or collected on the island of Hawai'i from 1904 to 1936. After 1936, in Kohala and Kona districts, Donaghho (1940) and van Riper and Scott (1978 ms.) found none (183, 189, 190). The last record of it, in the Kohala Mountains, thus remains H. C. Palmer's sighting of two in January 1892 (182); and on Kona slopes of Mauna Loa, the collection of a specimen by H. W. Henshaw at Pulehua Ranch sometime from 1898 to 1902 (196).

In Ka'ū District, not far from the Kona boundary, 'Ōma'o have been found in recent times. Baldwin (field journal), Donaghho (1968), and L. P. Richards recorded them from about 5000 to 6000 feet elevation in Kahuku in 1949, 1950, and 1967, respectively (274-276). They were also seen and heard in August 1973 by the author and P. C. Banko in Kahuku at many places on the lava fields of Mauna Loa's Southwest Rift from 7000 to 8650 feet elevation (267-272, 277, 278). This bird was found in a recent survey of Ka'ū forests to be continuously present at elevations from 2300 feet to subalpine scrub from Kahuku Ranch northward (van Riper & Scott 1978 ms.) (181, 200, 201).

Sightings in northern Ka'ū District, outside of Hawaii Volcanoes National Park, were recorded from 1937 to 1950 and again from 1966 to 1978. Donaghho (1951a, 1951b), Baldwin (1941), and Richards reported many times and during all seasons that they were relatively abundant in and near upper elevations of Keauhou Ranch from 1937 to 1950 (202-218). Donaghho (1966, 1968), A. J. Berger, Conant (1975), Mull (1975), Pratt (Pratt et al. 1977), Katahira (1978), and others present results of surveys conducted in Keauhou Ranch and the contiguous Kilauea Forest Reserve from 1966 to 1978 (219-266). S. Conant collected data monthly from 1972 to 1974 along 12 transects in different ecosystems (including Hawaii Volcanoes National Park), and concluded in a 1975 technical report for the International Biological Program (IBP) that 'Ōma'o reached the highest population densities in Kīlauea Forest Reserve and Upper Keauhou Ranch (249). Transect 91 in Kīlauea Forest Reserve yielded a density of 188 per 40 ha (98.8 acres) with 100% occurrence frequency during the census period (Conant 1975 IBP technical report).

In Hawaii Volcanoes National Park the species has been more or less continuously observed and reported since 1937. In the late 1930's and during the 1940's Baldwin (1941, 1953), Donaghho (1940, 1947, 1951b, 1951c), and others observed it above the Mauna Loa (Strip) Road to 8500 feet elevation (288, 289, 293, 296-301); in Kīpukamauna'iu (292, 295); near the Volcano House

and Kīlauea Iki (331-334, 358-362); and in the Makaopuhi and Nāpau Crater areas (281, 377-390). From 1940 to 1949 Baldwin (1953) censused 12 plots ranging from 2300 to 7500 feet elevation and determined that the frequency of 'Ōma'o occurrence was 96% in the Nāpau Crater area, 74% at Twin Craters (Thurston Lava Tube area), 2% at Luamanu, and 0% in the other nine plots (284). Baldwin (1941) found it to be uncommon in the Park in 1940 (282), although it ranged as low as Kīpukanēnē (283). Birds were recorded on Christmas counts in 1939 and 1940 (280, 333), although exact localities were not given.

The relatively few records of 'Ōma'o in the Park in the 1950's and 1960's are mostly from areas in which they had previously been reported (285, 286, 302, 303, 335-337, 363-369, 391-395). The author extended the upper elevational records of this bird on Mauna Loa from 8500 to 10,000 feet on 5 June 1967 (304). Dunmire (1962) recorded it in the 'Ōla'a Tract sometime between 1959 to 1961 (338).

In the 1970's, much the same pattern of relative abundance and distribution emerges from the records as that previously reported (287, 290, 305-323, 339-344, 346, 348-353, 355-357, 370-375, 392-395), with the following notable exceptions. They were found in small numbers or not at all in sections of the 'Ōla'a Tract affected by 'ōhi'a (Metrosideros collina) die-off, but were found in substantial populations in healthy forest of the Tract by J. Jacobi and F. Warshauer, Mull (1975), and Katahira (19'78) (291, 345, 347, 354). Berger recorded the disappearance of 'Ōma'o in the Kīpukanēnē area since the time of Baldwin (376). Conant reported them in small numbers (< 1/40 ha) in 'ōhi'a-lama (Metrosideros-Diospyros) forests above 1600 feet elevation in her 1976 to 1977 surveys in the Kalapana area (396).

In Kīlauea District the species has been recorded most often since 1936 from Hawaii Volcanoes National Park northward to the Stainback Highway area. Near the Park, Donaghho (1947, 1951a, 1951c) Baldwin, Richards, H. G. Craddock found it commonly on Keauhou Ranch from 1937 to 1951 (408-419), as did others, from 1955 to 1973 (420-427, 177, 179). In nearby Volcano and along the trail to Kūlani Cone, 'Ōma'o were frequently seen and heard by some of the foregoing and other observers from 1938 to 1978 (429-444). The 44 counted in Volcano on the 1967 Hawaii Audubon Society Christmas Count (444) were the most reported for any locality in this area during the period.

Farther to the north of the Park, in the Pu'u Maka'ala area, 'Ōma'o have been recorded from 1945 to 1978, sometimes in large numbers (399-404). Hawaii Audubon Society Christmas counts for 1973, 1974, and 1978 totaled 168, 318, and 289, respectively (402-404). To the east and downslope from the Park, they were heard a few times by the author at 2450 feet elevation near a Kahaua-Le'a trailhead in 1972, while van Riper and Scott (1978 ms.) reported them in the Puna Forest Reserve as low as 1804 feet elevation (445). The lowest elevational record since 1903 is that of Richards who found them to be "common" on a short hike in Keauohana Forest Reserve downslope from Pāhoa-Kaimū Highway at about 800 feet elevation on 21 September 1950 (445a).

In Mauna Kea District observations of the relative abundance and distribution of 'Ōma'o over a wide area were recorded from 1937 to 1978. Most of the sightings have been above Hilo along the Saddle Road (446-449, 451-453, 475-477), some extending upwards from moderate elevations to the intersection of the Pu'u'ō'ō Trail at about 6000 feet (454, 468-474). The upper elevational limit in the Mauna Loa-Mauna Kea saddle area seems to be the observation of two by Jacobi at 7600 feet on 1 February 1973 along the Mauna Loa Observatory Road (474). One was heard by Baldwin at 7341 feet elevation between Pu'uhuluhulu and Pu'ukole on the southeastern flank of Mauna Kea on 17 April 1943 (465), apparently the upper elevational record on Mauna Kea. The present lower elevation limit for the species in the Waiākea and Hilo Forest Reserves seems to be 2624 and 3280 feet, respectively (van Riper & Scott 1978 ms.) (180, 455). Westward, in the arid saddle area between Mauna Kea and Mauna Loa, it was recorded by Shallenberger (1977) on two occasions in Grid 31-73 of the U. S. Army's Pōhakuloa Training Area (466, 467). Scheffer (1965) (176) thought that it was the most common native bird in the Waiākea and Hilo Forest Reserves where Berger (1969) (178) also reported it to be common. 'Ōma'o were considered "still abundant" and continuously distributed from Kahuku Ranch through Hawaii Volcanoes National Park to the northern reaches of the Hilo Forest Reserve by van Riper and Scott (1978 ms.) (181, 455, 456).

Islandwide, the status of the 'Ōma'o has been variously described in recent times as "occurs as a breeding population" by Hawaii State Division of Fish and Game (1969 ms.); "a candidate for the Blue List" because of limited range by Mull (1972); "still survives" by Atkinson (1977); and "still to be commonly found" by van Riper and Scott (1978 ms.) (164-167).

There are no records of the 'Ōma'o from areas which might be considered outside their normal range.

CHRONOLOGICAL DISTRIBUTION OF RECORDS

Of some 480 records of distribution and relative abundance of this species, about 517 were classified according to decade of origin and compiled in Table 1. The fact that some statements spanned more than a single decade or incorporated multiple or duplicate records accounts for the difference between number of records cited and those which were classifiable according to decade.

The chronological distribution of records reflects the initial 100-year gap in knowledge relative to distribution and abundance of P. obscurus spp. Only about 2% of the total historical record derives from the first century after discovery of the Hawaiian Islands in 1778. About 71% of the records were created since the 1920's, while the 27% balance originated during the period 1880 to 1929.

TABLE 1. Distribution of 517 Phaeornis obscurus records by decade.

1770's -	1	1840's -	1	1910's -	3
1780's -		1850's -		1920's -	6
1790's -		1860's -		1930's -	66
1800's -		1870's -	1	1940's -	42
1810's -		1880's -	13	1950's -	32
1820's -	4	1890's -	84	1960's -	72
1830's -	4	1900's -	32	1970's -	156

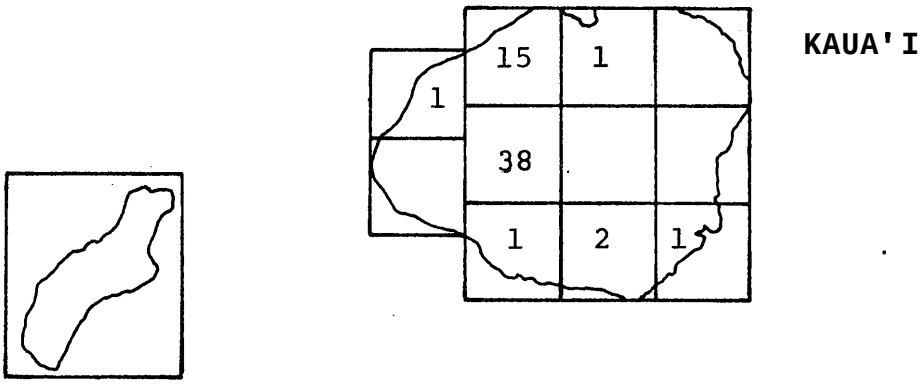
GEOGRAPHICAL DISTRIBUTION OF RECORDS

Records of Phaeornis obscurus distribution and relative abundance listed in Appendix I have been numbered sequentially in chronological and geographical order, as explained earlier. The total number of occurrence records for the islands of Kaua'i, O'ahu, Moloka'i, Lāna'i, and Hawai'i is shown geographically by quadrangle in Figures 1 and 2. Negative records (no birds seen or heard) outside of quadrangles in which P. obscurus spp. was historically resident are not included in the number shown. There are no records of P. obscurus spp. on islands other than where they have been recorded.

COMPLETENESS OF DATA, BIAS, ERRONEOUS AND DOUBTFUL RECORDS

Records in Appendix I are believed to be complete for the sources examined. No observation or report encountered in the literature search or in the field journals of others was knowingly omitted. Information from my own field notes, however, was included only in those cases where needed to fill in gaps or to strengthen statements made by others.

Frequency and distributional aspects of Phaeornis obscurus records obviously tilt in favor of localities patronized by early naturalists as well as birdwatchers and ornithologists who came later. The more or less continuous existence of easily detected populations over broad expanses of forest environments tends to reduce the influence of bias and strengthen the credibility of general statements.



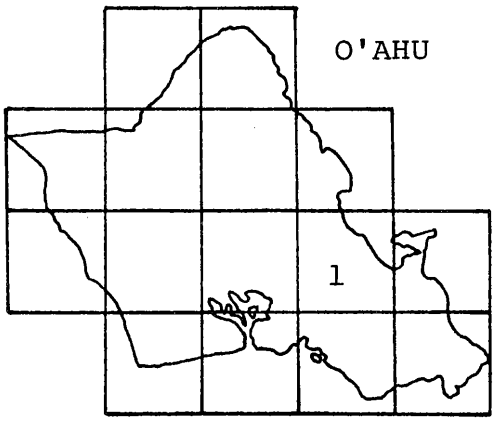
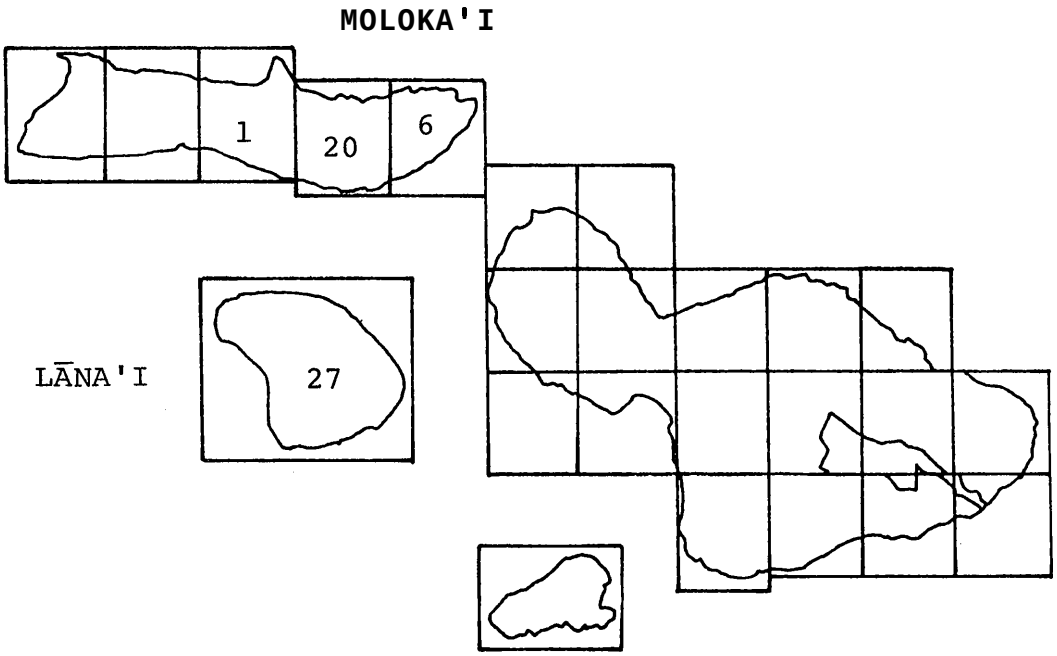


FIGURE 1. Distribution of observations, reports, and museum records of Phaeornis obscurus spp., per quadrangle, on islands of Kaua'i, O'ahu, Moloka'i, and Lāna'i, 1778-1978.



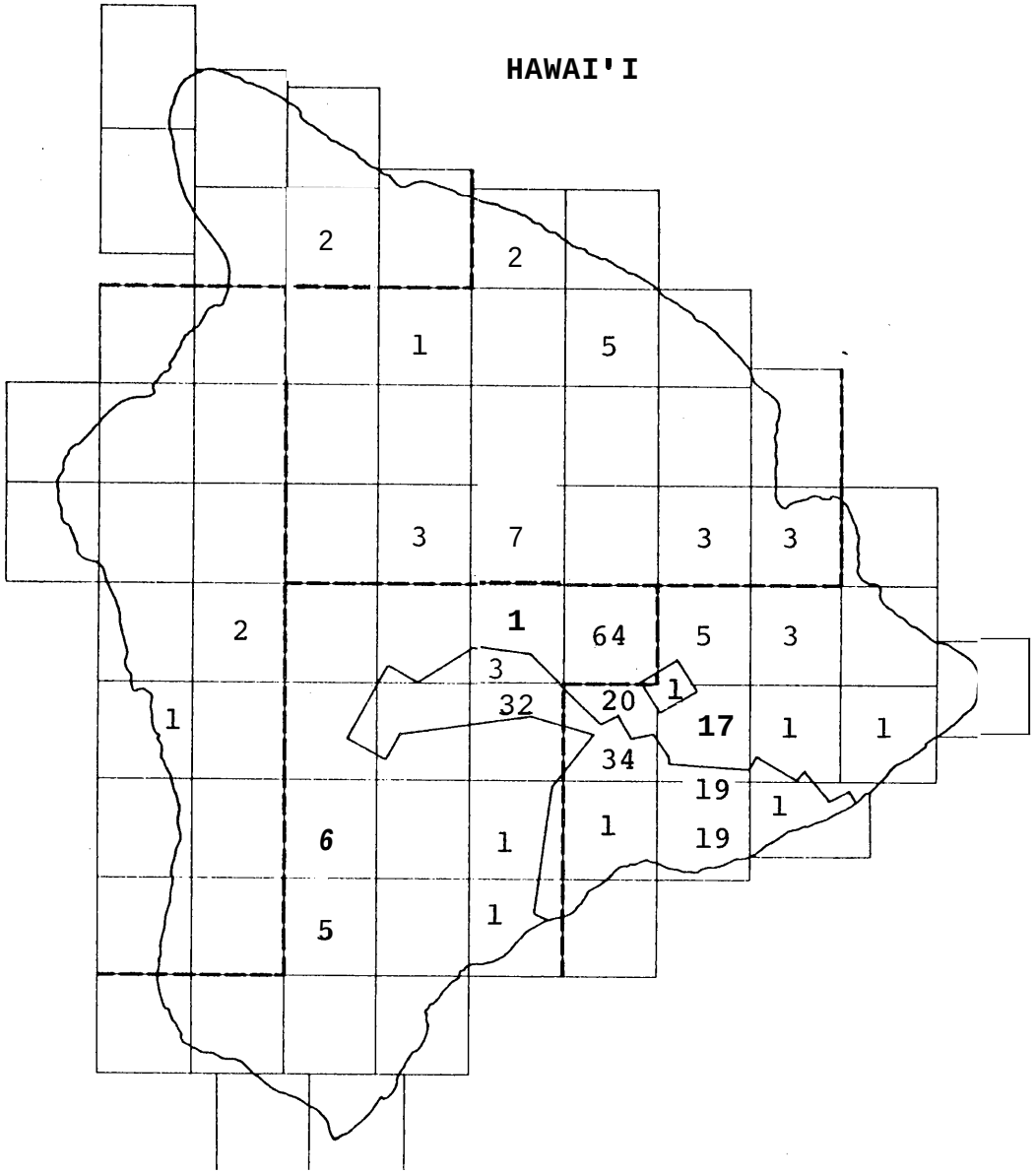


FIGURE 2. Distribution of observations, reports, and museum records of *Phaeornis obscurus* spp., per quadrangle, on Island of Hawai'i, 1778–1978.

Two apparent misstatements need to be pointed out. Donaghho (1963) credits G. C. Munro with possibly hearing an Oloma'o on Moloka'i in 1935, whereas Munro actually conducted his survey of that island in 1936 (120). Atkinson (1977), mislead by a statement of Munro (1944) and unaware of obscure notes by Gregory (1933, 1934, 1935), states that the Oloma'o on Lāna'i was last seen in 1931 (151-155). It was Munro who relayed to Gregory the information that the Oloma'o was "still not uncommon" on Lāna'i in 1934 (155).

Except for a few preliminary notes, findings on relative abundance and distribution of 'Ākepa resulting from islandwide surveys of forest birds by the U. S. Fish and Wildlife Service on Kaua'i beginning about 1967 and on Hawai'i from 1976 to 1979 are not included in this report. Similar information gathered by P. C. Banko during a 1973 re-survey of P. H. Baldwin's 1940 to 1949 census plots in Hawaii Volcanoes National Park can be found, more appropriately, in History of Forest Bird Populations in Hawaii Volcanoes National Park and Vicinity (CPSU/UH Avian History Report 3).

SUMMARY

Phaeornis obscurus is a medium-sized, gray-breasted, brown polytypic thrush once inhabiting at least five of the six forested Hawaiian Islands. An unknown number of specimens were taken on O'ahu in 1825 but collectors in 1837 failed to record its presence and it has not been reported since. On Kaua'i, Moloka'i, Lāna'i, and Hawai'i, this bird was almost ubiquitous in the 1890's, being found in dense as well as more open habitats from the lower to the upper limits of the forest. On Kaua'i, the population declined apparently more or less continually, for more than 50 years. Observers on Kaua'i in the late 1960's and mid-1970's never reported finding more than a few per day, and those only in a few favored upper elevation localities. Much the same timetable of depopulation is recorded for Moloka'i where a very few individuals were seen in one or two areas in the 1960's and 1970's. No thrushes have been reported since 1934 from Lāna'i where the resident subspecies is believed extinct. On the island of Hawai'i, thrushes disappeared from Kohala District, Hualālai, leeward Mauna Loa, and below about 2500 feet elevation from all districts along windward coasts of Hawai'i between about 1900 and 1970. The 'Ōma'o remaining on Hawai'i are apparently divided into two fairly disjunct geographical sub-populations, one which ranges the barren upper lava slopes of Mauna Loa from about 7000 to 9000 feet elevation and one which occupies a 75-mile long, more or less continuous forest from about 2500 to roughly 6500 feet elevation. Fragmentary data suggest that lower elevation elements of the latter population have receded in the past 25 years.

CONCLUSIONS

All five subspecies of the once-abundant and widespread Hawaiian Thrush have suffered depopulations of catastrophic proportions.

Phaeornis obscurus oahuensis and P. o. lanaiensis are extinct.

P. o. myadestina and P. o. rutha are represented by only a few surviving individuals.

P. o. obscurus has disappeared entirely from all lowland, leeward, and northern habitats on the island of Hawai'i. At mid-elevations in windward forests this subspecies is found only in sparse and scattered communities which may be declining. Sub-populations in higher forests are more abundant and widespread. Isolated groups found in favorable localities from 7000 to 10,000 feet along the flanks of Mauna Loa may represent elements of a discrete and perhaps substantial sub-population.

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APPENDIX I

1. Observations, reports, and specimen records are organized by island group, island, district, and/or quadrangle map. Order of listing, names and locations of district, and quadrangle boundaries are explained and illustrated in CPSU/UH Avian History Report 4: Introduction to Part I, Population Histories--Species Accounts.

2. Acronyms composed of the first three letters of the author's (or senior author's) last name, the initial letter of the first name, and last two digits of the year of publication represent sources found in the bibliography under References Cited. For example, BRYW01 = Bryan, W. A., and Alvin Seale. 1901. Notes on the birds of Kauai. Bishop Museum Occ. Papers. 1(3): 129-137. In cases where it is necessary to distinguish between two or more articles published by an author in any given year, letters are added to the acronym in alphabetical sequence, e.g., BRYW01a = Bryan, W. A. 1901. A key to the birds of the Hawaiian group. Bishop Museum Press. 76 pp.

   Parenthetical numbers such as (5), represent references listed under Unpublished Sources Cited in the bibliography.

3. Place-names are cited in original form.

4. Parenthetical information is qualified.

Relative Abundance/Locality	Elev. (ft.)	Date	Source
Phaeornis obscurus myadestina			
Island of Kaua'i			
ISLANDWIDE INFERENCE			
.1 probably does not number over a few hundred birds. ..now restricted to the deeper, more inaccessible portions of the Alakai Swamp..,.	....	(1975)	MARD75
UNDESIGNATED LOCALITY			
1 Banko: Townsend collected 1	....	(1835-1837)	(2)
2 obtained specimens / in nearly the same locality as specimens described by Dr. Stejneger	....	(1887-1888)	WILS91
3 Banko: Knudsen collected 6 specimens	....	(1886-1889)	(2)
4 Banko: Palmer collected 15 specimens	....	1891	(2)
5 extremely common	....	1891	ATKI77
6 not rare	....	(1891/1893)	ROTW93
7 Banko: Perkins secured 4 specimens	4000	May 1894	(2)
8 numerous	....	1899	ATKI77
9 seen and heard / in the rain forest	ca. 4000	(1941)	HARC45
10 seen / Alakai Swamp area	....	28-30 May 1966	ANON66
11 HSFG: occurs as a breeding population	....	(1969)	(5)

12	survives in moderate numbers	....	(1977)	ATKI77
MULTIQUADRANGLE				
13	extremely common...the most common bird in the Kauai forest / over all the forest region of the island from near sea level on the N side and outer edges of the forest to the mountaintop	....	1891	MUNG44
14	almost ubiquitous...common / throughout the forest, wherever birds are found, from the lower limits to the upper, not only in the densest parts of dense forest, but also in the more open woods	....	(1894-1896)	PERR03 (4)
15	common / generally distributed	....	(1894-1896)	PERR03 (4)
16	still numerous / on the forest edges	....	1899	MUNG64
17	searched in vain / all the outside forests	....	Sept. 1928 April 1931 July-Aug. 1932	MUNG64
18	only 1 seen / depths of the forest	....	28 Sept., April 1931; July-Aug. 1932	MUNG64
19	resident...fairly common...must be at least some hundreds, if not a few thousands / Alakai Swamp native forest area	....	June-Aug. 1960	RICF64
20	its range now / bounded by the Koaie to the W and the Olokele to the E	....	Aug. 1965	DONW65
21	1 heard / in the Alakai Swamp	....	3 Jan. 1968	ORER68
22	plentiful / Alakai Swamp	....	1-2 Sept. 1963	ORDW63

Island of Kaua'i--(Continued)

MULTIQUADRANGLE (con't.)

23	censused 1 / E Alakai Swamp	....	29 Dec. 1973	HARA74a
24	least numerous of 9 endemic birds seen... 4 day field trip / W Alakai Swamp	....	(1974?)	HARA74

MAKAHA POINT

'25	singing...used to waken us at daybreak / Halemanu	....	(Jan., Feb., Mar. 1891)	MUNG64

HAENA

25a	common even to the outer edge of the forest / at Halemanu above Mt. Puukepele by the present Kokee camps out to Kalalau Valley lookout	....	Dec. 1890 to May 1891	MUNG47
26	at least one hundred times more numerous than the smaller species / towards Kalalau up from Knudsen's mountain house, Halemanu (where specimens of smaller species were taken)	ca. 4000	(May 1895)	PERR03
27	1 seen / ca. 4 miles into the forest from the Kokee camps near the Koaie River	....	23 July 1932	MUNG47
28	1 seen / at the edge of the clearing (Kokee)	....	(6-7 Sept. 1946)	PEAG47
29	2 seen / along trail to Alakai Swamp	....	(6-7 Sept. 1946)	PEAG47
30	heard / Kokee area	....	(1960)	BALH60
31	King: 2 heard / on 3-hour hike from Koaie cabin to road-end trailhead	....	22 Feb. 1964	(1)
32	tentative identification made from recording of 1 bird song / near Kalalau Lookout	....	19-22 Mar. 1964	SCHP65

33	King: heard perhaps 10 / on hike to beyond Koaie cabin and return	....	2 May 1965	(1)
34	none seen / Mohihi River - Koaie cabin	....	11 Aug. 1965	DONW65
35	does not range / to the W of the Koaie Canyon	....	11-15 Aug. 1965	DONW65
36	none seen / Koaie cabin - Mohihi River	....	15 Aug. 1965	DONW65
37	2 censused in about 1 hr. in heavy rain... Christmas count / Kokee area	....	29 Dec. 1969	SEAW70
38	present...came to my bird table / Kokee	....	(8 July-2 Sept. 1970)	PLEJ70
39	1 reported / Alakai loop trail near Kokee	....	7 Oct. 1977	PYLR78
HANALEI				
39a	common even to the outer edge of the forest / from Hanalei to Hanakapeai	....	Dec. 1890 to May 1891	MUNG47
WAIMEA CANYON				
39b	common even to the outer edge of the forest / Kaholuamanu	....	Dec. 1890 to May 1891	MUNG47
40	Perkins: shot specimen(s) / unspecified distance up from Gay's mountain house above Makaweli	over 3000	25 May (1894)	(4)
41	Perkins: seem less numerous than last June / Kaholuamano (Kaholuamanu) Plateau (Gay's mountain house)	....	15 April (1895)	(4)
42	Banko: Perkins obtained 6 specimens / Kaholuamanu	....	Oct. 1895	(2)
43	Banko: Munro collected 2 specimens / 1 near Makaweli	....	5 July 1899	(2)

44	fairly common / (Kaholuamano [Kaholuamanu] and upwards)	....	(12 Apr.-4 May 1900)	BRYW01
45	Banko: Bryan and Seale took 4 specimens / 1 at Kaholuamanu	....	April, May 1900	(2)
46	2 alighted nearby / (?Kaholuamanu)	....	18 April (1915)	BRYW15
47	Munro: good view obtained...as a result of many trips in a week in the forest from Puu Ka Pele down valleys and ridges to the cliffs at the shore (6 routes enumerated) / near the Koaie stream	....	end of July (1932)	GREH33
48	Donaghho reported seeing several / ?Kaholuamanu	....	1936	MUNG47
49	present / around Waialae cabin	....	(1936)	DONW65
50	not uncommon / Kohua Ridge	....	1936	DONW65
51	fairly common / Kaholuamanu	ca. 3700	Jan. 1936	MUNG44
52	saw and heard a number / Kaholuamanu	....	29-30 July 1936	MUNG47
53	not rare / area above the Robinson mountain house, Kaholuamanu	....	(Oct. 1941)	DONW41
54	still doing well / (Kaholuamanu)	ca. 3700	1941	MUNG44
55	do not recall it / around Waialae cabin	....	1941	DONW65
56	present / Kaholuamanu and Waialae districts	....	(1947)	WOOD47

57	more...presumably of both native species were heard / between the upper Koaie River, ca. 3750 ft. and Kawaiiki Ridge, about 4250 ft. to the SE.. .near the upper Kohua Ridge within a mile of the Wainika Pali	....	19-22 July (1960)	RICF64
58	more...presumably of both native species were heard / in the upper Waialae River, ca. 3750 ft. to ca. 2 miles E along the high forest country leading toward Mt. Waialeale	....	3-5 Aug. (1960)	RICF64
59	estimated hearing 10 or more / near the upper Kohua Ridge within a mile of the Wainiha Pali	....	15 Aug. (1960)	RICF64
60	definitely saw 12. ..estimated hearing at least 15 / between the upper Koaie River, ca. 3750 ft., and Kawaiiki Ridge, ca. 4250 ft. to the SE	....	16 Aug. (1960)	RICF64
61	several heard and seen / along Kawaiiki Ridge from Koaie cabin toward Waialae cabin incl. near Koaie cabin	....	3 Sept. 1961	BOWJ62
62	heard singing 0600 hours / vicinity Koaie cabin	....	21 April 1962	ORDW62
63	seen / ridge S Koaie cabin	....	21 April 1962	ORDW62
64	King: 2 or so seen and heard / in deep valley over plateau from (Koaie) cabin	....	20 Feb. 1964	(1)
65	King: seen and heard / on hike along ridge to plateau, beyond Koaie cabin	....	20 Feb. 1964	(1)
66	King: 5 recorded. .,stopped every 100 yds. or so to listen and watch / along trail from Koaie cabin toward Waialeale ca. 2 or 3 miles ...side trip into deep valley on other side of plateau.. .and return	....	21 Feb. 1964	(1)

Island of Kaua'i--(Continued)

WAIMEA CANYON (con't.)

67	heard periodically / along ridge deeper and deeper into the swamp (past Koaie cabin)	....	21-23 Feb. 1964	WALR64
68	King: at least 4 seen / along ridge beyond Koaie cabin	....	2 May 1965	(1)
69	King: one heard / near Koaie cabin	....	2 May 1965	(1)
70	9 counted / Koaie - Waialae Trail	....	12 Aug. 1965	DONW65
71	none seen / Wainiha Rim	....	13 Aug. 1965	DONW65
72	8 counted / Koaie - Waialae Trail	....	14 Aug. 1965	DONW65
73	heard / near Koaie River cabin	....	(23 Sept. 1965)	HANJ66
74	8 seen / on a trip into the Alakai...got back 2 miles from the Koaie gulch	....	28 Aug. 1967	DONW67a
75	approximately 8 heard or seen in one traverse of the ridge / along the ridge trail extending SSE from the (Koaie) cabin paralleling Koaie stream.. .approximately 1.5 miles to source... making short side trips out spur ridges and descending into the canyon at the stream origin...Alakai Swamp...clear skies, wind moderate, mild temperature	....	31 May, 1 June 1968	GAUJ68
76	censused 2 / Waimea area, center E of junction of Kokee from Waimea and Kekaha	....	28 Dec. 1974	SEAW75

HANAPEPE

76a	common even to the outer edge of the forest / above the Olokele Sugar Mill on the sides of a branch of the Hanapepe Canyon	....	Dec. 1890 to May 1891	MUNG47

KOLOA

77	Miller: shot several / in the woods all up toward the base of the hills, from Rice's residence (near Kipu Kai ?)	ca. 200	30 Mar. 1903	(3)	
78	Miller: got 2 specimens...quite abundant ...others on inaccessible hillsides / while working up through the lantana on the hillside toward Kipu Kai from Rice's residence	ca. 200	31 Mar. 1903	(3)	

LIHUE

79	Perkins: present / at a good elevation in the mountains some miles W of Lihue...dense masses of staghorn fern	....	July/Aug. 1896	(4)	

Phaeornis obscurus oahuensis

Island of O'ahu

80	heard the melodious notes of a brown thrush / ascending pass to Nuuanu Valley from the east	....	14 May 1825	BLOA25	
81	Bloxam took specimens / unspecified locality	....	(1825)	WILS91	
82	not aware of any specimens being preserved in any museum, though Bloxam obtained a skin / unspecified locality	....	ca. 1826	ROTW07	
83	found feathers of a brown bird...that matched those of the breasts of the other Phaeornis, but the wing feathers were chocolate brown, not olive / Mt. Kaala	....	1938	DONW63	
84	Abbott: heard thrushlike 'qua'. ..had just returned from Hawaii and was quite familiar with this cry / Konahuanui Trail	....	(ca. 1939?)	DONW63	WW

Island of O'ahu--(Continued)

85	HSFG: thought to be extinct or extirpated from this particular island	....	(1969)	(5)
86	evidently common	....	(1825)	ATKI77
87	extinct	....	(1977)	ATKI77

Phaeornis obscurus rutha

Island of Moloka'i

ISLANDWIDE INFERENCE

88	HSFG: thought to be extinct or extirpated from this particular island	....	(1969)	(5)

UNDESIGNATED LOCALITY

89	Banko: Wilson secured 1 specimen	....	June 1888	(2)
90	Banko: Palmer collected 17 specimens	....	17 Dec. 1892 - 26 Jan. 1893	(2)
91	Banko: Perkins collected 6 specimens personally and secured 4 others (later?)	....	May, June, Sept. 1893	(2)
92	Banko: Flood took 3 specimens	....	Dec. 1894; Feb. 1895	(2)
93	common	....	1890's	MUNG44
94	Banko: Munro obtained 6 specimens	....	Oct., Nov. 1906; June 1907	(2)
95	thought I heard 1 sing during the bird survey but was not absolutely sure	....	1936	MUNG44
96	survives in very low numbers	....	(1977)	ATKI77

MULTIQUADRANGLE

97	not rare / Palmer saw it in the lowland as well as at the highest elevations	....	(1892/1893)	ROTW93
98	still remains / in spots whence other native birds have vanished	....	(1893/1896)	PERR03
99	almost ubiquitous / throughout the forest, wherever birds are found, from the lower limits to the upper, not only in the densest parts of dense forest, but also in the more open woods	....	(1893/1896)	PERR03
100	common / in the mountain forests	....	(1893/1896)	PERR03
101	none seen / bird survey on both E and W sides of the forest	....	1936	MUNG63
102	Donaghho did not see it / over a great deal of Molokai forest	....	1937	MUNG44
103	now in danger of extinction / (islandwide inference)	....	(1944)	MUNG44

KAUNAKAKAI

104	seen less often than apapane and iiwi / verdant forested ravine...(near) small romantic lake (which lay at an elevation of ca. 2000 feet) (probably Meyer Lake now)	....	(1895?)	SCHH00

KAMALO

105	Perkins: shot 1 in short time / vicinity of Makakupaia	(?ca.2900)	12 May (1893)	(4)
106	Perkins: saw plenty / up from Makakupaia	....	13 May (1893)	(4)
107	Perkins: got a shot / in gulch down from camp in ohia forest above Makakupaia	....	25 May (1893)	(4)

Island of Moloka'i--(Continued)

KAMALO (con't.)

108	Perkins: one shot / up from camp at Makakupaia	....	10 June (1893)	(4)
109	Perkins: parents and young seen / in gulch below Makakupaia	....	17 June (1893)	(4)
110	Perkins: shot specimen / down from first peak of the back ridge in first dense forest on way up to Pelekunu Pali	....	25 June (1893)	(4)
111	Perkins: heard several sing / near the head of Waikolu across from Makakupaia	....	2 Aug. (1893)	(4)
112	Perkins: shot 1 / near highest camp above Makakupaia	....	13 Aug. (1893)	(4)
113	Perkins: shot 1 / unspecified locality (up from Makakupaia)	....	10 Sept. (1893)	(4)
114	Perkins: shot 1 / in the high forest above Makakupaia	....	17 Sept. (1893)	(4)
115	collected nest / in the dense woods on the summit of Puualu	....	1 May (1907)	BRYW08
116	Banko: Bryan collected 1 specimen / Wailua (?Wailau)	....	April-June 1907	(2)
117	Banko: Bryan collected 3 specimens / along Pelekunu (trail)	....	April-June 1907	(2)
118	collected type-specimen / Kilohana Mountain (Kilau?)	....	30 April 1907	BRYW08
119	Banko: Bryan collected 2 specimens / Punalu (?Punalau)	....	April-June 1907	(2)

120	Munro: thought he heard singing / along Wailau crest	" " " "	1935 (?1936)	DONW63
121	observed 2 for about five minutes / Puu Haha, on the SW slope ca. 300 ft. from the top... along Kapulei ridge	....	17 July 1963	PEKN63
122	rare...status determined from over 10 years residence / in the dense rainforest of central Molokai at Kamueli	" " " "	(ca. 1955-1964)	PEKN64
123	Pekelo saw / lee of the cliffs at Kumueli... E of Kuana ridge which is E of Puu Kolekole cabin	" " " "	(1972)	PRAT73
124	rare...2 recorded at once...another seen in same area same day / above Puu Kolekole cabin in the Molokai Forest Reserve...1 mile E of N. Pekelo's 1963 sightings of 2	4460	21-25 July 1975	SCOJ77

HALAWA

125	not at all rare...much oftener heard than seen / collecting trips to unspecified localities out of Pukoo	" " " "	Dec. 1892	ROTW93
126	more numerous here (than near Pukoo) / hills above Halawa in forest much higher than Pukoo	" " " "	Jan. 1893	ROTW93
127	Banko: Bryan collected 1 specimen / Mbanui	" " " "	April-June 1907	(2)
128	Banko: Bryan collected 3 specimens / Halawa	" " " "	April-June 1907	(2)
129	more abundant than at any of the other localities visited / Halawa	" " " "	(15 April-15 June 1907)	BRYW08
130	Banko: Bryan collected 2 specimens / Brown's Ranch (Puu o Hoku)	" " " "	1907	(2)

Phaeornis obscurus lanaiensis

Island of Lāna'i

131	Banko: Wilson collected 1 / undesignated locality	....	June 1888	(2)
132	not rare, Palmer saw it / in the lowland as well as the highest elevation	....	(Nov. 1892)	ROTW93
133	Banko: Palmer collected 20 / undesignated locality	....	1–26 Nov. 1892	(2)
134	Perkins: some seen and shot / deep gulch other side of plateau from camp near head of gulch behind Koele	....	17 Jan. (1894)	(4)
135	Perkins: shot specimen(s) / flat above head of gulch behind Koele	....	24 Jan. (1894)	(4)
136	Perkins: shot specimen(s) / upwards from camp near head of gulch behind Koele	....	27 Jan. (1894)	(4)
137	Perkins: shot one / up from camp near head of gulch behind Koele	....	late June to 4 July (1894)	(4)
138	Perkins: shot specimen(s) / out from camp at Halepaakai	....	5–13 July (1894)	(4)
139	Banko: Perkins collected 2 / Lanaihale	....	1893–1894	(2)
140	Banko: Perkins collected 2 / undesignated locality	3000	1893/1894	(2)
141	Banko: Perkins collected 6 / undesignated locality	....	1893/1894	(2)

142	common / in the mountain forests. ..Rothschild credits this bird to the lowlands of Lanai, meaning no doubt the lower part of the forest, which is far removed from the low-lands, where no Phaeornis could exist	....	(1893/1894)	PERR03 (4)
143	almost ubiquitous / throughout the forest, wherever birds are found, from the lower limits to the upper, not only in the densest parts of dense forest, but also in the more open woods	....	(1893/1894)	PERR03 (4)
144	Banko: Weiske took 1 specimen / undesig-nated locality	....	Feb. 1894	(2)
145	a common bird and its call notes could be heard constantly.. .under (frequent) obser-vation / especially in the N and S ends of the small Lanai forest	....	(1911-1923)	MUNG44
146	common	....	1911-1923	ATKI77
147	probably increasing	....	(1923)	MUNG44
148	Munro: probably increasing	....	(1923)	GREH24
149	declined	....	(after 1923)	MUNG44
150	Munro: still to be seen / undesignated locality	....	(1931)	GREH32
151	call notes...conspicuously absent / the few times I have been through the Lanai forest	....	since 1931	MUNG44
152	not seen / (islandwide inference)	....	since 1931	ATKI77
153	Munro: still fairly common...forests were often visited	....	(1932)	GREH33
154	Munro: found 1 dead / in a water tank on the highest point of the island	....	(1933)	GREH34

Island of Lāna'i--(Continued)

155	Munro: still not uncommon	....	(1934)	GREH35
156	(formerly) inhabited all the present forest, frequenting the low trees and underbrush	....	(1944)	MUNG44
156a	HSFG: thought to be extinct or extirpated	....	(1969)	(5)

Phaeornis obscurus obscurus

Island of Hawai'i

ISLANDWIDE INFERENCE

157	still fairly common / in the forests of Hawaii.. .vertical range.. .from the lowest forest zone up to 5000 ft.	....	(1887-1888)	WILS90
158	fairly common...perhaps the species most frequently met with / most districts of Hawaii, lowest forest zone up to 5000 ft. and probably higher	....	(1887-1888)	WILS99
159	common / island of Hawaii...at ca. 2000 ft. el., not so common at 4500 and 5000 ft.	....	Sept., Oct. 1891	MUNG44
160	range / from the lowest to the highest limits of the forest proper	....	(June/Oct. 1892)	PERR93
161	common / generally distributed.. .extremely numerous in Kona District	....	(1892-1896)	PERR03
162	almost ubiquitous / throughout the forest, wherever birds are found, from the lower limits to the upper, not only in the densest parts of dense forest, but also in the more open woods	....	(1892-1896)	PERR03

163	found abundantly / in the denser forests above 1000 ft., ...all over the island	....	(1894-1902)	HENH02
164	HSFG: occurs as a breeding population / island of Hawaii	....	(1969)	(5)
165	candidate for the Blue List...limited range	....	(1972)	MULM72
166	still survives	....	(1977)	ATKI77
167	van Riper et al.: still to be commonly found	....	(1978)	(8)

UNDESIGNATED DISTRICT

168	Banko: specimen collected by U. S. Exploring Expedition / on way from Napoopoo to Kilauea Volcano	....	16 Nov. 1840	(2)
169	Banko: Wilson collected 3 specimens	....	1887/1888	(2)
170	Banko: Wilson collected 1 specimen / Palopopa (?)	....	1887/1888	(2)
171	not uncommon	....	(1891/1892)	ROTW93
172	Banko: Palmer collected nearly 20 specimens	....	1891/1892	(2)
173	Banko: McGregor collected 1 specimen / mountains on Hawaii	....	18 Jan. 1900	(2)

MULTIDISTRICT

174	less common / on the northern slopes of Mauna Kea and in the Kohala Mountains...seen wherever there was forest that the native birds still inhabitated	....	(Sept., Oct. 1891)	MUNG44

Island of Hawai'i--(Continued)

MULTIDISTRICT (con't.)

175	Banko: Henshaw collected 27 specimens / Kaumana, Keaau and Olaa	....	1898-1902	(2)
176	appears to be the most common native bird in numbers and song / through the Hilo and Waiakea Forest Reserves on the lower slopes of Mauna Kea, mauka from Hilo	1500-3500	16 April 1965	SCHP65
177	common / forests bordering the Kulani Prison Road...downslope	5200-2000	23 Jan. 1966	BERA66
178	I have found it most common / along the eastern part of the Saddle Road, which ascends from Hilo into the high saddle land between Mauna Kea and Mauna Loa; along the Kulani Prison Road on the eastern slope of Mauna Loa; and at the Thurston Lava Tube in Volcanoes National Park, as well as in similar rain forests adjacent to the Park	....	(ca. 1967-1968)	BERA69
179	200 censused / Kulani Cone to Puu Makaala	....	30 Dec. 1972	GAGW73
180	van Riper et al.: found as low as 2624 ft. el. / Waiakea forests	....	(1978)	(8)
181	van Riper et al.: continuous distribution / from Kahuku Ranch through Hawaii Volcanoes National Park, to the northern reaches of the Hilo Forest Reserve	....	(1978)	(8)

Kohala District

UNDESIGNATED LOCALITY

182	Palmer: a couple seen / (encamped in Kohala mountains day's travel from Kohala)	....	(Jan. 1892)	ROTW93

MULTIQUADRANGLE

183	van Riper et al.: failed to find / on Kohala Mountain	....	(1978)	(8)

KAMUELA

184	Banko: Wilson collected 2 specimens / Waimea	....	1887/1888	(2)
185	Banko: Wilson collected 2 specimens / Punalala (?), Waimea	....	1887/18 88	(2)

Kona District

MULTIQUADRANGLE

186	especially numerous / district of Kona	....	(1891)	ROTW93
187	temporary movement from normal range into koa **woods** to feed on looper caterpillars / Kona	....	(1892-1896)	PERR03
188	absent / on Hualalai	....	May 1940	DONW40
189	van Riper et al.: Morgan failed to find any / South Kona Forest Reserve	....	(1978)	(8)
190	van Riper et al,: failed to find / Kona area	....	(1978)	(8)

UNDESIGNATED LOCALITY

191	specimen obtained / during several days excursion from Kealekekua Bay into the interior	....	Jan./Feb. 1779	STRE50
192	Banko: Wilson collected 1 specimen	....	1887/1888	(2)

UNDESIGNATED LOCALITY (con't.)

193	Banko: Munro collected 1 specimen	....	19 Sept. 1891	(2)	
194	so common	....	(June-Oct. 1892)	PERR93	

PUU LEHUA

195	Perkins: pair nesting / unspecified locality (? below Pulehua)	3000	Mar. 1896	(4)	
196	Banko: Henshaw collected 1 specimen / Pulehua Ranch	....	1898-1902	(2)	

HONAUNAU

197	Banko: Wilson collected 1 specimen / Kaawaloa	....	1887/1888	(2)	

Ka'ū District

UNDESIGNATED LOCALITY

198	saw 1 small bird, about the size of a sparrow, of a light mixed grey color, with a faintly yellow beak...perched on a block of lava...so tame as to permit me to catch it with my hands (? 'Ōma'o) / near the top ...Mauna Loa	....	29 Jan. 1834	WILW19	
199	Banko: Perkins collected 3 specimens	....	July 1895	(2)	

MULTIQUADRANGLE

200	van Riper et al.: lowest distribution is 2296 ft. el. / Kau Forest	....	(1978)	(8)	

201	van Riper et al.: regularly observed in alpine and subalpine scrub habitats / Mauna Loa	....	**(1978)**	(8)

PUU ULAULA

202	Banko: Baldwin collected **1** specimen / **0.25** mile **N of NPS** bndry. **,** Keauhou	**7500**	**1948/1949**	(2)

KULANI

203	Donaghho: saw **5,** heard 21 / from about **6700** ft. el. Mauna Loa Trail down to Keawewai water tank and into koa forest thence making a "C" and out again going S, thence down to Brown's Ranch	....	**2** July **1937**	(9)
204	several heard calling / in the forest ENE from Keawewai water tanks	....	**2** July **1937**	DOWN51a
205	in great number / koa forest, Kulani Cone trail from Volcano area	....	13 July **1937**	DOWN51a
206	increased until **it** was very common...3 or more birds were always within hearing / from about where koa encountered until **it** was the dominant tree, along Kulani Cone trail from Volcano	....	**13** July **1937**	DOWN51a
207	many heard / along Puu OO trail just above Keawewai	....	12 Sept. **1937**	DONW51c
208	abundant / Keawewai, a region a few miles to the NE of the Park	....	Aug. **1938**	BALP41
209	Baldwin: heard in abundance at 0512 hours / Keawewai cabin	....	**11** Sept. **1938**	(10)
210	Baldwin: heard / koa grove near Keawewai cabin	....	**11** Sept. **1938**	(10)

KULANI (con't.)

211	Baldwin: certainly the noisiest...seemed to be the most abundant bird / Puu Kaipu	....	11 Sept. **1938**	(10)
212	NPS: **25-100,** common / at Kulani and the long trail	....	**26** Dec. **1939**	(11)
213	Baldwin: heard and seen / upper edge of the forest belt through which the Puu OO trail runs, Keauhou Ranch	ca.7000+	**6** Aug. **1941**	(10)
214	Banko: Baldwin collected 1 specimen / Solomon's Waterhole, Keauhou Ranch	....	**1948/19 49**	(2)
215	Baldwin: present / hike along N base Kulani Cone	....	10 May **1949**	(10)
216	Baldwin: present...common in the kipukas of larger trees, including Acacia; along the Puu OO trail..collected specimen(**s**) / in hike through sparse Metrosideros forest from junction Kulani Prison road and **1942** lava flow up to Puu OO trail and S to Solomon's Waterhole	....	**12** Sept. **1949**	(10)
217	Baldwin: present / **0.25** mile **W** Solomon's Waterhole	....	**12** Sept. **1949**	(10)
218	Richards: noted, number unspecified, 1000-**1830** hours / hike to just past **4** mile marker on trail from end of Haunani St., Volcano, to Puu Kulani, Upper Olaa Forest Reserve	3800-**4200**	**13** Oct. **1950**	(12)
219	(noted) / on the lower **slopes** of Kulani	....	28 May **1966**	DONW**66**
220	heard and seen / Kulani Prison Camp area near guest cabin	....	**28** May **1966**	DONW66

221	put on a grand display / along Kulani Prison road	ca. 4000	16–23 Nov. 1966	ORDW67
222	met with and studied / forest along Stainback Highway and base of Kulani Cone	....	24 Dec. 1968	DONW68
223	Berger: censused 22 / Transect 1, 200 acre IBP Stud Plot, Kilauea Forest Reserve (0945–1280 hours)	....	11 Jan. 1972	(13)
224	Berger: censused 53 / Transect 1, 200 acre IBP Study Plot, Kilauea Forest Reserve (1130–1400 hours)	....	6 Feb. 1972	(13)
225	Berger: censused 36 / Transect 1, 200 acre IBP Study Plot, Kilauea Forest Reserve (0955–1225 hours)	....	14 Mar. 1972	(13)
226	Berger: censused 35 / Transect 1, 200 acre IBP Study Plot, Kilauea Forest Reserve (1220–1410 hours)	....	20 May 1972	(13)
227	Berger: censused 27 / Transect 1, 200 acre IBP Study Plot, Kilauea Forest Reserve (1315–1430 hours)	....	20 July 1972	(13)
228	Berger: censused 21 / Transect 2, 200 acre IBP Study Plot, Kilauea Forest Reserve (1215–1325 hours)	....	11 Jan. 1972	(13)
229	Berger: censused 33 / Transect 2, 200 acre IBP Study Plot, Kilauea Forest Reserve (1427–1618 hours)	....	6 Feb. 1972	(13)
230	Berger: cnesused 29 / Transect 2, 200 acre IBP Study Plot, Kilauea Forest Reserve (1246–1400 hours)	....	14 Mar. 1972	(13)
231	Berger: censused 25 / Transect 2, 200 acre IBP Study Plot, Kilauea Forest Reserve (1425–1535 hours)	....	20 May 1972	(13)

Island of Hawai'i--(Continued)

KULANI (con't.)

232	Berger: censused 23 / Transect 2, 200 acre IBP Study Plot, Kilauea Forest Reserve (1445-1538 hours)	....	20 July 1972	(13)
233	Berger: censused 16 / Transect 3, 200 acre IBP Study Plot, Kilauea Forest Reserve (1215-1320 hours)	....	12 Jan. 1972	(13)
234	Berger: censused 34 / Transect 3, 200 acre IBP Study Plot, Kilauea Forest Reserve (1240-1430 hours)	....	7 Feb. 1972	(13)
235	Berger: censused 35 / Transect 3, 200 acre IBP Study Plot, Kilauea Forest Reserve (0930-1125 hours)	....	15 Mar. 1972	(13)
236	Berger: censused 37 / Transect 3, 200 acre IBP Study Plot, Kilauea Forest Reserve (0910-1125 hours)	....	23 April 1972	(13)
237	Berger: censused 19 / Transect 3, 200 acre IBP Study Plot, Kilauea Forest Reserve (1225-1337 hours)	....	21 May 1972	(13)
238	Berger: censused 14 / Transect 3, 200 acre IBP Study Plot, Kilauea Forest Reserve (1203-1255 hours)	....	18 July 1972	(13)
239	Berger: censused 20 / Transect 4, 200 acre IBP Study Plot, Kilauea Forest Reserve (0923-1135 hours)	....	12 Jan. 1972	(13)
240	Berger: censused 42 / Transect 4, 200 acre IBP Study Plot, Kilauea Forest Reserve (1000-1215 hours)	....	7 Feb. 1972	(13)

241	Berger: censused 36 / Transect 4, 200 acre IBP Study Plot, Kilauea Forest Reserve (1151-1350 hours)	....	15 Mar. 1972	(13)
242	Berger: censused 23 / Transect 4, 200 acre IBP Study Plot, Kilauea Forest Reserve (1148-1325 hours)	....	23 April 1972	(13)
243	Berger: censused 30 / Transect 4, 200 acre IBP Study Plot, Kilauea Forest Reserve (0950-1140 hours)	....	21 May 1972	(13)
244	Berger: censused 29 / Transect 4, 200 acre IBP Study Plot, Kilauea Forest Reserve (1015-1140 hours)	....	18 July 1972	(13)
245	heard...singing regularly and saw several / upper Kilauea Forest Reserve	....	late July, early Aug. 1972	ANON73
246	168 censused (Christmas Count) / Kilauea Forest Reserve	....	30 Dec. 1972	GAGW73
247	Conant: censused 188 birds per 40 ha, 100% occurrence frequency / monthly censuses, Kilauea Forest Reserve (Transect 91)	....	Dec. 1972 - July 1973 Aug. 1974 - Mar. 1975	(14)
248	Conant: censused 88 birds per 40 ha, 100% occurrence frequency / monthly censuses, upper Keauhou Ranch (Transect 92)	....	Dec. 1972 - July 1973 Aug. 1974 - Mar. 1975	(14)
249	have highest population densities / in Kilauea Forest Reserve and Upper Keauhou Ranch (from data collected monthly on 12 transects in different ecosystems including Hawaii Volcanoes National Park)	....	Mar. 1972 - July 1973 Aug. 1974 - Nov. 1974	CONS75
250	censused 65 (Christmas Count) / Kilauea Forest Reserve	....	30 Dec.1973	MULW74
251	censused 217 (Christmas Count) / Keauhou Ranch	....	14 Dec. 1974	MULW75

KULANI (con't.)

252	censused 120 (Christmas Count) / Kilauea Forest Reserve	....	14 Dec. 1974	MULW75
253	present...saw more than a pair / Keauhou, near Keawewai	....	4 Oct. 1975	DONW75
254	abundant.. .highly vocal (5 hours observations by 3 observers) / ca. 1 mile along bndry. fence between Kilauea Forest Reserve and Keauhou Ranch approximately 11 miles NW of Volcano	....	19 Aug. 1977	PRAH77
255	as abundant but 50% less vocal than on Aug. 19.. .(8 hours observations by 3 observers) / ca. 1 mile along bndry. fence between Kilauea Forest Reserve and Keauhou Ranch approximately 11 miles NW of Volcano... also adjacent recently-logged area Keauhou Ranch near point of beginning 11 miles NW of Volcano	....	20 Aug. 1977	PRAH77
256	found 5 in 30 min. / along upper Stainback Highway	....	13 Sept. 1977	PYLR78
257	30 censused (Christmas Count) / Waiakea Forest Reserve Transect 27	....	2 Jan. 1978	KATL78
258	94 censused (Christmas Count) / Kulani Project Transect 28 mauka	....	2 Jan. 1978	KATL78
259	360 censused (Christmas Count) / Kulani Project Transect 28 makai	....	2 Jan. 1978	KATL78
260	174 censused (Christmas Count) / Keauhou Ranch Transect 29	....	2 Jan. 1978	KATL78
261	64 censused (Christmas Count) / Keauhou Ranch Transect 30	....	2 Jan. 1978	KATL78

262	21 censused (Christmas Count) / Kilauea Forest Reserve (Keauhou Ranch Transect 30)	....	2 Jan. 1978	KATL78
263	19 censused (Christmas Count) / Kilauea Forest Reserve (Keauhou Ranch Transect 31)	....	2 Jan. 1978	KATL78
264	26 censused (Christmas Count) / Keauhou Ranch Transect 31	....	2 Jan. 1978	KATL78
265	156 censused (Christmas Count) / Keauhou Ranch	....	2 Jan. 1978	KATL78
266	53 censused (Christmas Count) / Kilauea Forest Reserve (Keauhou Ranch)	....	2 Jan. 1978	KATL78

ALIKA CONE

267	Banko: heard and saw none / near Great Crack, SW Rift Mauna Loa	9700	25 Aug. 1973	(15)
268	Banko: heard 2 / near Great Crack, SW Rift Mauna Loa	8650	26 Aug. 1973	(15)
269	Banko: saw 1 / near Great Crack, SW Rift Mauna Loa	8500	26 Aug. 1973	(15)
270	Banko: heard or seen / near Great Crack, SW Rift Mauna Loa	8350 8200 8040 8000	26 Aug. 1073	(15)
271	Banko: heard and seen / W Umi Caverns, SW Rift Mauna Loa	7900 7800	27 Aug. 1973	(15)
272	Banko: saw several / W Umi Caverns, SW Rift Mauna Loa	7720	27 Aug. 1973	(15)

WOOD VALLEY

273	Banko: Henshaw collected 3 specimens / Ainapo	....	1898-1902	(2)

Island of Hawai'i--(Continued)

PUU KEOKEO

274	present / on hike through Kipuka Nene (Kahuku)	6000	16 Mar. 1949	BALP69
275	Richards: noted, number unspecified, 0745-1030 hours / Kipuka Nene, 5800 ft.; Kipuka Akala (?), 5300 ft.; Kahuku-Ainapo Trail	....	3 Nov, 1950	(12)
276	2 pairs seen during brief noon foray afield / along Kahuku-Ainapo road where the ohia forest came up to the road	....	27 Dec. 1967	DONW68
277	Banko: heard / unnamed Puu, NW Puu Keokeo, SW Rift Mauna Loa	7367	27 Aug. 1973	(15)
278	Banko: heard and seen / Puu Keokeo, SW Rift Mauna Loa	7000	28 Aug. 1973	(15)

PAHALA

279	Banko: Walton collected two specimens / (?near Pahala)	....	(? ca. 1900)	(2)

Hawaii Volcanoes
National Park

MULTIQUADRANGLE

280	2 seen on Christmas count / 4 observers together 8 miles in 2 parties 2 miles on foot from Kipuka Puaulu through adjacent golf couse to KMC through Kilauea Iki Crater, excluding area between KMC and Kilauea Iki (0600-1330 hours)	....	17 Dec. (1939)	DONW40

281 recently seen / at various places from the Napau Crater region at 2800 ft. up to the Kilauea Crater at 4000 ft. .... (1940) BALP41

282 uncommon / in the Park 1940 BALP41

283 Baldwin: ranges / from Kipuka Nene around to Kilauea Iki and (Bird Park) area, up to 7000 ft. E of Mauna Loa truck trail and at this elevation over to the 1881 lava flow... part of the latter area may be an 'Oma'o blank, however .... 6 Aug. 1941 (10)

284 determined from extensive series of repetitive counts in HVNP that, in a hundred days of censusing, Omao could be expected to be recorded: .... (1940-1949) BALP53

		Total Count Days	
0 days in....Plot:	1 Kipuka Keana Bihopa	2300	(64)
0 days in....Plot:	2 Kipuka Nene No. 2	3000	(73)
0 days in....Plot:	3 Kipuka Nene No. 3	3000	(73)
96 days in....Plot:	4 Napau Lava Trees	2850	(23)
0 days in....Plot:	6 Kipuka Kulalio	5500	(110)
0 days in....Plot:	7 Kipuka Puaulu	4050	(92)
74 days in....Plot:	8 Twin Craters	3650	(100)
0 days in....Plot:	10 Mauna Loa	7500	(41)
0 days in....Plot:	12 Kipuka Kulalio	5900	(53)
0 days in.. ..Plot:	13 Ainahou Gate	3050	(54)
0 days in....Plot:	17 Kalanaokuaiki Pali	3300	(61)
2 days in....Plot:	18 Lua Manu	3650	(66)

285 2 seen (Christmas Count) / 11 observers in 5 parties; total party hours 23 (20 on foot, 3 by car); total party miles 45 (16 on foot, 29 by car) Halina Pali road, Napau Crater trail to Pulu Factory, Twin Craters, Golf Course, Nobriga Ranch road, Bird Park, Mauna Loa truck trail to 5500 ft. el., (0600-1500 hours) .... 1 Jan. (1955) BOTI55

MULTIQUADRANGLE (con't.)

286	moderately common / in the wet ohia forest especially along the crater rim trail between Park Hdqs. and Thurston Lava Tube	....	(1961)	DUNW61
287	Pratt: found along the entire swath at regular intervals.. .during a 3 week study period / swath (bndry. trail) up to 15 ft. wide and 2.5 miles long from Thurston Lava Tube and along Park bndry. along Kilauea Forest Reserve	....	(Jan. 1971)	(17)

PUU ULAULA

288	Baldwin: saw 2, collected 1 / hike from end of Strip Road to 7500 ft. and across Keauhou to first kipuka, down to 7000 ft. and return along contour	....	22 Oct. 1948	(10)
289	Baldwin: present/ in large...koa clumps in understory of Naio, Metrosideros, Styphelia (traversed on hike N from end of Strip Road to 7500 ft. Keauhou Ranch 1-2 miles W of Solomon's Waterhole, and return via 6850 ft. contour)	....	24 Oct. 1948	(10)
290	Jacobi: heard call that sounded like Omao, 1230 hours / end of Mauna Loa Strip Road	6700	2 Oct. 1972	(18)

PUU MAKAALA

291	Jacobi and Warshauer: not recorded in 23 days fieldwork / in Cibotium forest beyond the end of Olaa Back Road and in ~~A.~~ ~~koa~~ forest in Large Tract Section (see also No. 345)	....	Jan. 1974 - Jan. 1975	(7)

KIPUKA PAKEKAKE

292	2 seen, 1 heard / Kipuka Maunaiu, S from end of Mauna Loa truck trail	ca. 6500	20 July 1937	DONW51b
293	1 seen near 8500 ft. el...heard its mate farther on up the trail / Mauna Loa summit trail	....	28 July 1937	DONW51b
294	Baldwin: several heard and seen (7-13) / on hike Mauna Loa summit trail	ca. 8500	10 Aug. 1939	(10) (11)
295	Donaghho: saw a pair / Kipuka Maunaiu	7500	June-Aug. 1937	(9)
296	Donaghho: saw a pair / Mauna Loa trail	8300	June-Aug. 1937	(9)
297	NPS: 5 seen / Mauna Loa Trail	7300-8500	(17) Nov. 1939	(11)
298	1 heard / Mauna Loa (trail)	8500	May 1940	DONW40
299	has been found to occupy strip of relatively barren country / Mauna Loa	8000-8500	(1940)	BALP41
300	Baldwin: heard...found droppings on rock perches / on hike along 1881 flow near W border of Park	6750-7400	21 July 1941	(10)
301	Baldwin: lichen-covered perch on aa... population judged very sparse / 2 miles N of the end of Mauna Loa truck trail	ca. 7500	6 Aug. 1941	(10)
302	NPS: 1 heard / 2 miles above end of Strip Road	....	14 May 1959	(19)
303	uncommon on lava flows / Mauna Loa summit trail	7000-9200	(1961)	DUNW61
304	Banko: saw intermittently all the way to Puu Ulaula / beginning of Mauna Loa trail to Red Hill	6500-10,000	5 June 1967	(15)

Island of Hawai'i--(Continued)

KIPUKA PAKEKAKE (con't.)

305	Pratt: heard / along the Mauna Loa summit trail	7500-9200	(Jan. 1971)	(17)
306	Banko: heard 2, saw 1 / Mauna Loa summit trail	8400-8660	11 Oct. 1971	(15)
307	USFWS: Jacobi saw and heard 1 at 15 ft. / along Mauna Loa trail	8700	16 May 1972	(20)
308	Jacobi: saw 1 calling (1530-1545 hours) / Mauna Loa trail	8600	16 May 1972	(18)
309	Berger: neither seen nor heard...only an accumulation of droppings / Mauna Loa trail	8000	22 May (1972)	(21)
310	Jacobi: saw and heard in ohia tree 4 meters tall (0900 hours) / Mauna Loa trail	6900	7 Oct. 1972	(18)
311	Jacobi: saw 1 sitting on high points of aa lava flow, (1540 hours) / Mauna Loa trail	8500	19 Oct. 1972	(18)
312	Jacobi: heard 1 calling from flats S of cabin, (1815 hours) / Puu Ulaula, Mauna Loa trail	10,000	20 Oct. 1972	(18)
313	Jacobi: saw 2 perched on high rock in lava flow, (1040 hours) / Mauna Loa trail	8600	20 Oct. 1972	(18)
314	Jacobi: heard one calling nearby (1400 hours) / Mauna Loa trail	8500	26 Oct. 1972	(18)
315	Jacobi: saw 3 perched on rock (1130 hours) / edge of aa lava flow 50 meters E of Mauna Loa trail	8600	27 Oct. 1972	(18)
316	Jacobi: heard one calling nearby (0700 hours) / Puu Ulaula cabin, Mauna Loa trail	10,000	27 Oct. 1972	(18)

317	Jacobi: saw 1 on aa flow / Mauna Loa trail	8600	13 Jan. 1973	(18)
318	none censused / Mauna Loa trail	6600-8200	30 Dec. 1973	MULW74
319	monthly survey data supports concept of apparently resident populations / tree line ecosystem	8000+	Mar. 1972 - July 1973; Aug.-Nov. 1974	CONS75
320	Conant: censused 7 birds per 40 ha, 88% occurrence frequency / 8 censuses, tree line ecosystem, (Transect 12)	....	Dec. 1972 - July 1973 Aug, 1974 - Mar. 1975	(14)
321	Conant: censused less than 1 bird per 40 ha / monthly censuses, subalpine scrub, HVNP (Transect 9)	....	Dec. 1972 - July 1973 Aug. 1974 - Mar. 1975	(14)
322	censused 5 / Mauna Loa trail	6600-8200	14 Dec. 1974	MULW75
323	2 censused (Christmas Count) / Mauna Loa trail	6600-8200	2 Jan. 1978	KATL78

KILAUEA CRATER

324	Perkins: seen on very long day's tramp / up the mountain from Kilauea (Volcano House)		23 July (1894)	(4)
325	Banko: Wolcott collected 1 specimen / Kilauea	....	2 April 1901	(2)
326	absent / koa woods above Kilauea on the Kau side	....	early summer months 1895	PERR03
327	large incursion / koa woods above Kilauea on the Kau side	....	Aug. 1895	PERR03
328	Perkins: at some seasons / 1.5-2 miles of Volcano House (toward Mauna Loa)	....	up to 1896 (19 Sept. 1947)	(22)

Island of Hawai'i--(Continued)

KILAUEA CRATER (con't.)

329	Banko: Henshaw collected 2 specimens / Volcano (House)	....	1898-1902	(2)
330	seen on more than one occasion / Volcano House	....	(Oct. 1902)	MCGR02
331	Donaghho: saw 1 / in the dense forest on the N rim of Kilauea Iki	....	1 Sept. 1937	(9)
332	saw 3 / within 300 yds. of the Volcano House	....	May 1940	DONW40
333	7 seen (Christmas Count) / 6 observers in 2 parties, party 1 (Kilauea Iki) 7 miles 6 hours; party 2 (Kipuka Puaulu and Golf Course) 3 miles 5 hours; total 10 miles (0530-1200 hours)	....	22 Dec.(1940)	HATG41
334	Baldwin: present / undisturbed fern forest Kilauea Forest Reserve near N rim Kilauea Crater	4025	4 Oct. 1948	(10)
335	9 censused (Christmas Count), 6 observers in 1 to 3 parties; 13 party-hours on foot; 4.5 party-hours by car; 66 total party miles (7 on foot, 59 by car) / Bird Park, Golf Course, Ainahou Road to Ruttles Farm, Thurston Lava Tube trail and portions of Kilauea-Iki trail and portions of side-trails, old CCC Camp, Park Hdqs. area, Wright Road to end (0630-1715 hours)	....	1 Jan. 1954	ANON54
336	NPS: 1 heard / 300 yds. E of Park Hdqs., N side of Mamalahoa Highway	....	10 Oct. 1959	(19)
337	seen / (Kilauea) volcano area	....	Easter vacation (1960)	HANC60

338	3 seen in 6 trips...16.75 hours / Olaa Tract (from Wright Road)	....	Oct., Nov. 1959; May, June, July 1960; April 1961	DUNW62
339	1 seen and heard / just outside the entrance to Hawaii Volcanoes National Park	....	30 Aug. 1971	HANR75
340	Berger: now uncommon or absent / around the Volcano House, Park Hdqs., western part of Crater Rim Trail	....	(1970-1972?)	(21)
341	Berger: heard 3 (0645 hours) / Park cabin No. 8 (NPS residence area)	....	17 July 1972	(21)
342	none censused / Mauna Loa Strip Road	4000-6000	30 Dec. 1973	MULW74
343	none censused / Rim of Kilauea Crater	....	30 Dec. 1973	MULW74
344	none censused / Bird Park	....	30 Dec. 1973	MULW74
345	Jacobi and Warshauer: occasional in 23 survey days (at least 5 birds consistently found over the total survey time in a particular forest type, however often in numbers of less than 5 per day / in closed Metrosideros forest in from the Volcano Ag. Exp. Sta., and in open Metrosideros forest beyond the end of Wright Road and the Small Tract Section, and in Cibotium forest along trail to the koa forest, Olaa Tract (NPS) (see also No. 291	....	Jan. 1974 - Jan. 1975	(7)
346	censused 3 / rim of Kilauea Crater	6600-8200	14 Dec. 1974	MULW75
347	censused 32 / Olaa Tract	....	14 Dec. 1974	MULW75
348	Conant: none found / monthly censuses, Kipuka Ki, HVNP-Keauhou Ranch (Transect 4)	....	Dec. 1972 - July 1973 Aug. 1974 - Mar. 1975	(14)

KILAUEA CRATER (con't.)

349	Conant: none found / monthly censuses, lower mountain parkland (Transect 5)	....	Dec. 1972 - July 1973 Aug. 1974 - Mar. 1975	(14)
350	Conant: less than 1 bird per 40 ha, 23% occurrence frequency / monthly censuses, upper mountain parkland (Transect 7)	....	Dec. 1972 - July 1973 Aug. 1974 - Mar. 1975	(14)
351	Conant: none found / monthly censuses, Kipuka Puaulu, (Transect 16)	....	Dec. 1972 - July 1973 Aug. 1974 - Mar. 1975	(14)
352	Conant: none found / 7 censuses, Tree Molds (Transect 3)	....	Dec. 1972 - July 1973 Aug. 1974 - Mar. 1975	(14)
353	1 heard / Volcanoes National Park Visitor Center	....	13 Sept. 1975	KATL75
354	23 censused (Christmas Count) / Olaa Tract	....	2 Jan. 1978	KATL78
355	none censused (Christmas Count) / Mauna Loa (Strip) Road	4000-6600	2 Jan. 1978	KATL78
356	14 censused (Christmas Count) / rim of Kilauea Crater	....	2 Jan. 1978	KATL78
357	none censused (Christmas Count) / Kipuka Puaulu and adjacent areas	....	2 Jan. 1978	KALT78

VOLCANO

358	1 heard from somewhere within the forest / Twin Craters, near Kilauea Crater	....	28 Aug. 1937	DONW51c
359	NPS: 1 seen / Thurston Lava Tube parking area	....	9 June 1939	(11)
360	NPS: 1 seen / Thurston Lava Tube parking area	....	6 Dec.1939	(11)

361	saw 1 / on the N rim of Kilauea Iki	....	May 1940	DONW40
362	Northwood: heard / near Thurston Lava Tube	....	18 Aug. 1941	(23)
363	observed 2 / near Thurston Lava Tube	....	(23 Mar.-14 April 1958)	EASW58
364	moderately common / in the wet ohia forest, especially along the crater rim trail between Park Hdqs. and Thurston Lava Tube	....	(1958-1960)	DUNW61
365	4 seen in 8 trips...21.25 hours / E rim Kilauea Crater, Kilauea Iki, upper Chain of Craters Road area	....	May, Oct. (2 trips) 1959; April (2 trips), June, Oct. 1960; Feb. 1961	DUNW62
366	1 seen / Thurston Lava Tube	....	27 Feb. 1961	KINB61
367	1 seen well...others possibly glimpsed / Ring Trail...ca. 1 mile S of Thurston Lava Tube	....	Feb. 1962	CURH63
368	1 seen / Kilauea Iki	....	7 June (1966)	DONW67
369	1 present / Thurston Lava Tube	....	25 Dec. 1967	ORER68
370	Berger: never heard more than 3 at one time / Thurston Lava Tube area	....	(1970-1972 ?)	(21)
371	Banko: 3 censused 0635-0910 hours / Thurston Lava Tube to Byron Ledge, return via Kilauea Iki Rim Trail	....	1 Jan. 1972	(15)
372	Banko: 5 censused 0650-0855 hours / Thurston Lava Tube to Byron Ledge, return via Kilauea Iki Rim Trail	....	3 Jan. 1972	(15)
372a	Banko: 10 censused 0645-0835 hours / Thurston Lava Tube to Byron Ledge, return via Kilauea Iki Rim Trail	....	9 Jan. 1974	(15)
373	Conant: censused 61 birds per 40 ha, 100% occurrence frequency / monthly censuses, Thurston Lava Tube (Transect 1)	....	Dec. 1972 - July 1973 Aug. 1974 - Mar. 1975	(14)

VOLCANO (con't.)

374	heard **2** / on hike from Thurston Lava Tube S along Crater Rim Trail (Escape Road)	....	**13** Sept. **1975**	KATL75
375	at least 4 heard / Thurston Lava Tube	....	**13** Sept. **1975**	KATL75

KAU DESERT

376	Berger: certain disappearance since **1940's** / Kipuka Nene (not included in IBP transects) (Plots 2 and **3** of Baldwin)	....	**1970-1972 (25** June **1971)**	(21)

MAKAOPUHI CRATER

377	Donaghho: almost certainly heard **3** times / (on hike from Makaopuhi to Napau Crater)	....	**15** June **1937**	(9)
378	Donaghho: heard **12** / down Kalapana Trail along Park fence line and up to Napau Crater trail	....	**23** June **1937**	(9)
379	Craddock: saw **1,** heard 10 / Napau Crater area	....	**23** June **1937**	(16)
380	heard quite a few...saw **1** / along trail to Makaopuhi Crater from forest W of Napau Crater	....	**23** June **1937**	DONW47
381	heard twice / along E rim Makaopuhi Crater	....	25 June **1937**	DONW51
382	Donaghho: common / in the wet koa forest and...at Makaopuhi and Napau Crater	....	June-Aug. **1937**	(9)
383	Baldwin: a number heard and several seen / overnight cross-country trip from Napau Crater trail to summit of Kane Nui O Hamo and return	....	**21, 22** Aug. **1938**	(10)

384	Baldwin: heard / going up the side of Kane Nui O Hamo	....	5 Jan. 1939	(10)
385	Baldwin: present / all along the trail N of the 1840 lava flow (Lava Trees), N of Napau Crater	....	3 Aug. 1939	(10)
386	Baldwin: 1 heard / at the Lava Trees 0.5 mile N of Napau Crater	2700	3 Aug. 1939	(10)
387	common/ in the seldom visited ohia...wilderness to the N of Makaopuhi Crater	....	(1940)	BALP41
388	Baldwin: occurred universally, abundant in certain areas, common in all others / hike from Napau Crater 2750 ft. el. down Puna Rift to 2250 ft. el. and return	....	16 July 1941	(10)
389	NPS: found abundant / below Napau Crater on the Puna rift	....	July 1941	(11)
390	Baldwin: about 30 seen or heard / hike to and circumnavigating Napau Crater	....	25 Nov. 1944	(10)
391	1 censused Christmas count / Napau Crater trail to Pulu Factory (4 hours by foot, 1 hour by car)	....	1 Jan. 1955	ANON55
392	Conant: none censused / monthly censuses, Kipuka Keana Bihopa (Transect 88)	....	Dec. 1972 - July 1973 Aug. 1974 - Mar. 1975	(14)
393	1 censused (Christmas Count) / Napau Crater Trail, Old Summer Camp, Thurston Lava Tube, Halemaumau Road (4 hours by foot, 1 hour by car)	....	26 Dec. 1955	ANON56
394	9 seen in 4 trips...14.75 hours / (along trail) between Makaopuhi and Napau Craters	....	July 1959; April (2 trips), Oct. 1960	DUNW62
395	NPS: many heard calling...several seen / Puu N of Makaopuhi Crater (within 1 mile)	....	1 Oct. 1960	(19)

KALAPANA

396	Conant: Omao surveyed per 40 ha: 23 in closed Metrosideros forests, various understory types; 18 in closed Metrosideros forests with native shrub understory; 4 in open Metrosideros forsts: 11 in open Metrosideros-Cibotium forests; less than 1 Omao in Metrosideros-Diospyros forests above 1600 ft. el. / E of Mauna Ulu flows...Kalapana Extension	....	(1976-1977)	(6)

Kīlauea District

MULTIQUADRANGLE

397	Miller: heard along the way / on trip from Olaa Mill (Keaau) to Volcano House	....	18 Dec. 1902	(11)
398	Baldwin: universally present (but) do not believe as abundant as in...Keawewai koa forests / walk from Makaopuhi Crater to 22 mile post, above Glenwood, Volcano Highway	....	6 Jan. 1939	(10)
399	NPS: seen / hike to an unmapped cinder cone at 3700 ft. el. below Kulani Cone (vicinity Mt. View Flume Road)	....	(April 1945)	(11)

PUU MAKAALA

400	Richards: good observations / from Kulani Prison Hut at 9000 ft. el. and down Stainback Highway to Flume Road	....	19 Aug. 1950	(12)
401	at least 5 or 6 heard...3 seen / Stainback Highway	....	25 Dec. 1967	ORER68

402	censused **168** / Kulani Road and Puu Makaala	....	30 Dec. **1973**	MULW74
403	censused **318** / Kulani Road and Puu Makaala	....	**14** Dec. **1974**	MULW75
404	**289** censused (Christmas Count) / Stainback Highway and Puu Makaala	....	**2** Jan. **1978**	KATL78

MIN VIEW

405	Perkins: very numerous / Olaa District	1500/ **1600**	June-Sept. **1895**	(4)
406	Banko: Perkins collected **1** specimen / Olaa	....	**(1892-1896)**	(2)
407	Banko: Henshaw collected **24** specimens / Olaa	....	**1898-1902**	(2)

KILAUEA CRATER

408	heard / Keauhou Ranch near Forest Reserve bndry. on hike from Kipuka Puaulu	....	**30** June **1937**	DONW47
409	frequently heard / near Keauhou Ranch Forest Reserve fence, on hike from Kipuka Puaulu	....	**30** June **1937**	DONW**47**
410	Donaghho: saw **1,** heard **9** / from Kipuka Puaulu N into Brown's Ranch koa forest thence SE to fence-line and back via tanks and ranch house (7 miles)	....	**30** June **1937**	(9)
411	present / in Koa forest on hike from vicinity Keawewai water tanks to Kilauea	....	**2** July **1937**	DONW5la
412	Craddock: saw **1,** heard 14 / **29** Mile Road (first **5** miles of trail from end of Haunani Road to Puu Kulani)	....	**13** July **1937**	(16)
413	Baldwin: heard several or more times / on horseback ride from Bird Park to Keawewai	....	10 Sept. **1938**	(10)

KILAUEA CRATER (con't.)

414	seen and heard / through pastures and scattered koa along Puu OO trail to Keawewai from Keauhou Ranch, Kulani and Lalaau visible	....	11 Sept. 1937	DONW51c
415	Baldwin: (heard) a good many times today / 1330 hours along Kulani Cone trail at 2 mile mark	....	24 Nov. 1938	(10)
416	Baldwin; heard...1 seen shortly after / 1415 hours near 3 mile mark Kulani Cone trail	....	24 Nov. 1938	(10)
417	Richards: noted (number unspecified) 1030-1800 hours / Keauhou Ranch, on ca. 1.5 miles hike (beginning 3 gates up Puu OO trail jeep road) in general direction Puu OO trail, then NE for 0.75 mile crossing "Old Koa Mill Road" headed for Kilauea Forest Reserve, return via "O.K.M. Rd."	....	29 Oct. 1950	(12)
418	Richards: noted (number unspecified) 1115-1745 hours / hike to just beyond 2 mile marker on trail to Puu Kulani from end of Haunani Street, Volcano	....	16 Jan. 1951	(12)
419	Richards: noted (number unspecified) 0900-1700 hours / hike to 2 mile marker on trail to Puu Kulani from end of Haunani Street, Volcano	....	17 Jan. 1951	(12)
420	1 censused (Christmas Count) / Nobriga Ranch road (8 hours by foot, half-hour by ear)	....	1 Jan. 1955	ANON55
421	fairly common / (Keauhou Ranch)	....	(17-19 June 1960)	EISE61
422	9 censused (Christmas Count) / Keauhou (Nobriga) Ranch Road (8 hours by foot, half-hour by car)	....	31 Dec. 1955	ANON56

423	numerous / Koa parkland...Keauhou Ranch behind the Park	....	**19** June **(1960)**	**DUNW60**
424	**10** seen/ along a trail ca. a mile into the tree fern jungle from Wright Road	....	**27** Feb. **1961**	KINB61
425	**1** heard / in the area near the (Volcano) Golf Course	....	Aug. **1964**	**BELJ65**
426	**5** censused (Christmas Count) / Keauhou Ranch and Volcano Golf Course	....	**30** Dec. **1972**	GAGW**73**
427	censused **49** (Christmas Count) / Keauhou Ranch	....	**30 Dec. 1973**	**MULW74**

VOLCANO

428	numerous at all seasons / forests on the Olaa side (of Kilauea)	....	**(1895/1896)**	PERR03
429	Baldwin: heard **1** / along Kulani Cone trail to 1 mile mark **(0945-1125** hours)	....	**24** Nov. **1938**	(10)
430	Baldwin: **1 seen** and heard / near Kulani Cone trail head	....	**29** Dec. **1938**	(10)
431	Baldwin: **1** heard / **0.5** mile **S of** 1 mile marker , Kulani Cone trail	....	**8** Feb. **1939**	(10)
432	Richards: numerous...heard approximately **15-25 (1400-1830** hours) / hike ca. **4** miles SSW along Charles Tong trail and return, beginning ca. 0.5 mile from Belt Highway near end of Olaa Forest Park Reserve, **24** miles from Hilo	**2500**	**19** Sept. **1950**	(12)
433	Richards: present / **0900-1645** hours hike ca. **4.75** miles **SSW** along **Charles** Tong trail and return, beginning ca. 0.5 mile from Belt Highway near end of Olaa Forest Park Reserve, **24** miles from Hilo	**2500**	**20** Sept. **1950**	(12)

VOLCANO (con't.)

434	Richards: saw **1** and heard possibly 10 **(1130-1830** hours) / **2.5** miles hike along trail fom end of Haunani St., Volcano, to Puu Kulani, Upper Olaa Forest Reserve	**3400-3700**	**12** Oct. **1950**	(12)
435	Richards: noted (number unspecified) **1130-1800** hours / hike for approximately 1.5 miles along trail to Puu Kulani **from** end of Haunani St., Volcano	**3900-4000**	**15** Oct. **1950**	(12)
436	Richards: noted (number unspecified) **1400-1830** hours / ca. **1.5** miles hike along trail to Puu Kulani from end of Haunani St., Volcano	**3900-4000**	**1 Nov. 1950**	(12)
437	**9** censused (Christmas Count) / Wright Road (half-hour by foot, half-hour by car)	....	31 Dec. **1955**	**ANON56**
438	none...despite my counting over a dozen two weeks ago / lunch stop, couple of hundred yards along Kulani trail from end of Wright Road	....	**8** June **(1966)**	DONW67
439	Banko: heard a few times / near trail-head, Kahaualea	**2450**	**4** Dec. **1972**	(15)
440	**9** censused (Christmas Count) / Wright Road and Upper Olaa Forest Reserve	....	**30** Dec. **1972**	GAGW73
441	watched...on **2** separate days...on a third occasion heard a pair singing / (Volcano residence)	....	**(19** Oct. **1973)**	MULM74
442	censused **2** (Christmas Count) / Volcano, Wright Road, and Upper Olaa Forest Reserve	....	30 Dec. **1973**	MULW74
443	censused **7** (Christmas Count) / Volcano community	....	**14** Dec. **1974**	MULW75

444	44 censused (Christmas Count) / Volcano community	....	2 Jan. 1978	KATL78

KALALAU

445	van Riper et al.: lowest distribution is 1804 ft. el. / Puna Forest Reserve	....	(1978)	(8)

PAHOA SOUTH

445a	Richards: common . . . on short hike / Keauohana Forest Reserve, makai Pahoa-Kaimu highway	(ca. 800)	21 Sept. 1950	(12)

Mauna Kea District

UNDESIGNATED LOCALITY

446	seen and heard / kipuka along Saddle Road	....	late Aug. or early Sept. (1951)	BALH52
447	seen / Saddle Road	....	(27 Mar. 1960)	ANON60
448	fairly numerous / Saddle Road	....	16-23 Nov. 1966	ORDW67
449	nest found / near the Saddle Road	....	11 May 1968	BERA70

MULTIQUADRANGLE

450	common / on Mauna Kea	ca.4000-6500	May 1940	DONW40
451	fairly well scattered over the very rough but relatively open lava flows / Saddle Road ...where the ohia trees were only 15 to 25 ft. tall	....	during the winter months (1967-1968)	BERA69

MULTIQUADRANGLE (con't.)

452	found first nest, contained 1 pipped egg / depths of a dense kipuka...Saddle Road area	....	11 May 1968	BERA69
453	van Riper: 5 seen in 5 hours intermittent walking survey / Saddle Road, 19 miles W of Hilo	....	19 May 1971	(24)
454	a common resident / upper edge of the forest ...eastern slope of Mauna Kea	....	(1973)	VANC73
455	van Riper and Scott: lower elevational limit 3280 ft. / throughout Hilo Forest Reserve	....	(1978)	(8)
456	van Riper and Scott: still abundant / NE forests on Hawaii	....	(1978)	(8)

HONOKAA

457	Banko: Miller collected 5 specimens / Paauilo	....	22 Dec. 1902	(2)
458	Banko: Blacow collected 5 specimens / Horner's Ranch, Paauilo	....	1902-1903	(2)

MAKALAHAU

459	Banko: Wilson collected 2 specimens / Mana	....	1887/1888	(2)

KEANAKOLU

460	Miller: 4 specimens taken in 3 hours / Blacow's Ranch 2 miles above "Grandfather Horner's" above Laupahoehoe	....	22 Dec. 1902	(3)

461	Miller: specimen(s) collected / in ohia and koa forest vicinity Blacow's Ranch, above Laupahoehoe ca. 10 miles	800	23 Dec. 1902	(3)
462	Miller: obtained 2 specimens / Blacow Ranch area	....	30 Dec. 1902	(3)
463	Miller: abundant at all points and in all sorts of timber / the section of country called Paradise (Blacow's Ranch area)	....	31 Dec. 1902	(3)
464	Berger: seen / Laupahoehoe Forest Reserve, as low as 2500 ft. el.	....	(no date)	(13)

PUU KOLI

465	Baldwin: heard 1 / on hike from cones 2 miles W of Puuhuluhulu to Puu Koli, N flank Mauna Loa	7341	17 April 1943	(10)
466	2 observed / dense mamane-naio kipuka along Hilo-Kona Road (Grid 31-73) Pohakuloa Training Area	....	13 Jan. 1977	SHAR77
467	1 heard / kipuka near dense mamane-naio kipuka along Hilo-Kona Road (Grid 31-73) Pohakuloa Training Area	....	19 Jan. 1977	SHAR77

PUU OO

468	occasionally noted / farther along Puu OO trail on way from Keawewai to Mauna Kea	....	12 Sept. 1937	DONW51c
469	Baldwin: saw perch (?) / along Saddle Road ....view of Aina Hou	ca. 5500	13 Nov. 1942	(10)
470	Banko: Baldwin collected 1 specimen / along Volcano-Puu OO trail, South Hilo District	....	1948/1949	(2)

Island of Hawai'i--(Continued)

PUU OO (con't.)

471	Richards: saw 1...heard about 3 more / hike 250 yds. down Puu OO trail towards Mauna Loa from where it crosses Saddle Road	....	15 Aug. 1950	(12)
472	Richards: possibly 6 heard / on 0.25 mile hike through kipuka, Puu OO Ranch, 20 miles from Hilo	....	18 Sept. 1950	(12)
473	Richards: noted 1300-1815 hours 27 Oct., 0745-1215 hours 28 Oct. / Puu OO trail, S from Saddle Road 2 miles 27 Oct.; 1.5 miles 28 Oct.	....	27, 28 Oct. 1950	(12)
474	Jacobi: 2 seen and heard in barren aa flow coming into small ohelo-pukiawe scrub kipuka / Mauna Loa Observatory Road (from Puuhulu-hulu on Saddle Road)	7600	1 Feb. 1973	(18)

PIIHONUA

475	Baldwin: possibly heard / 8 miles above Kaumana flume. ..along Saddle Road	ca. 4000	13 Nov. 1942	(10)
476	heard about a dozen / Saddle Road	2000-4000	(23 Mar.-14 April 1958)	EASW58
477	seen and heard / Saddle Road, 15 mile marker from Hilo	....	mid-Aug. 1958	BALH58

HILO

478	4 specimens obtained / within 8 miles of Hilo (village)	....	Aug. 1875	SCLP81
479	Banko: Henshaw collected 3 specimens / Kaumana	....	1898-1902	(2)
480	Banko: Henshaw collected 24 specimens / Kaiwiki	....	1898-1902	(2)

ABSTRACT

Phaeornis palmeri is a medium-sized (6-7 inch long) olive to ashy-brown thrush with a whitish abdomen endemic to Kaua'i. It was first described in 1893. Exhaustive search uncovered some 36 observations, collection records, reports and related statements on relative abundance and geographical distribution from 1891 to 1978. All data are arranged in order and systematically analyzed. Distributional records are shown by U. S. Geological Survey quadrangle. References and names of observers are cited. Completeness of data, bias, erroneous and doubtful records are addressed. Findings are summarized. Until such time as results of U. S. Fish and Wildlife Service surveys are published it is concluded that the Puaiohi is on the verge of final disappearance if not actually extinct.

8. Phaeornis palmeri
Puaiohi or Small Kaua'i Thrush

The Puaiohi is a medium-sized (6-7 inch long) olive to ashy-brown thrush with a whitish abdomen endemic to the island of Kaua'i. It is the only monotypic species of the endemic genus Phaeornis. The species apparently derived, like that of its congener P. obscurus, from the American solitaire genus Myadestes (Stejneger 1888; Amadon 1950). Thirteen specimens of Puaiohi were found to be distributed in museums, as follows: three each in the American Museum of Natural History, Bernice Pauahi Bishop Museum, British Museum of Natural History, and Cambridge University Museum of Zoology; and one in the Museum of Comparative Zoology, Harvard University (Banko 1978 ms.). Rothschild (1893) described the species and Perkins (1903) gave the first account of its habits from field observations. Berger (1972) combined information from these and other sources in a summary treatment.

OBSERVATIONS, REPORTS, AND SPECIMEN RECORDS

Drawing conclusions from a large volume of historical information on relative abundance and distribution of Puaiohi required that data be geographically arranged and chronologically ordered in a systematic fashion, as outlined in the Introduction to Part I (CPSU/UH Avian History Report 4). Records presented in Appendix II satisfy criteria necessary for basic documentation and comparative analysis.

In the following descriptive account, sources of published information are cited by author and year in the usual style. One, two, or three digit numbers in parentheses refer to specific records in Appendix II. Sources of published and unpublished information listed in Appendix II may be traced to complete references in the bibliography.

Early Status and Distribution (1888-1900):

Rothschild (1893) noted the comparative scarcity of the Puaiohi in his original description of the species (4, 5, 14) and credited H. C. Palmer with the collection of the type specimen on 21 March 1891 (the specimen label actually reads 24 March) at Halemanu, Kaua'i (12). Two young, taken two years later, probably in the same locality, are also attributable to Palmer (3). G. C. Munro (Gregory 1929) later claimed to have shot the type specimen (11a). Though S. B. Wilson did not record the species during his 1887/1888 visit to the Islands, it was F. Gay's belief that a species of thrush other than Kāma'o (P. obscurus myadestina) might be more common on the windward side of Kaua'i

where its native Hawaiian name "Puaiohi" was more in use (Wilson & Evans 1891) (1), thus indicating a more extensive original range than presently recognized. However, Palmer made a search for Puaiohi in the Hanakāpī'ai area but did not find it (14).

Perkins (1903) stated that the Puaiohi was by far the rarest and most local of the Hawaiian thrushes, being outnumbered in the Halemanu locality by the Kāma'o in a ratio of at least 100:1. He noted seeing as many as eight on one day, but only four on one or two other occasions, from 11 to 21 May 1895 (15). During this period Perkins was successful in collecting only eight specimens (15). Perkins (1903) described the Puaiohi as "local and not common" (16), noting that the preferred habitat of this bird included koa (Acacia koa) with heavy leaf litter on the ground (Wilson & Evans 1891).

Bryan (Bryan & Seale 1901) reported that he did not encounter the species during a three-week field trip to Kahōluamanu from 12 April to 4 May 1900 (17).

Later Observations and Records (1941-1978):

The Puaiohi seems not to have been noted for 45 years after its last sighting by R. C. L. Perkins in 1895. In October 1941, Donaghho (1941) saw two in the Alaka'i above Kahōluamanu, apparently one each on the Wai'alae and Wai'ale'ale trails (18).

Richardson and Bowles (1964) were the next to record the species, collecting two specimens and seeing at least 15 others on 19 and 20 July 1960 at about 3300 feet elevation between the uppermost Koai'e River and Kawai Iki Ridge to the southeast (24). More, presumably of both Phaeornis species, were heard a few days later between 3750 and 4250 feet elevation near upper Kohua Ridge within a mile of Wainiha Pali, and during 3 to 5 August 1960 in the upper Wai'alae River area leading towards Wai'ale'ale (25, 26). They described the status of Puaiohi as "resident and fairly common" in some areas of the Alaka'i region (7).

B. King (1961) reported seeing one on 4 March 1961 on a two-day trip into Alaka'i, and Ord (1963) noted four on a trip during 1 to 2 September 1963, but localities of both records were not designated (8, 9). W. B. King saw two on a three-hour hike from Koai'e Cabin to the trailhead on 22 February 1964 (19); one was banded by an undesignated person near the Koai'e Cabin on 6 September 1964 (27); and Walker (1964) sighted two on his descent into "Ooaa valley" past the Koai'e Cabin on 23 September 1964 (28).

Donaghho (1965) spent 12 to 14 August 1965 along the Koai'e and Wai'alae trails as far as the Wainiha "rim," counting three on two different days (29-31). Finding none on 11 August on the trail into Koai'e Cabin and on 15 August on his way out (20, 21), he concluded that the Puaiohi was restricted to an area bounded by the Koai'e to the west and the Olokele to the east (22, 32). Hancock (1966) reported mist-netting one near the Koai'e Cabin in

September 1965. The species was seen and heard in undesignated place(s) during 28 to 30 May 1966 and on 17 February 1968 somewhere in the Alaka'i area (Anonymous 1966, 1968) (10, 11).

Donaghho (1967) reported that R. Sehl identified a Puaiohi on 28 August 1967 in the Koai'e area (34). Gauthey, Atkinson, and Huddleston (1968) reported hearing one near the head of the Koai'e River on 31 May 1968 (35).

The last published report seems to be that of Hart (1974) who did not see the Puaiohi during an undated four-day field trip in western Alaka'i, presumably in 1973 (23).

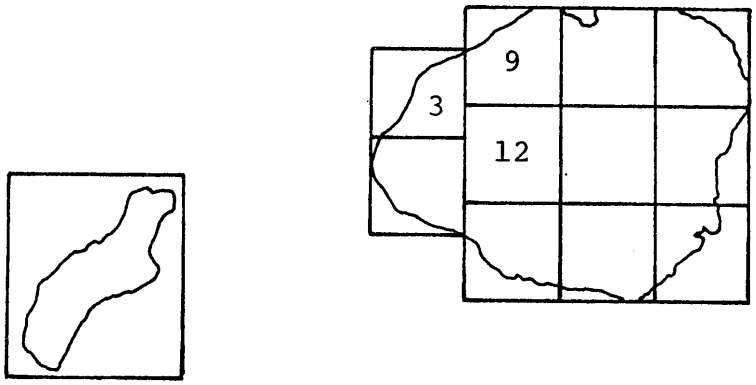
Marshall (1975), apparently on advice from John L. Sincock, stated that this species "has been seen at only 3 of 54 former (census) stations since 1968, and it is doubtful that the populations exceeds 100 birds" (.1).

CHRONOLOGICAL AND GEOGRAPHICAL DISTRIBUTION OF RECORDS

The scientific discovery of the Puaiohi after the midpoint of the historic period and its limited numbers within a restricted range, are illustrated in the chronological and geographical distribution of records shown in Table 2 and Figure 3. One-third of the observational statements originated during the decade of species discovery and nearly two-thirds during the 1960's when birdwatchers sought it out after the survey of F. Richardson and J. Bowles.

TABLE 2. Distribution of 36 Phaeornis palmeri records by decade.

1770's -		1840's -		1910's -	
1780's -		1850's -		1920's -	
1790's -		1860's -		1930's -	
1800's -		1870's -		1940's -	
1810's -		1880's -		1950's -	1
1820's -		1890's -	12	1960's -	21
1830's -		1900's -	1	1970's -	1



KAUA'I

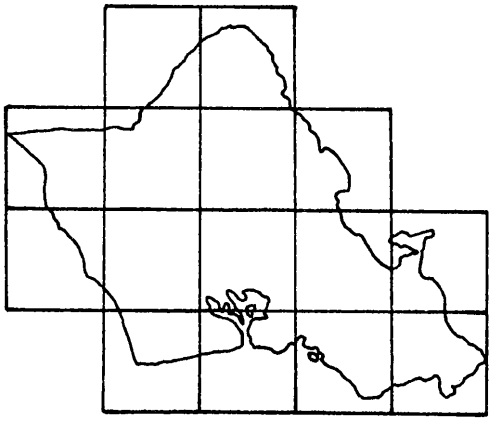
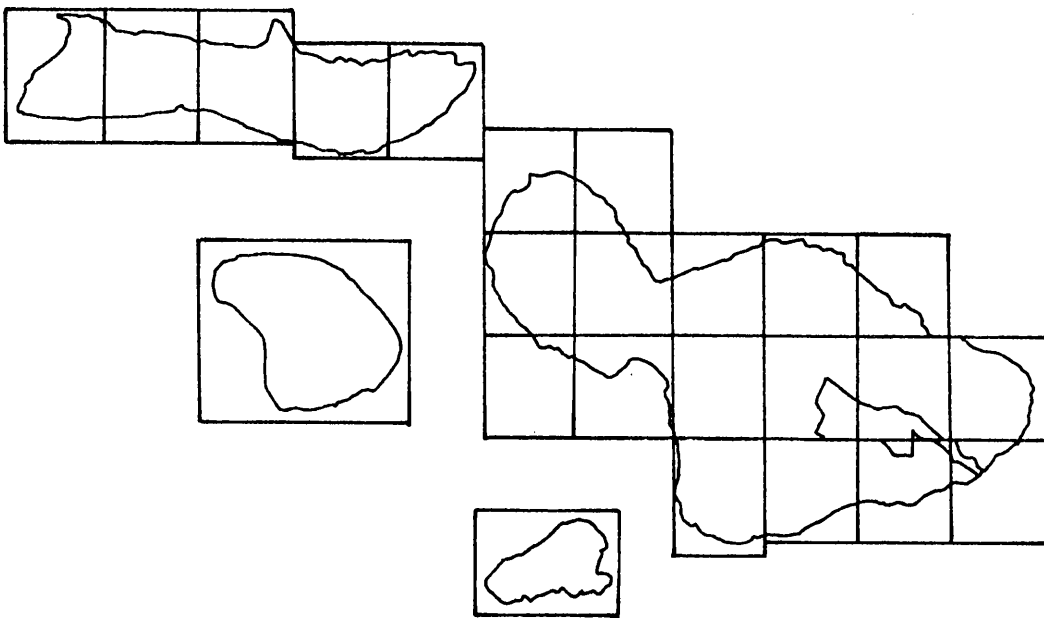


FIGURE 3. Distribution of observations, reports, and museum records of Phaeornis palmeri, per quadrangle, on Island of Kaua'i, 1778-1978.



COMPLETENESS OF DATA, BIAS, ERRONEOUS AND DOUBTFUL RECORDS

Records in Appendix II are believed complete for the sources examined. The minor question as to who actually shot the type specimen, H. C. Palmer or G. C. Munro, is the only bit of contradictory evidence encountered.

Except for a single preliminary note, findings on relative abundance and distribution of Puaiohi resulting from islandwide surveys of forest birds by the U. S. Fish and Wildlife Service on Kaua'i beginning about 1967 are not included in this report.

SUMMARY

The Puaiohi is a medium-sized, brown thrush endemic to the island of Kaua'i. About half of the existing status and distribution records refer to its presence in the locality of Halemanu (near Kōke'e) where it is not known to have been recorded since the 1890's. The remaining records refer to its occurrence in and near the southeastern portion of the Alaka'i where it has not been reported since 1968. Except for unpublished information gathered by the U. S. Fish and Wildlife Service since 1967, the contemporary status and distribution of the Puaiohi is unknown.

CONCLUSIONS

Puaiohi known to native Hawaiians in windward forests apparently disappeared before the widespread ornithological collections of the late 19th century. The rare and local sub-population found in the Kōke'e area in the early 1890's became extinct sometime after 1895. None have been reported in the sparsely populated Alaka'i after 1968. Unreported results of the U. S. Fish and Wildlife Service surveys since 1968 obscure the contemporary status of this species. The Puaiohi is apparently on the verge of final disappearance and it may actually be extinct.

Observers

Francis Gay, Warren B. King, George C. Munro, Henry C. Palmer, and Robert Sehl are observers not listed in the bibliography.

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APPENDIX II

1. Observations, reports, and specimen records are organized by island group, island, district, and/or quadrangle map. Order of listing, names and locations of district, and quadrangle boundaries are explained and illustrated in CPSU/UH Avian History Report 4: Introduction to Part I, Population Histories--Species Accounts.

2. Acronyms composed of the first three letters of the author's (or senior author's) last name, the initial letter of the first name, and last two digits of the year of publication represent sources found in the bibliography under References Cited. For example, BRYW01 = Bryan, W. A., and Alvin Seale. 1901. Notes on the birds of Kauai. Bishop Museum Occ. Papers. 1(3): 129-137. In cases where it is necessary to distinguish between two or more articles published by an author in any given year, letters are added to the acronym in alphabetical sequence, e.g., BRYW01a = Bryan, W. A. 1901. A key to the birds of the Hawaiian group, Bishop Museum Press, 76 pp.

   Parenthetical numbers such as (5), represent references listed under Unpublished Sources Cited in the bibliography.

3. Place-names are cited in original form.

4. Parenthetical information is qualified.

Relative Abundance/Locality	Elev. (ft.)	Date	Source
Phaeornis palmeri			
Island of Kaua'i			
ISLANDWIDE INFERENCE			
.1 Sincock (?): has been seen at only 3 of 54 former (census) stations since 1968, and it is doubtful that the population exceeds 100 birds	....	(1975)	MARD75
UNDESIGNATED LOCALITY			
1 Gay: may be more common / windward side of Kaua'i	....	(1887-1888)	WILS91
2 Perkins: favorite spots are those where koas grow amongst the brushwood, and the ground is covered with dead leaves and fallen twigs / undesignated locality	up to 4000	(1895)	WILS96
3 shot 2 young specimens / unspecified locality (Palmer was unable to collect in district of Hanalei)	....	June/July 1893	ROTW93
4 Palmer made unsuccessful collection attempts / unspecified locality	....	July/Aug. 1893	ROTW93
5 must be very rare / (Halemanu ?)	....	1893	ROTW93
6 Banko: Palmer collected 2 specimens (see #3) / undesignated locality	....	2 July 1893	(2)

MULTIQUADRANGLE				
7	resident and fairly common / in some areas of the Alakai Swamp forest region	....	(June-Aug. 1960)	RICF64
8	1 seen on two-day trip / Alakai Swamp	....	4 Mar. 1961	KINB61
9	4 noted / Alakai Swamp	....	1-2 Sept. 1963	ORDW63
10	seen / Alakai Swamp area	....	28-30 May 1966	ANON66
11	heard / trip into Alakai Swamp	....	17 Feb. (1968)	ANON68
MAKAHA POINT				
11a	Munro: shot type specimen / Halemanu forests	....	March 1891	GREH29
12	type was shot / on the property of Knudsen at Halemanu	....	21 Mar. 1891	ROTW93
13	Banko: Palmer collected 1 / near Halemanu	ca. 4000	24 Mar. 1891	(2)
14	Palmer made unsuccessful search / Hanakapie (?Hanakapiai)	....	(20-30 April 1891)	ROTW93
HAENA				
15	Perkins: saw 8 different individuals (on one day); only on one or two other occasions did I see half this number on any one day (collecting 8 specimens on 11 straight working days)...by far the rarest and most local of the Hawaiian thrushes...(in the vicinity of Halemanu) was at least 100 times more numerous than the (Puaiohi)... / from Halemanu (Kundsen's mtn. house ca. 4000 ft. el.) towards Kalalau, then downwards at right angles...entering forest on left, looking at Kalalau at a different point	....	11-21 May (1895)	PERR03 (1) (2)

Island of Kaua'i--(Continued)

HAENA (con't.)				
16	local and not common / on the high plateau	....	(1894-1896)	PERR03
17	not met with / (Kaholuamanu)	....	(12 April-4 May 1900)	BRYW01
18	2 seen / Alakai Swamp above Kaholuamanu on both the Waialae and th2 Waialeale Trails	....	(Oct. 1941)	DONW41
19	King: 2 seen / on 3-hour hike from Koaie cabin to roadend trailhead	....	22 Feb. 1964	(3)
20	none seen / Mohihi River - Koaie Cabin	....	11 Aug. 1965	DONW65
21	none seen / Koaie Cabin - Mohihi River	....	15 Aug. 1965	DONW65
22	does not range / to the W of the Koaie Canyon	....	11-15 Aug. 1965	DONW65
23	not seen / West Alakai Swamp	....	undated 4-day field trip (?1973)	HARA74
WAIMEA CANYON				
24	collected 2 specimens.. .and then through careful observation...sure of seeing at least 15 individuals / all were seen between the uppermost Koaie River region and Kawaiiki Ridge to the SE...specimens were collected in the canyon of the Koaie River	3300	19, 20 July (Aug. 1960)	RICF64
25	more. ..presumably of both native species were heard / between the upper Koaie River ca. 3750 ft. and Kawaiiki Ridge, ca. 4250 ft., to the SE...near the upper Kohua Ridge within a mile of the Wainiha Pali	....	9-22 July (1960)	RICf64

26	more...presumably of both native species were heard / in the upper Waialae River ca. 3750 ft. to ca. 2 miles E along the high forest country leading toward Mt. Waialeale	....	3-5 Aug. (1960)	RICF64
27	USFWS: 1 banded / Alakai Swamp (Koaie Ridge, near cabin)	....	6 Sept. 1964	(4)
28	2 seen / descending into "Ooaa valley", past Koaie cabin	....	23 Sept. 1964	WALR64
29	3 counted / Koaie-Waialae Trail	....	12 Aug. 1965	DONW65
30	none seen / Wainiha Rim	....	13 Aug. 1965	DONW65
31	3 counted / Koaie-Waialae Trail	....	14 Aug. 1965	DONW65
32	its range now / bounded by the Koaie to the W and the Olokele to the E	....	Aug. 1965	DONW65
33	1 mist-netted / (vicinity USGS Koaie River cabin)	....	(Sept. 1965)	HANJ66
34	Sehl: identified 1 / on a trip in to the Alakai...got back 2 miles from the Koaie gulch	....	28 Aug. 1967	DONW67
35	1 heard and seen / near the head of Koaie stream	....	31 May 1968	GAUJ68