

PLUMAGE SEQUENCE AND TAXONOMY OF LAYSAN AND NIHOA FINCHES

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The varied plumages of the Laysan Finch (*Telespyza cantans*) have caused misunderstanding ever since the birds were discovered. Wilson (1890) described the species from a single specimen in immature plumage. He had seen several other birds caged in Honolulu, all of which were in plumage similar to the one he possessed, a circumstance that led him to conclude that the sexes were alike. When specimens of birds in fully adult plumage later became available, Rothschild (1892) described them as another form, *Telespyza flavissima*, also stating that the sexes were alike. Still later, Schauinsland (1899) and Rothschild (1899) realized that *flavissima* was the adult of *cantans*, and placed the former name into synonymy.

Fisher (1903) followed Rothschild in assuming that the sexes were alike in the adult stage. He mentioned male specimens in three plumages: the bright yellow adult, streaked immatures, and an intermediate stage. Females in immature and intermediate feathering were noted, although variation in the latter suggested to him that some adult birds were among his series. Fisher (1903) believed that the juvenal plumage was worn a year, the intermediate plumage being assumed after the first nesting season; he also thought that the adult plumage might not be attained until the birds were in their third year. This correct assessment has been neglected by the few later workers who have concerned themselves about plumages of the Drepanididae. As recently as 1972, Berger stated: "It is not known if immature birds acquire the fully adult plumage in one year or longer."

In 1967, Eugene Kridler, then Manager of the Hawaiian Islands National Wildlife Refuge, obtained a series of Laysan Finches which he sent to the National Fish and Wildlife Laboratory (formerly Bird and Mammal Laboratories), where they were prepared and incorporated into the collections of the National Museum of Natural History (USNM). The new material, along with older specimens in the USNM and additional material borrowed from the American Museum of Natural History, has permitted us to analyze and

detail the molt sequence in *T. cantans*. Most of the specimens we have examined were from Laysan Island, although some were from the introduced population that flourished on Midway Island between approximately 1890 and 1945. A few birds had been maintained in the National Zoo prior to their accession into the USNM collection.

When Bryan (1917) described the Nihoa Finch (*Telespyza ultima*) he considered it "a somewhat dwarfed form of the Laysan species" and commented briefly on the variation in his series of five specimens. Vanderbilt and Meyer de Schauensee (1941) described an adult male and a young female and mentioned that the rest of their series showed "all stages of plumage" between these two. Captive birds began the annual molt in late June or early July (Berger 1972). Apparently no one has analyzed either the molt cycle or the true extent and basis of plumage variation in this population.

Our examination of this species was based on a series of 40 specimens in the USNM, all but two taken in June 1923, at the conclusion of the breeding season (Wetmore, unpubl. notes, 1923). Additional material was borrowed from the Los Angeles County Museum of Natural History and the Academy of Natural Sciences, Philadelphia. These included nine specimens taken by Vanderbilt in August 1940 (Vanderbilt and Meyer de Schauensee 1941) and two other August birds, and three individuals taken in February, part of the type series (Bryan 1917, Willett 1945).

In the descriptions that follow, capitalized color terms are from Ridgway (1912).

THE LAYSAN FINCH

Nesting by *Telespyza cantans* on Laysan Island may take place as early as February or March, although apparently most birds nest so that young are hatched in May or June (Berger 1972). Most young have fledged by late July or early August (Ely and Clapp 1973). The long nesting season, as well as the protracted molting period of drepanidids generally (Amadon 1950) complicates the

study of molt by producing a variety of plumage combinations at any given time. On the other hand, these factors allow one to trace the sequence of plumages in rather small series taken at widely separated time periods, as is often the situation with insular populations which may be sampled only sporadically.

The juvenal plumage of males is characterized as follows: The nuchal feathers are Olive Buff, with brown streaks along the rachis near the tips. Back feathers are gray basally, Deep Olive Buff distally with dark brown spots near the tip along the rachis. The wing feathers are edged with white or Primrose Yellow. On the upper breast the feathers are Reed Yellow, with brown center streaks. The greater upper secondary coverts are broadly tipped with white or buff. The flanks are Light Buff, the feathers having brown center streaks. The juvenal plumage of the female is very similar to that of the male, except that the nuchal feathers are gray or light buff, and the female may be somewhat paler on the throat.

The first prebasic (postjuvenal) molt takes place in September birds of our series. This molt seems to start on the back and rump. It involves some, perhaps all, of the upper wing coverts, and also results in changed appearance of the crown, breast, flanks, and back. The molt does not involve flight feathers except, apparently, for the central rectrices. It is last completed on the nape, and is essentially complete on most birds by early November. Some individuals, however, perhaps those of later hatching dates, have not finished this molt by February. This extensive individual variation is a complicating factor and is undoubtedly in part responsible for the misunderstanding of the plumages of the species.

Male birds in the first basic (first winter) aspect have wing coverts tipped with Olive Yellow. The back feathers have a large central oval spot, and are tipped and edged with Light Yellowish Olive. The rump is Sayal Brown. Flight feathers are narrowly edged with white or pale yellow. The breast is Wax Yellow, with fine brown shaft streaks on the feathers, and the abdomen is white to pale buff. The lower flank feathers have brown oblong center spots and are edged and tipped with Chamois. The crown has Olive Yellow feathers with dark, narrow shaft streaks. Females in this aspect are essentially the same as the males but are a paler yellow on the breast. The males tend to have fewer breast streaks. Birds in the late winter (March) and spring (April and May) of their first year are very worn and faded. Breast streaking particularly becomes more faint as time passes.

Males in September of their second year have nearly completed the second prebasic molt; all flight feathers have been replaced. In the second winter, the neck is gray. Feathers of the middle and upper back are Citrine on the edges and tips, gray in the center and darkest along the shafts; some have dark brown oval spots. The lower back and rump are Light Brownish Olive. Outer edges of the rectrices are Pyrite Yellow, and the primary coverts are edged with Sulphine Yellow. The secondaries and their coverts are broadly edged with Sulphine Yellow, becoming paler yellow distally and then white near the tip. The crown is Sulphine Yellow, with a variable amount of brown streaking along feather shafts. The breast and throat are Lemon Chrome. The Light Grayish Olive flanks are lightly streaked. Females at this time are similar to the males in molt stage and

in general aspects of coloration. The back feathers of the females are edged with light brown and have large brown oval spots in the center. The throat and breast are Wax Yellow, unstreaked. White is more extensive on the secondaries than in the male, and dorsal spotting is heavier.

The second breeding aspect of males is achieved by extensive wear. By May, most of the brown back and crown spots are worn off and the gray neck collar is accentuated. The crown is Aniline Yellow and the neck, breast and upper abdomen are Lemon Chrome. The yellow breast feathers are extremely worn and much basal white shows through. The back is greenish yellow but shows much gray because of exposure of the feather bases. The rump is Grayish Olive. Females in the comparable second breeding aspect retain extensive dark brown streaking on the crown and spotting on the back. The crown feathers are edged with Pyrite Yellow but the edging is gone from the back feathers. The throat and breast are unstreaked Wax Yellow; the flanks are Smoke Gray, lightly streaked with brown.

The third prebasic molt brings the birds into fully adult plumage. In September, males are essentially unstreaked, although some individuals may have a few feathers with dark shaft stripes, especially on the lower back. The head and primary covert edgings are Sulphine Yellow; the back is Pyrite Yellow. The gray neck appears as a collar. The lower back and rump are grayish brown. The sides of the face, neck, throat, and breast are Lemon Chrome. The abdomen is whitish and the flanks are Smoke Gray. Primaries are narrowly edged with white and the secondaries are broadly edged with Pale Lemon Yellow. The plumage of adult females is similar to that of second year females, but the crown is more yellow and less streaked and the gray collar is more pronounced. Back feathers have dark brown spots and the brownish edging is tinged with yellow. The breeding aspect of adults is lightened by wear of the previous winter's plumage. Wear may be so extensive that the back in some males appears as gray as the neck collar.

In both sexes, then, the sequence of molts results in an increase in the extent of yellow with age and, in males, an elimination of spots. There is little difference between the second year and fully adult females. Second year males resemble females of both these age groups and are perhaps indistinguishable from them in the field.

THE NIHOA FINCH

Both sexes are well represented in the USNM series of this species. There is a streaked juvenal and a yellow-headed adult aspect in each sex, and there are no intermediate birds. All the adult June birds are extremely worn, but most have initiated a molt in which the inner primaries and secondaries and some breast feathers are being replaced. None of the immature birds is molting. One March bird in fresh adult aspect, but with worn primaries, and one September bird in fresh streaked, but not juvenal, plumage, led us to postulate that there is a late summer first prebasic (post-

juvenal) molt and an incomplete prealternate (prenuptial) molt in this species, and that the adult aspect is achieved by the first breeding season. The examination of additional material confirmed our prediction.

An August female with traces of juvenal plumage is molting into a plumage in which the throat feathers have brown triangular shaft spots and the breast feathers are plain yellow or yellow with a brown shaft streak. An August male is somewhat further along in this molt and is essentially the same ventrally. The new back feathers are edged with Sulphine Yellow and have large brown central spots. Another August male and a September female both have the new streaked yellow ventral plumage, but the female has not replaced the back feathers whereas the male has.

An unsexed February bird (probably male) shows traces of this streaked breast plumage but has begun to attain a pure yellow breast. The back is still spotted. A February female retains the spotted plumage but has a few new feathers. Another February male has lost most of the spotted immature plumage and is acquiring the breeding plumage. The crown is yellow, but the occiput is still worn and streaked. A March male with worn primaries has otherwise completely fresh adult breeding plumage.

Thus, this small series of birds shows the occurrence of both a prebasic postjuvenal and a first prealternate molt, culminating in an adult breeding aspect. Feather wear is severe during the breeding season. After breeding the adults undergo a complete prebasic molt and, in early spring, a partial prealternate molt. The February birds have only a few feathers in sheath, and seem to be in the very earliest molt stages. They were originally preserved in fluid and were later prepared as study skins, so it is likely that pin feathers have been lost.

In the juvenal plumage the back feathers are Fuscous Black with a very narrow edge of Olive Lake. The feathers of the rump are Sayal Brown with narrow Fuscous Black streaks along the rachis and across the tips, forming faint cross bars. The primaries are narrowly edged with Sulphine Yellow; the secondaries are edged with Citron Yellow and white or buff. The feathers of the head are streaked with Fuscous Black and narrowly edged with Sulphine Yellow. Nuchal feathers are much like the back. The sides of the head are finely streaked with black and Sulphine Yellow. There is a dark malar streak, and the throat is more yellow than the sides of the head. The upper breast feathers are Citron Yellow with triangular Fuscous Black markings along the rachis at the distal end of the feathers. The lower abdomen is Light Buff. The lower breast has faint streaks along the rachis and the tips of the feathers are faintly edged with Fuscous Black, giving the appearance of faint cross barring. The flanks are Warm Buff with Fuscous streaks. The rectrices are edged with Sulphine Yellow. The juvenal female plumage is very similar to that of the juvenal male, but the underparts are paler in that the yellow is limited to the upper breast. In general appearance these birds are much darker than juvenal *T. cantans*. The black predominates in the Nihoa birds, whereas the yellow is much more prevalent in the Laysan birds.

In the first basic plumage, the winter birds have head and neck feathers edged with Sulphine Yellow, with Fuscous Black shaft streaks. A dark malar stripe is distinct. The large central streaks of the back feathers are Fuscous Black, and the edging is Deep

Olive Buff. The throat and breast are Lemon Chrome, with Fuscous Black streaks. Similar streaks appear on the Drab Gray flanks. The abdomen is whitish. The sexes are essentially alike in this aspect, which differs from the juvenal plumage in being brighter yellow and less heavily streaked.

In adult males the head, neck, and back are Pyrite Yellow, with a broad Gray band between the neck and mid-back. The lower back and rump are Gray. The throat and breast and secondary edgings are between Lemon Chrome and Aniline Yellow, and the flanks are Smoke Gray. Adult females differ less from the first winter birds than do males. The head and back feathers are edged with Pyrite Yellow and streaked with Fuscous Black. The back is also streaked as in the first winter birds. The sides of the head are Pyrite Yellow. The throat, breast and edgings of the secondaries are Wax Yellow, and the flanks are Drab Gray. The yellow on the breast does not extend as far posteriorly on the female as on the male. The abdomen in both sexes is whitish.

RELATIONSHIP OF LAYSAN AND NIHOA FINCHES

The populations of finch-billed honeycreepers on Laysan (*cantans*) and Nihoa (*ultima*) islands were originally described as separate species. Delacour (1928) seems to have been the first to place *ultima* as a subspecies of *cantans*, an arrangement that has been generally followed with little comment or question. Amadon (1950) mentioned the size difference between the forms, and felt that it could be accommodated by subspecific rank. We have seen no indication in the literature that other differences between the birds have been evaluated.

PLUMAGE SEQUENCE

We have shown above that the fully adult plumage of *cantans* is not acquired until the third year of life, that is, by the third prebasic molt. By contrast, there is a single immature stage in *ultima*, the birds acquiring the adult aspect in a single year by a prealternate molt. *Telespyza cantans* has only a prebasic molt each year, whereas *ultima* has both a prebasic and a partial prealternate molt.

SIZE DIFFERENCE

Measurements of only a few birds of these populations have been published, and only Vanderbilt and Meyer de Schauensee (1941) and Amadon (1950) made comparisons. The extent of the size differences has not been discussed elsewhere. Measurements of series of these forms are given in Table 1.

Adult males of Laysan Island are 9% longer-winged and 5% longer-tailed than their Nihoa counterparts. Females from Laysan have wings 7% longer than Nihoa females, but the

TABLE I. Measurements (mm) of samples of Laysan and Nihoa finches. Bill measurements are from anterior edge of nostril. All adults are moderately to extremely worn, immature birds are slightly or not worn. Parenthetical numbers represent sample size.

	Range	Mean \pm SE	SD
<i>T. cantans</i> , Laysan			
Adult male, breeding			
Wing (19)	77.0-86.5	83.00 \pm .48	2.10
Tail (18)	56.7-62.0	60.00 \pm .38	1.61
Bill (13)	10.1-12.1	11.67 \pm .15	0.53
Tarsus (19)	21.7-25.7	24.10 \pm .23	0.99
Middle toe (19)	18.2-21.0	19.46 \pm .19	0.84
Immature male, first winter			
Wing (8)	80.0-82.0	80.64 \pm .24	0.67
Tail (8)	56.7-59.0	57.83 \pm .25	0.71
Bill (4)	11.7-12.2	12.00	—
Tarsus (8)	23.0-26.0	24.34 \pm .31	0.88
Middle toe (8)	18.5-20.0	19.31 \pm .26	0.74
Adult female, second breeding			
Wing (10)	77.2-80.3	79.10 \pm .30	0.95
Tail (10)	52.8-59.2	56.67 \pm .61	1.93
Bill (9)	11.5-11.9	11.74 \pm .05	0.15
Tarsus (10)	22.0-24.0	23.26 \pm .19	0.61
Middle toe (10)	18.0-19.1	18.42 \pm .12	0.37
Immature female, first winter			
Wing (12)	75.0-81.2	77.23 \pm .54	1.86
Tail (12)	53.5-57.1	55.63 \pm .40	1.40
Bill (12)	11.2-12.6	11.92 \pm .12	0.42
Tarsus (12)	22.6-23.6	23.00 \pm .08	0.27
Middle toe (12)	17.8-19.1	18.21 \pm .10	0.33
<i>T. ultima</i> , Nihoa			
Adult male			
Wing (13)	73.2-77.4	75.59 \pm .38	1.38
Tail (12)	52.5-60.5	56.82 \pm .70	2.42
Bill (13)	9.8-11.0	10.42 \pm .08	0.30
Tarsus (13)	21.5-23.3	22.41 \pm .15	0.52
Middle toe (12)	15.6-17.5	16.77 \pm .20	0.70
Immature male			
Wing (20)	71.9-79.5	76.82 \pm .41	1.83
Tail (18)	52.2-59.9	55.79 \pm .49	2.08
Bill (19)	8.5-11.3	9.96 \pm .14	0.60
Tarsus (20)	21.2-23.0	22.28 \pm .12	0.56
Middle toe (15)	15.6-17.8	16.43 \pm .16	0.62
Adult female			
Wing (6)	72.7-75.1	73.83 \pm .39	0.97
Tail (6)	52.6-59.0	56.23 \pm .88	2.16
Bill (6)	9.5-10.4	9.95 \pm .12	0.30
Tarsus (6)	20.9-22.2	21.30 \pm .20	0.48
Middle toe (5)	15.9-17.5	16.80 \pm .27	0.61
Immature female			
Wing (14)	70.6-77.5	74.71 \pm .51	1.92
Tail (13)	51.9-57.2	55.38 \pm .41	1.50
Bill (14)	9.0-10.5	9.69 \pm .12	0.45
Tarsus (13)	20.7-22.6	21.67 \pm .16	0.58
Middle toe (13)	14.8-17.0	16.22 \pm .19	0.70

tails of the two groups are essentially the same length. Adult males of *cantans* have, on the average, 7% longer tarsi, 16% longer middle toes, and 12% longer bills than adult male *ul-*

tima. The differences in adult females are 9, 9, and 17%. We have no data on the weights of the birds, but as judged from study skins prepared by the same person, *cantans* is a substantially larger bird.

EXTENT OF SEXUAL DIMORPHISM

There is little sexual dimorphism in size in the Nihoa birds. Adult males average 2% longer in the wing and barely longer in the tail than adult females. In *cantans*, males average 5% longer in the wing and 6% longer in the tail than females. There is but little sexual difference in measurements of other body parts in either population.

EXTENT OF AGE DIMORPHISM

Immature and adult birds from Nihoa Island differ little in size, birds of the two age groups (in the same sex) averaging nearly the same in length of tail, bill, tarsus, and middle toe. In both sexes, immatures actually average longer in wing length than the adults. In contrast to the situation in *ultima*, adult males of *cantans* have 3% longer wings and 4% longer tails than first year birds, and adult females average 2% larger than immatures in both measurements. The Laysan birds achieve their adult size a year earlier than they acquire the adult plumage.

COLOR DIFFERENCES

The extent of difference in color and intensity of streaking has not been discussed by those who have merged these populations into a single species, except that Amadon (1950) briefly noted a difference. Vanderbilt and Meyer de Schauensee (1941) said: "In coloration the two are much the same." In the immature plumage, *ultima* from Nihoa is a darker bird with more extensive streaking than *cantans*. The yellow of the adult plumage is brighter in *cantans* than in *ultima*.

HISTORY

Perhaps most neglected by those who have combined these forms is the phylogenetic significance of the nomenclatural treatment. Proper phylogenetic classification of *cantans* and *ultima* would seem to hinge on whether their derivation from a presumed common ancestor was independent or sequential. If the islands were colonized independently, by separate invasions, the resultant bird populations might reasonably be considered as two distinct species or as two subspecies of the parental form, depending on the degree of di-

vergence from the parental stock. If they have had independent evolutionary histories since establishment, they cannot logically be considered two subspecies of a single species (unless there is a third extinct parental subspecies). Only if colonization of Laysan from Nihoa, or vice versa, has taken place could the two be considered subspecies of a single species distinct from the parental stock. Even if the colonization were sequential, the degree of distinctness might warrant specific rank. We do not know the nature of the parental stock (or stocks) from which these populations have derived, or whether colonization was independent or sequential. In addition to implying a close genetic similarity, subspecific rank implies that we know much more about the histories of these populations than we actually do.

CONCLUSION

None of the morphological differences noted above is of itself necessarily indicative of specific as opposed to subspecific status. Taken together, however, the set indicates a rather significant genetic difference between the populations. Specific rank for these forms more adequately expresses our lack of knowledge about their relationships and emphasizes the fact that rather important biological differences exist. We recommend that *cantans* and *ultima* be classified as distinct species.

THE TYPE AND TYPE LOCALITY OF *T. CANTANS*

Wilson (1890) stated that the type specimen of *Telespyza cantans* had been captured on Midway Island. There is, however, no evidence that this or any other finch-billed drepanidid ever occurred naturally on Midway. When Rothschild (1892) described *T. flavissima* from Laysan, he noted that *cantans* was also from Laysan rather than from Midway, but gave no basis for his statement. Having both forms, Rothschild obviously knew that *cantans* did occur on Laysan, and Palmer, Rothschild's collector who visited both Laysan and Midway, had sent information that no native finch-bill occurred on the latter (Rothschild 1893). Laysan Island has been accepted as the revised type locality of *T. cantans* by nearly all since 1892.

Munro (1960), agreeing that *cantans* had not come from Midway, set forth anecdotal evidence that it might have come from Nihoa rather than from Laysan; Berger (1972) also cited this uncertain origin of Wilson's bird. Greenway (1968) addressed this point, not-

ing that the type of *cantans* was a large bird like those on Laysan rather than the smaller Nihoa form. This assessment was based on a comparison of published measurements (Wilson 1890, Amadon 1950) and examination of the plate accompanying Wilson's paper. To our knowledge, no one has directly compared Wilson's bird to representatives of the Laysan and Nihoa populations. Indeed, the location of the type, if extant, is unknown to us.

Measurements of the type of *T. cantans* published by Wilson (1890) are far beyond the range of Nihoa birds and are large even compared to those of our sample from Laysan. In metric equivalents, Wilson's measurements are: wing 86.4 mm, tail 64.5 mm, tarsus 27.9 mm (cf. Table 1). We have compared the plate published with the description of *cantans* to series of both populations in the USNM and are convinced that the bird depicted is an immature male in first winter aspect, of the Laysan population. Thus, the accepted allotment of specific names, *cantans* to Laysan birds (with *flavissima* a junior synonym) and *ultima* to Nihoa birds, seems to be correct.

THE GENERIC NAME

The question of which generic name to use for *cantans* and *ultima* is more philosophical than biological. Seven species of finch-billed Hawaiian honeycreepers were originally described in five genera—*Psittirostra*, *Loxioides*, *Chloridops*, *Telespyza*, and *Rhodacanthis*—which, as they were named, were considered closely related. In a study of anatomical features, Clark (1912) concluded that *cantans* was most similar to *Loxioides bailleui* and less closely related to *Psittirostra psittacea*. Greenway (1944) suggested that *Psittirostra* be kept distinct while the other four were merged as *Loxioides*, and more recently (1968) formalized this concept. Meanwhile, Amadon (1950) merged all the genera into one, *Psittirostra*, stating: "The great morphological diversity existing among closely related species in this family makes it advisable to define genera somewhat more broadly than in conservative families." Richards and Bock (1973) noted that Amadon's (1950) and Greenway's (1968) classifications of the family reflect their differing opinions on generic limits. Baldwin (1952) summarized the philosophical problem, recognizing the "convenience" of a single generic name: "In our present state of fragmentary knowledge it does no violence to the finch-billed group to think of it as a monophyletic assemblage of well-differenti-

ated species. It remains as an unsatisfactory feature of [Amadon's] arrangement that any known interrelationships among the several members of this group have been obscured by such lumping"

The presumed monophyletism of the finch-billed honeycreepers notwithstanding, we are not convinced that considering the results of the radiation to be congeneric is the best approach. Recognition of a single genus for this complex implies not only that the species had a common origin but also that the relationships of one to another are known. In a way, the recognition of two genera implies the latter even more strongly. On the other hand, the use of five genera recognizes that the birds are considerably different, to degrees usually recognized by generic rank in other groups, and that problems in assessing their origins and affinities still exist.

We use the name *Telespyza* for the species *cantans* and *ultima* because they are unique among the group (Amadon 1950:197) in the possession of a strongly streaked immature plumage and they differ from other finch-billed honeycreepers in proportions (Amadon 1950:192, 249) and in bill shape. In adopting this course we have no alternative to recognizing the other four genera as they were originally conceived, until new evidence on their relationships becomes available.

Although Wilson (1890) originally spelled the generic name "*Telespyza*," Rothschild (1893:7) emended it to "*Telespiza*" on the basis of incorrect transliteration by Wilson. Rothschild's spelling was used by most subsequent authors, except Greenway (1944, 1968). According to Articles 32 and 33 of the current International Code of Zoological Nomenclature (1964), Rothschild's emendation is unjustified and *Telespiza* must be treated as a junior objective synonym of the originally spelled *Telespyza*.

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LITERATURE CITED

- AMADON, D. 1950. The Hawaiian honeycreepers (Aves, Drepaniidae). *Bull. Am. Mus. Nat. Hist.* 95:155-262.
- BALDWIN, P. H. 1952. The Hawaiian honeycreepers (Aves, Drepaniidae). *Auk* 69:92-98.
- BERGER, A. J. 1972. Hawaiian birdlife. Univ. Press of Hawaii, Honolulu.
- BRYAN, W. A. 1917. Description of *Telespiza ultima* from Nihoa Island. *Auk* 34:70-72.
- CLARK, H. L. 1912. Notes on the Laysan Finch. *Auk* 29:166-168.
- DELACOUR, J. 1928. Les oiseaux des Iles Hawaii. *Oiseaux* 9:1-30.
- ELY, C. A., AND R. B. CLAPP. 1973. The natural history of Laysan Island, northwestern Hawaiian Islands. *Atoll Research Bull.* 171.
- FISHER, W. K. 1903. Birds of Laysan and the Leeward Islands, Hawaiian group. *Bull. U.S. Fish Comm.* No. 23.
- GREENWAY, J. C., JR. 1944. The generic arrangement of the Drepanidinae. *Bull. Mus. Comp. Zool.* 94:140-142.
- GREENWAY, J. C., JR. 1968. Family Drepanididae. In R. A. Paynter, Jr. [ed.] *Check-list of birds of the world*, Vol. 14. *Mus. Comp. Zool.*, Cambridge, Mass.
- INTERNATIONAL COMMISSION ON ZOOLOGICAL NOMENCLATURE. 1964. *International code of zoological nomenclature*. London.
- MUNRO, C. C. 1960. *Birds of Hawaii*. Rev. ed. Charles E. Tuttle Co., Rutland, Vt.
- RICHARDS, L. P., AND W. J. BOCK. 1973. Functional anatomy and adaptive evolution of the feeding apparatus in the Hawaiian honeycreeper genus *Loxops* (Drepanididae). *Am. Ornithol. Union., Ornithol. Monogr.* No. 15.
- RIDGWAY, R. 1912. *Color standards and color nomenclature*. Publ. by author, Washington, D.C.
- ROTHSCHILD, W. 1892. Descriptions of seven new species of birds from the Sandwich Islands. *Ann. Mag. Nat. Hist. (ser. 6)* 10:108-112.
- ROTHSCHILD, W. 1893. *The avifauna of Laysan and the neighboring islands. Part 1*. London.
- ROTHSCHILD, W. 1899. [*Telespiza flavissima* is adult male of *T. cantans*]. *Bull. Br. Ornithol. Club.* 8:56-57.
- SCHAUMSLAND, H. 1899. *Drei Monate auf einer Korallen-Inseln*. Max. Nössler Verlag, Bremen.
- VANDERBILT, G., AND R. MEYER DE SCHAUENSEE. 1941. Zoological results of the Vanderbilt Nihoa expedition. I. Summary of zoological explorations and the birds of Nihoa. *Not. Nat. (Phila.)* No. 86.
- WILLETT, G. 1945. The type of *Telespiza ultima* Bryan. *Auk* 62:139.
- WILSON, S. B. 1890. On a new finch from Midway Island, North Pacific. *Ibis* 33:339-341, pl. 9.
- U.S. Fish and Wildlife Service, Washington, D.C. 20240. Accepted for publication 20 November 1976.