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### NOTES ON SOME NON-PASSERINE GENERA, 2

By DEAN AMADON

#### NOTES ON POLYNESIAN LORIES

Peters recognized fifteen genera in the subfamily Loriinae. Examination of skins of the type species of all of these, and of the more important literature, indicates that many of these genera are based upon slight, intergrading structural characters, or upon color pattern alone. Indeed, of the fifteen genera, four are monotypic, while five or six others are composed of a few closely related species which seem still to replace each other geographically (superspecies). This has resulted from two factors: (1) the species concept has been broadened, and many forms once believed to be good species are now rightly considered to be subspecies; (2) the genus concept has not been broadened. Modern ornithologists have retained most of the old narrowly defined genera, or even set up new ones.

The above situation is by no means restricted to the present subfamily. If the binomial system of genus and species is to remain useful in ornithology, an attempt to base genera upon more substantial characters seems necessary. During this process some of the present genera could be retained as subgenera. This has been advocated recently by Huxley (1940, *The New Systematics*, Introduction). But the extensive use of subgenera in publication is both awkward and fraught with the danger of lapsing into some form of quadri-nomial nomenclature. Hence the use of the subgenus is likely to remain infrequent.

The present notes are restricted to the lories of Polynesia. Only those changes in nomenclature believed necessary to indicate the relationships of these few forms have been made. Eventually I believe it will be possible and desirable to rearrange the entire subfamily into about one-half or less of the present number of genera.

Notes on plumage given below are to be considered as supplemental to the full descriptions given in standard works, especially those of Salvadori (*Cat. Birds*, XX, pp. 41-79) and Mivart (*Monograph of Lories*).

#### GENUS VINI LESSON

Size small; form slender; tail pointed, of twelve feathers; bill slender; hook on maxilla quite long.

I believe it necessary to unite *Charmosyna* with *Vini*. This is probably true of at least *Glossopsitta* also. Satisfactory definition of *Vini* awaits a complete study of its relationship to *Trichoglossus*, *Psitteuteles* and other currently recognized genera.

#### SUBGENUS CHARMOSYNA WAGLER

Hook of the maxilla relatively longer; rectrices more acute; shaft streaks not conspicuous over entire crown.

The following minor variations, all of which have been considered of generic value by ornithologists, are present in some members of this subgenus and absent in others: shaft streaks on crown, bright patches in primaries, attenuated tips on primaries, pointed wing with first primary longest.

A key to the forms of the subgenus

<sup>1</sup> Previous papers in this series comprise American Museum Novitates, Nos. 115, 124, 149, 322, 337, 350, 356, 364, 365, 370, 419, 469, 486, 488, 489, 502, 504, 516, 520, 522, 531, 590, 609, 628, 651, 665, 666, 709, 714, 820, 828, 912, 915, 933, 939, 947, 977, 986, 1006, 1007, 1056, 1057, 1091, 1116, 1133, 1144, 1152, 1166 and 1175.

*Charmosyna* discussed in the present paper, and to their closest allies follows. Those included in the key have the following characters, one or more of which will serve to separate them from all other members of this subgenus: back entirely green, under parts mostly green, breast without shaft streaks, sides of head without a blue patch or yellow streaks.

KEY TO SUBGENUS *Charmosyna* (IN PART)

- A.—With red feathers around base of bill.
- 1.—With yellow spots on secondaries and inner primaries. . . . . *rubrigularis*.
  - 2.—Without yellow spots on secondaries and inner primaries.
    - a.—Large red patch on throat, upper breast and sides of face; distinct red spots on tail feathers.
      - (1).—Thighs red. . . . . *aureicincta* (adults).
      - (2).—Thighs mostly green. . . . . *aureicincta* (juvenals).
    - b.—Only upper throat and base of bill red; tail feathers at most only tinged with reddish. . . . . *palmarum* (part).
- B.—Without red feathers around base of bill.
- 1.—With blue crown.
    - a.—Crown dark blue; crissum red. . . . . *diadema* (female, male unknown).
    - b.—Crown light blue; crissum green. . . . . *toxopei*.
  - 2.—Without blue on crown.
    - a.—Center of crown blackish; wing under 85 mm. . . . . *meeki*.
    - b.—Center of crown green; wing over 85 mm. . . . . *palmarum* (part).

Some of the forms of *Vini* included in the above key, as well as a few others, might be considered as subspecies only. It seems best to consider them full species for the present since: (1) they all inhabit islands and are isolated from each other; (2) present knowledge of several of these forms is fragmentary; (3) the extent to which each form differs from the others is highly variable.

***Vini diadema*** (J. Verreaux and Des Murs)

This species is still known only from the two female cotypes in the Paris Museum from New Caledonia. Mr. Macmillan, who collected there in 1939 for the Whitney Expedition, did not encounter this lory.

***Vini palmarum*** (Gmelin)

I have seen no specimens in which the red about the base of the bill is entirely lacking,

although such have been described and figured. The amount of red is less, however, in females and juvenals. Three or four of the males examined have a few inconspicuous reddish feathers on the abdomen and thighs. In the latter respect they suggest *V. aureicincta* in which the thighs are entirely red.

WING.—NEW HEBRIDES: Futuna (near Tanna): ♂ 96, 97; ♀ 92. Mai: ♂ 91, 92, 94; ♀ 92, 94, 95, 97. Lopevi: ♂ 96; ♀ 89. Pauuma: ♂ 93. Pentecost: ♀ 90, 93. Aurora (Maiwo): ♂ 93. Aoba: ♂ 92, 93, 94, 98; ♀ 92. Merlav: ♀ 88, 91. BANKS IDS.: Gaua: ♂ 91, 94, 97, 98; ♀ 89, 90, 90, 90. Vanua Lava: ♂ 94; ♀ 95. Valua: ♂ 91; sex? 92. SANTA CRUZ IDS.: Vanikoro: ♂ 93, 93, 95; ♀ 91, 92. Tinakula: ♀ 91, 91. DUFF IDS.: Disappointment: ♂ 94, 95, 96; ♀ 92, 92, 97, 98. Treasurers: ♂ 96.

TAIL.—NEW HEBRIDES: Futuna: ♂ 80, 82, 88; ♀ 74? Efate: ♀ 76. Mai: ♂ 83; ♀ 80, 81, 82, 82. Lopevi: ♂ 78; ♀ 78. Pentecost: ♀ 76, 78. Aurora: ♂ 79. Aoba: ♂ 83, 88. Merlav: ♀ 88, 91. BANKS IDS.: Gaua: ♂ 77, 78, 85; ♀ 74, 74, 76, 79. Vanua Lava: ♂ 76; ♀ 78. Valua: ♂ 75. SANTA CRUZ IDS.: Vanikoro: ♂ 72, 78, 80; ♀ 77, 79. DUFF IDS.: Disappointment: ♂ 84; ♀ 76, 79, 81, 82, 83. Treasurers: ♂ 84.

The above measurements do not indicate any obvious geographical variation in size. Birds from the different islands do not vary in color either. No material from Tanna Island, the type locality, was available. The specimens from the little island of Futuna, which is about fifty miles east of Tanna, are like those from the more northern islands.

RANGE.—New Hebrides, Banks, Santa Cruz and Duff Islands. In addition to those listed in giving the above measurements, *V. palmarum* has been recorded from several other islands in the New Hebrides (Aneiteum, Tanna, Erromango, Epi, Ambrym, Espiritu Santo).

***Vini aureicincta*** (Layard)

In what seems to be the only juvenal of this species in the series, the thighs are greenish, faintly tinged with red, instead of

being bright red as in the adults. In this specimen the yellow lower border of the red throat patch is only faintly suggested. The Whitney Expedition, which collected extensively throughout the Fijis, found *V. aureicincta* only on Viti Levu. Our older specimens from the Rothschild Collection are also from that island. The species has been recorded from Ovalau and Taviuni.

WING.—Viti Levu: ♂ 93, 94, 96, 96; ♀ 92, 92?, 93, 93?, 96, 97.

TAIL.—Viti Levu: ♂ 75, 77, 79?, 83; ♀ 75?, 77, 78?, 80, 82, 84.

#### SUBGENUS VINI LESSON

Shaft streaks conspicuous on crown, none on breast; tail shorter; tail feathers subacute; hook on maxilla often slightly shorter; abdomen dark blue.

#### KEY TO SUBGENUS *Vini* (INCLUDING JUVENALS)

- A.—Without green in plumage.  
 1.—Tail dark blackish blue. . . . . *peruviana*.  
 2.—Tail light bluish white. . . . . *ultramarina*.  
 B.—With green in plumage.  
 1.—Dorsal surface entirely green. . . . . *stephensi*.  
 2.—Occiput blue.  
 a.—Tail with conspicuous red and black pattern. . . . . *kuhlii*.  
 b.—Tail mostly yellowish green. . . . .  
 . . . . . *australis*.

Adults of *Vini australis* have the tips of the outer primaries somewhat attenuated. This character is scarcely suggested or entirely absent in the other species. No geographical variation in color was found in any of the five species.

#### *Vini australis* (Gmelin)

WING.—SAMOA: Tau: ♂ 104–117 (111); ♀ 104–113 (109). Ofu: ♂ 110, 112; ♀ 114. Olosinga: ♀ 108. Upolu: ♂ 104–114 (109); ♀ 108, 110, 111. Savaii: ♂ 113, 114, 115; ♀ 104–112 (109). CENTRAL POLYNESIA: Alofa: ♂ 107. Fotuna: ♂ 107–114 (110); ♀ 104–111 (108). Niuafoofu: ♂ 108, 112; ♀ 109, 111. Boscawen (Tafahi): ♂ 113. Keppel (Niuatobutabu): ♂ 112, 113. Niue (Savage): 109. FIJIS: Turtle: ♂ 112–115 (113); ♀ 106–111 (109). Ongea Levu: ♂ 110–116 (114); ♀ 111, 112, 114. Fulanga: ♂ 103–115 (110); ♀ 114. Mothe: ♂ 109; ♀ 109, 110, 112. Oneata: ♂ 112; ♀ 109, 111. TONGA IDS.:

Tongva: ♀ 113. Tofua: ♂ 105–115 (109); ♀ 105–111 (108). Uia: ♂ 109, 112; ♀ 107, 110, 110. Fotuhaa: ♀ 107, 110, 112. Haafeva: ♀ 114. Uoleva: ♀ 108, 111.

TAIL.—SAMOA: Tau: ♂ 61–69 (66.5); ♀ 61–67 (63.4). Ofu: ♂ 68; ♀ 67. Olosinga: ♂ 69; ♀ 64. Upolu: ♂ 64–65 (64.5); ♀ 63, 69. Savaii: ♂ 65, 68, 69; ♀ 62–66 (64.6). CENTRAL POLYNESIA: Fotuna: ♂ 64, 66, 69; ♀ 62–69 (64.4). Niuafoofu: ♂ 62, 69; ♀ 63, 64. Boscawen: ♂ 68; ♀ 65. Keppel: ♂ 69; ♀ 67. Niue: 67. FIJIS: Turtle: ♂ 65–70 (67.5); ♀ 64, 65. Ongea Levu: ♂ 67–72 (68.8); ♀ 63–70 (66.2). Fulanga: ♂ 65, 66, 67. Mothe: ♂ 65; ♀ 66, 67. Oneata: ♂ 68. TONGA IDS.: Tongva: ♂ 64; ♀ 68. Tofua: ♂ 65–69 (66.8); ♀ 62–71 (64.4). Uia: ♂ 69; ♀ 63, 67. Fotuhaa: ♂ 64, 70; ♀ 64, 66, 66. Haareva: ♀ 66. Late: ♂ 64. Uoleva: ♀ 65, 66.

These measurements suggest that the population of the Lau Archipelago may be of slightly larger size than the others. This is confirmed when the mean wing and tail lengths of the four main groups are combined and compared.

LOCALITY	MALE		FEMALE	
	Wing	Tail	Wing	Tail
Samoa	110.6	66.7	109.0	64.3
Central Polynesia	110.7	66.7	108.0	64.4
Lau Archipelago, Fiji	112.6	67.8	110.5	65.1
Tonga	109.3	66.5	109.25	65.1

This size variation is, of course, far too slight to permit individual specimens from the Lau Archipelago to be identified.

RANGE.—Samoa, Tonga, Lau Archipelago, Fiji; and several of the central Polynesian Islands in this region. In addition to the islands given above, *Vini australis* has been recorded from Tongatabu, Eua, Hapai, and Vavau Islands in the Tongas, and from Wallis Island in central Polynesia. Its apparent absence from the rather large and centrally located island of Tutuila, Samoa, seems surprising.

#### *Vini kuhlii* (Vigors)

Juvenals have many of the red feathers of the under parts tipped with grayish

purple so as to give a somewhat barred appearance. As compared with adults, juvenals have much less red and more blackish purple in the rectrices. The green tips of the latter are smaller in the juvenals and are dark green, not yellowish green.

WING.—Rimitara: ♂ 132–136 (134); ♀ 124–134 (129). Fanning: ♂ 127, 135; ♀ 128. Washington: ♂ 132, 134.

TAIL.—Rimitara: ♂ 69–73 (70.6); ♀ 67–72 (69.3). Fanning: ♂ 68, 71; ♀ 71. Washington: ♂ 69, 69, 75.

RANGE.—Austral Islands (Rimitara, "Ruantin"), Washington Island and Fanning Island. The last two islands are so small and geographically isolated that it seems very probable that this species is native to the Austral Islands and introduced by man on the other two islands.

#### *Vini stepheni* (North)

In the usual adult plumage the green of the dorsal surface extends around and encroaches slightly on both sides of the breast. From there a broken purple band extends across the red breast. These purple feathers, as well as the red feathers of the mid-breast, have green areas near their bases, which are sometimes visible to a slight degree. In one specimen the breast is entirely red with no indication of a purple band.

The under parts of juvenals are green, mixed, on throat and abdomen, with purple and a little red. In the post-juvinal molt, which begins on the head, the green under parts of the juvenal are gradually replaced by red adult feathers. Dorsally the tail of juvenals is largely dark green, not light yellowish green. This is true to a lesser degree of the rump and back; the upper parts of adults and juvenals are otherwise similar.

WING.—♂ 126–133 (129); ♀ 124–127 (126).

TAIL.—♂ 85–93 (90); ♀ 85–91 (88).

RANGE.—Henderson Island, Tuamotus.

#### *Vini peruviana* (P. L. S. Müller)

Juvenals are blue above and grayish blue below, though usually they are paler gray-

ish white around the base and sides of the mandible. In two juvenals this tendency is more pronounced, and the upper throat and sides of the head are mixed with white. One of these is a nestling, which indicates that the variation just noted cannot be attributed to the beginning of the post-juvinal molt.

WING.—SOCIETY ISLANDS.: Fenua ura (Scilly): ♂ 112–116 (114); ♀ 110–114 (111). Mopelia: ♂ 106?, 109, 112. Borabora: ♂ 114, 115, 116; ♀ 116. TUAMOTU ISLANDS.: Rangiroa: ♂ 112. Tickahau: ♀ 107. Kaukura: ♂ 110–117 (113); ♀ 108–113 (110). Arutua: ♂ 112–120 (114); ♀ 108–111 (109). Apataki: ♂ 108–117 (112); ♀ 108–112 (109).

TAIL.—SOCIETY ISLANDS.: Fenua ura: ♂ 66–74 (69.8); ♀ 65–69 (66.8). Mopelia: ♂ 67, 67, 71; ♀ 65, 67. Borabora: ♂ 68–70 (69.3); ♀ 67, 70. TUAMOTU ISLANDS.: Rangiroa: ♂ 69. Tickahau: ♀ 67. Kaukura: ♂ 67–72 (69.7); ♀ 65–72 (67.7). Ahii: ♂ 66. Arutua: ♂ 69–73 (71.1); ♀ 67–71 (68.3). Apataki: ♂ 66–73 (69.7); ♀ 65–72 (68.7).

To permit comparison of the populations of the two groups of islands, the mean wing and tail lengths are listed below. I have included measurements of seven males from Borabora, four from Rangiroa, and two from Aitutaki, Cook (Hervey) Islands, as listed by Townsend and Wetmore (1919–1920, Bull. Mus. Comp. Zool., LXIII, p. 194).

LOCALITY	WING (MALES ONLY)	TAIL (MALES ONLY)
Society Islands	113.7	69.65
Tuamotu "	112.4	69.74
Cook "	107.5	68.2

The above figures suggest that the birds comprising the Society Islands population of *Vini peruviana* may be slightly larger than the others. The females from this group are also slightly larger. The Cook Islands specimens seem to be very small; moreover, Wetmore lists four females as having the mean length of wing only 104.9, and of tail 65.4. However, this material is very scanty, and Wetmore probably employed a slightly different technique in measuring the wings. Indeed *V. peruviana*

may have been introduced by man on Aitutaki Island. It was the only species of bird found there, and is referred to by Townsend (*op. cit.*, p. 159) as: "This common pet of the natives. . ."

RANGE.—Society Islands, westernmost of the Tuamotu Islands, Cook Islands. Islands on which it has been recorded, in addition to those mentioned above, are Tahiti, Huaheine, Maitea, and Moorea in the Society Group, and Niau, Tuamotus.

### *Vini ultramarina* (Kuhl)

There is a complete albino in our series from Huapu Island. One skin, otherwise in normal juvenal plumage, is acquiring the white flecks of the adult plumage on the sides of the head and on the throat, thus showing that the post-juvenal molt begins in this region.

WING.—Nukuhiva: ♂ 123, 124, 126; ♀ 113–120 (117.5). Huapu: ♂ 118–127 (122); ♀ 111–124 (117).

TAIL.—Nukuhiva: ♂ 80; ♀ 73–78 (75.6). Huapu: ♂ 71–78 (75.25); ♀ 70–78 (73.4).

RANGE.—Nukuhiva and Huapu, Marquesas Islands.

NOTES ON THE SPECIES OF THE SUBGENUS *Vini*.—Variation in the tail/wing ratio among these five species is quite noticeable. Expressed as a percentage of the wing length, the tail lengths are as follows: *stephensi*, 70; *ultramarina*, 63; *peruwiana*, 62; *australis*, 60; *kuhlii*, 53. In the subgenus *Charmosyna* the tail is about 85 per cent of the wing length in the Polynesian species but varies in the more specialized forms of New Guinea. It is interesting that the easternmost of the *Charmosyna* group, *V. aureicincta*, occurs only on the larger islands of the Fiji Group, whereas *V. australis* is restricted in Fiji to the small islands in the southeastern part of the group. These two species still replace each other geographically, which suggests they may have been only subspecifically different at some time in the past.

### GENUS PHIGYS G. R. GRAY

Tail short, central rectrices slightly shorter than lateral ones; feathers of hind

neck long and extending over back, upper of these feathers green, lower red; crown without shaft streaks; body form stockier than in *Vini*, outer primaries attenuated near tips; blue patch on abdomen; slight sexual color dimorphism; bill slightly heavier than in *Vini*.

This monotypic genus is evidently a specialized offshoot of the subgenus *Vini*, the members of which (especially the short-tailed *V. kuhlii*) it resembles in many respects. Until a more extensive study of its relationship to other lorics can be made, it seems best to retain *Phigys* as generically distinct.

### *Phigys solitarius* (Suckow)

Wetmore (1925, *Ibis*, p. 836) noted that females differ from males in having the forehead brighter blue and the hind crown washed with greenish. He believed juvenals to resemble the females in these characters. However, careful study of juvenals collected by the Whitney Expedition makes it evident that they show the same sexual characters as the adults but in a less pronounced manner. Males have green in the hind crown only near the bases of the feathers, and usually concealed. In some thinly feathered male juvenals the green is more or less visible, but it does not extend to the tips of the feathers as in all females. The difference in the forehead color is slightly indicated in most juvenals. Juvenals have the red feathers of the breast more or less tipped with purple, but this seems to wear off very quickly and is not noticeable in more than half of those examined. The breast feathers of juvenals are, furthermore, peculiar in having concealed yellowish green spots, which are occasionally visible. One exceptional female has a broken green band across the mid-breast.

About one-fourth of the adults examined have a few red feathers on the forehead, but never enough to be conspicuous. A few adults have the long red feathers of the hind neck washed with orange. These variations occur in both sexes.

WING.—Lakemba: ♂ 134?; ♀ 133. Matuku: ♂ 133–138 (136); ♀ 130–134 (132). Tuvutha: ♂ 133, 137. Vatu Vara:

♂ 140; ♀ 134? Yathata: ♂ 134. Taviuni: ♂ 140? Rambi: ♂ 137, 137. Vanua Levu: ♂ 133?, 133?; ♀ 133. Wakaya: ♂ 129, 134; ♀ 130. Viti Levu: ♂ 137; ♀ 129, 131, 135. Kandavu: ♂ 135, 140, 145; ♀ 129-140 (134). Ono: ♂ 143; ♀ 128, 129?

TAIL.—Lakemba: ♂ 66; ♀ 66. Matuku: ♂ 68-71 (68.8); ♀ 62-68 (64.7). Tavutha: ♂ 64, 69; ♀ 64. Vatua Vara: ♂ 69; ♀ 65. Yathata: ♂ 71. Taviuni: ♂ 64; ♀ 69. Rambi: ♂ 70, 70; ♀ 69. Vanua Levu: ♂ 65, 69; ♀ 66, 67. Koro: ♂ 67. Wakaya: ♂ 63, 65; ♀ 62, 66, 66. Ovalau: ♀ 61. Viti Levu: ♂ 68; ♀ 65-67 (65.5). Kandavu: ♂ 62-71 (65.7); ♀ 63-67 (64.5). Ono: ♂ 72; ♀ 62.

No obvious size variation among the birds from the several islands is indicated in these measurements.

RANGE.—Fiji Ids. All of the Fijian Islands from which *Phigys* has been recorded previously and some additional ones are given above. This species may have been carried to some of the smaller islands by man. However, in the southeastern group or Lau Archipelago it was found only on the northern island of Lakemba but not on the more southern members of this chain where *Vini australis* occurs. The ranges of the two species do not overlap.

GENERAL REMARKS.—As already noted, *Phigys solitarius* and some of the species of *Vini* have the outer primaries attenuated at the tip. This specialization, which is found only in the adults, is much more pronounced in the New Guinean species, *Vini papou*. The rectrices, unlike the primaries, are always more acute in juvenals. This seems due in part to an actual difference in the shape of the feathers, and in part to a tendency in the tail feathers of the juvenals to wear to an acute point. This difference is not so noticeable in the subgenus *Charmosyna*, in which the rectrices are always more acute, but it can be observed in the shorter, lateral feathers of the tail. Consideration of all the lorries of the genus *Vini* suggests that they, as well as *Phigys*, may have evolved by specialization of a stock, many of whose traits are still retained by such a species as *V. palmarum*. Among the characters believed more or less primitive are

slender form, greenish coloration, long pointed tail and absence of attenuated tips on the primaries and rectrices. Even the species with red under parts are much more greenish in the juvenal plumage, and in some the red adult feathers have greenish areas near their bases.

MOLT.—Junge (1937, Nova Guinea, N.S., I, p. 175, foll.) presents data on the primary molt of seven species of lorries. He found that the molt usually begins at the fifth primary and proceeds in both directions. Accordingly, the fourth and sixth, third and seventh, second and eighth, and first and ninth primaries will be replaced at the same time. Finally the tenth, innermost feather will be replaced to complete the primary molt. Such a molt is diagrammatically represented in Fig. 1, A.

Examination of more than one hundred molting specimens of the eight species of Polynesian lorries discussed in the present notes reveals that they follow the same molting pattern. However, many specimens seem to begin the molt by losing the fourth and fifth quills almost at the same time, so that the third and sixth are the next pair to drop, etc. (Fig. 1, B). The primary molt in fully 85 per cent of the skins examined was of one or the other of these two slightly different types. I found much less variation from the normal than did Junge. Moreover, most of the variations noted were minor ones, such as the beginning of the molt with the fifth and sixth primary, etc. In general the molt of the outer primaries seems to proceed more regularly and apparently more rapidly than that of the inner primaries. This is perhaps correlated with the greater importance of the former in flight. Occasionally one or two of the inner primaries will fail to drop out in turn and be skipped. A very few completely atypical specimens were found in which new primaries were scattered throughout the wing. In no instance did the molt begin at one end of the row of primaries and proceed toward the other. Usually the molt is the same in both wings. Sometimes one may be a feather "ahead" of the other; rarely, there is greater difference.

The molt of other feather tracts cannot

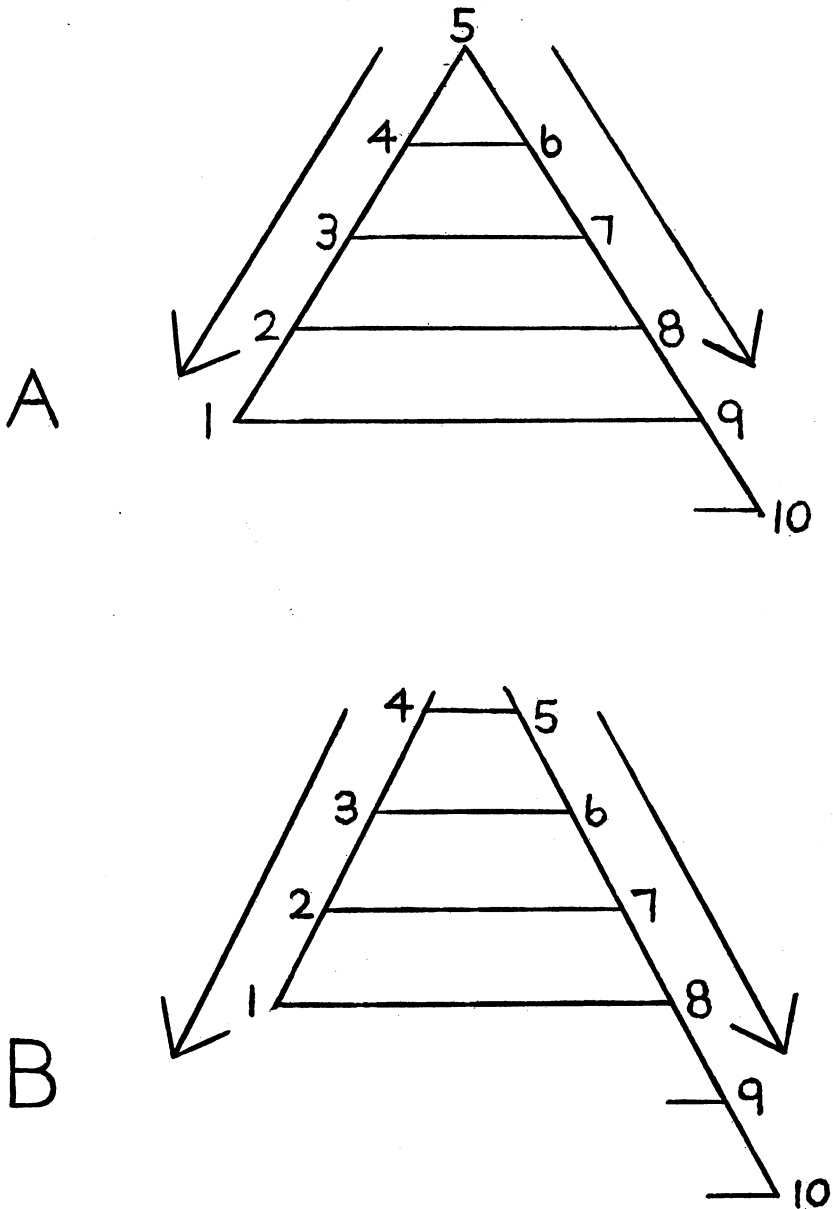


Fig. 1. Molt of primaries in lories. Arrows indicate progression of molt toward end of feather row. A.—When molt begins with 5th (from outermost) primary. B.—When molt begins with 4th and 5th primaries.

readily be studied in dried skins of these small lories. It is evident that the post-juvinal molt begins in the head region. It proceeds until the entire adult body plum-

age is acquired, or almost so, before the adult wing and tail quills begin to come in. Probably the general course of the molt in adults also follows this sequence.

#### THE PARROTS OF THE GENUS *PROSOPEIA*

**GENERIC RELATIONSHIPS.**—The parrots of the Fijian genus *Prosopeia* closely resemble those of the Australian and New Guinean genus *Alisterus*. Many authors have noted this, the first of whom was Latham. He considered *Prosopeia tabuensis* and *Alisterus scapularis* to be varieties of one species. Later Garrod (1874, Proc. Zool. Soc. London, p. 588) declared that in *Alisterus* the carotid arteries are normal, whereas in *Prosopeia* the left carotid is superficial. The late Waldron Miller, in his manuscript notes on the classification of parrots, remarks that he had confirmed Garrod's statement about *Prosopeia*, but he added that *Alisterus* should be reëxamined, since the members of the two genera seem alike in all other structural characters and even in color pattern. Moreover, Thompson (1899, Proc. Zool. Soc. London, p. 34, foll.) by a study of skull characters found *Prosopeia*, *Aprosmictus* (includes *Alisterus*) and *Polytelis* to be very closely related not only to each other but to the Australian genus *Platycercus* and its nearer allies, such as *Cyanoramphus* and *Eunymphicus*. The left carotid is superficial in these platycercine parrots. They are further peculiar in lacking a furcula (with the exception of *Eunymphicus*, according to Beddard).

It has long been evident that the carotids and furcula are not of great importance in the classification of these parrots. Nevertheless it seems best to keep the genera *Alisterus* and *Prosopeia* apart, unless they are found to have similar carotids. Hence the latter genus will here be limited to the Fijian species and may be defined as follows:

#### **PROSOPEIA BONAPARTE**

Bill massive, especially in the male; bill without red; coloration of juvenals and of adults of both sexes essentially identical; left carotid superficial; furcula present.

**SEX AND AGE CHARACTERS.**—In all forms of the genus *Prosopeia* males are somewhat larger than females. The size difference is proportionately very much greater in the bill. It is possible to sex specimens at a glance by this difference in the size of the bill. The bill length (chord of culmen) in males averages about 20 per cent longer than in females; the corresponding difference in the wing and tail lengths is only about 8 per cent. Even if all juvenals are included, the bill measurements of males and females do not overlap in a single instance. The bill lengths listed below are included to show this sexual difference. For subspecific comparisons the wing and tail measurements are believed to be more exact and useful. Sexual differences in coloration seem not to exist.

No peculiarities of coloration were to be found in the juvenals, nor any satisfactory method of separating them from adults. The bill in this genus is usually entirely black or dark horn, but in some specimens there are yellowish white areas near the tip of the maxilla. Such birds are apparently younger, and quite frequently they are of rather small size, yet some specimens with yellowish areas in the bill were among the largest examined. Evidently the bill gradually becomes black with age, but some individuals obviously reach adult size before this change is completed. It is possible that the wing and tail feathers of juvenals are slightly narrower than those of adults. If so, the difference seems to be lost almost immediately through wear. The measurements of specimens believed to be possibly immature are not listed below, unless they exceed those of black-billed adults.

**MOLT.**—It is not always realized that processes such as molting may be restricted to a definite time of the year in tropical birds, just as in others. The present material of *Prosopeia* shows that these parrots have a regular annual molting cycle which



is similar in all forms of the genus. The data showing this are summarized below. Several specimens taken during each of the calendar periods listed were available.

DATE	MOLT	PLUMAGE WEAR	FORM
June 10	None	Moderate	<i>P. t. splendens</i>
" 20-30	"	"	<i>P. personata</i>
July 10, 11	"	Rather heavy	<i>P. t. tabuensis</i>
September 23	"	Very heavy	<i>P. personata</i>
November 1-10	About one-third of specimens just beginning	Moderate to heavy	<i>P. t. splendens</i>
" 25	All in early stages of complete molt	Very heavy	<i>P. t. taviuensis</i>
December 5, 6	Midst of complete molt	—	<i>P. t. atrogularis</i>
" 10-15	"	—	<i>P. t. taviuensis</i>
" 19-22	"	—	<i>P. t. koroensis</i>
February 10-12	Just finishing molt	None	<i>P. t. atrogularis</i>
" 15-20	"	"	<i>P. t. tabuensis</i>

Wood (1924, Emu, XXIII, p. 118) found in August a nest of *P. t. splendens* containing eggs. This suggests that the complete molt which begins in November or thereabouts follows by a short time the nesting season.

**SURVEY OF THE GENUS.**—The parrots of the genus *Prosopeta* are native to the larger islands of the Fiji Group. That all forms of the genus are closely related is indicated by: (1) only one form occurs on any island, with one exception resulting from the introduction of a second subspecies by man; (2) all are structurally identical in even minor characters; (3) all have a quite similar color pattern with green upper parts, blue primaries, partially red or orange under parts and usually blackish feathers around the base of the bill.

As regards coloration, however, two rather different types occur. One of these is peculiar to *P. personata*, the form occurring on Viti Levu, the largest island of the group. This species is green with blue primaries, a yellow and orange area on the under parts and black feathers around the base of the bill. In the other type of coloration, that of the subspecies grouped under the misnomer, *P. tabuensis*, the entire under parts and the head are red, while blue occurs in the tail and frequently on the neck, as well as in the wing. Because of these color differences, *P. personata* and *P. tabuensis* have always been considered distinct species. Moreover, one race of *tabuensis*

has been introduced on Viti Levu without crossing with *personata*.

The races of *P. tabuensis* are native to the other larger Fijian Islands. One of

them, *splendens*, which is found on the rather isolated island of Kandavu, differs from all the others in the crimson rather than maroon color of the under parts and head. It is possible that *splendens* would not interbreed with the maroon forms, just as it does not with *personata*. Unless this is demonstrated in nature, *splendens* may continue to be considered a race of *tabuensis*.

#### *Prosopeta personata* (G. R. Gray)

WING.—Viti Levu: ♂ 236-248 (243.8); ♀ 225-238 (229.8).

TAIL.—Viti Levu: ♂ 223-259 (232.6); ♀ 215-245 (224.6).

CULMEN.—Viti Levu: ♂ 30-34 (31.9); ♀ 25-28 (26.5).

RANGE.—Viti Levu, Fiji Islands. There are published records from the small nearby islands of Ovalau and Mbau, but the Whitney Expedition did not find this species there.

#### *Prosopeta tabuensis splendens* (Peale)

**SUBSPECIFIC CHARACTERS.**—Under parts and head crimson, blue collar broad, few or no blackish feathers around the base of the bill.

WING.—Kandavu: ♂ 224 plus -245 (230.6); ♀ 219 plus -222 (220.8). Viti Levu: ♂ 238.

TAIL.—Kandavu: ♂ 207 plus -223 (214.3); ♀ 202 plus -228 (213.2). Viti Levu: ♂ 224.

CULMEN.—Kandavu: ♂ 29 (juv.?)—32 (30.5); ♀ juv. 24, ads. 25–26 (25.4). Viti Levu: ♂ 32.

RANGE.—Kandavu, Fiji Islands. Introduced and established on Viti Levu but apparently rather rare there.

REMARKS.—Two specimens from Viti Levu, as would be expected, appear identical with those from Kandavu.

**Prosopiea tabuensis taviunensis**  
(Layard)

SUBSPECIFIC CHARACTERS.—Size small; no blue collar; rump feathers usually (78 per cent of examined skins) without maroon tips; feathers around base of bill only slightly blackish.

WING.—Taviuni: ♀ 207+, 213. Ngamea: ♂ 224?, 225?

TAIL.—Taviuni: ♀ 189. Ngamea: ♂ 193+, 195.

CULMEN.—Taviuni: ♂ juv. 30, ads. 32–34 (33); ♀ 25–27 (26). Ngamea: ♂ 33–34 (33.3); ♀ 26, 27.

RANGE.—Taviuni and Ngamea, Fiji Islands.

REMARKS.—Series from the two islands appear identical. Usually the rump feathers in this race are not tipped with maroon. In several specimens a few feathers are so tipped, and in one specimen from each island there is much maroon on the rump. One specimen of *taviunensis* in our series has a tinge of blue on the sides of the neck; all the others lack even a trace of a blue collar.

**Prosopiea tabuensis koroensis**  
(Layard)

SUBSPECIFIC CHARACTERS.—Size medium; blue collar lacking in majority of specimens (63 per cent of examined skins), when present narrow and interrupted; rump feathers extensively tipped with maroon; feathers around base of bill blackish.

WING.—Koro: ♂ 230 plus–240 (234.8).

TAIL.—Koro: ♂ 212?, 220+; ♀ 203+, 210+, 214+.

CULMEN.—Koro: ♂ 32–34 (33.1); ♀ 27, 28, 29.

RANGE.—Koro, Fiji Islands.

**Prosopiea tabuensis atrogularis** (Peale)

*Platyercus atrogularis* PEALE, 1848, U. S. Expl. Exp., VIII, p. 129, "shores of the Feejee Islands." Type locality hereby restricted to Vanua Levu.

SUBSPECIFIC CHARACTERS.—Size large; blue collar well developed and conspicuous; rump feathers usually (86 per cent of examined skins) without maroon tips; feathers around base of bill blackish.

WING.—Vanua Levu: ♂ 241, 242, 255.

TAIL.—Vanua Levu: ♂ 221, 231.

CULMEN.—Vanua Levu: ♂ 32, 33, 35. Kio: ♂ 32–36 (34); ♀ 28, 29, 29.

RANGE.—Vanua Levu and the adjacent small island of Kio, Fiji Islands.

REMARKS.—Peale described *P. atrogularis* as having "nuchal spot blue." Cassin (1858, U. S. Expl. Exp., VIII, ed. 2, p. 235) said further of the type, "the blue nuchal collar is wide and well defined." Hence it seems reasonably certain that Peale secured his type on the large island of Vanua Levu, which is the only place in the Fijis where a form agreeing with this description occurs. The type of *atrogularis* seems to be lost, for Dr. Friedmann and Mr. de Schauensee have been kind enough to advise me that it is not in the collections of the U. S. National Museum or of the Academy of Natural Sciences of Philadelphia.

Our specimens from Kio are in very heavy molt, which makes them appear to have smaller blue collars than topotypical birds from Vanua Levu. Closer examination shows that this apparent difference is to be attributed to the condition of the plumage.

**Prosopiea tabuensis tabuensis**  
(Gmelin)

*Psittacus tabuensis* GMELIN, 1788, Syst. Nat., I, pt. 1, p. 317, Friendly (Tonga) Islands.

*Conurus Anna* BOURJOT ST. HILAIRE, 1837–1838, Hist. Nat. Perr., III, Pl. xxxviii, no locality given.

HISTORICAL.—The type of *Psittacus tabuensis*, which is now in the Vienna Museum (1873, Ibis, p. 30), was taken on Tongatabu Island by Captain Cook's Expedition. Apparently the species has never been taken there since. Later ex-

plorers found it on the nearby island of Eua, which is more rugged and forested. The Whitney Expedition found *Prosopiea tabuensis* to be quite common on Eua in 1925. When this species was discovered in the Fijis, along with allied forms, it was natural to suggest that it had been introduced into the Tongas by the natives, who trafficked a great deal in parrots. This suggestion now seems very probable, both because of the unusual variability of the Tonga population—discussed below—and on general considerations. Among the latter are: (1) All forms of *Prosopiea* are woodland parrots with short, rounded wings. Peale (*loc. cit.*) described their flight as wavering and undulatory. The evolution within the Fiji Islands of three forms which approach specific distinction, and of two additional valid subspecies, is ample evidence of the sedentary habits of the *Prosopiea* parrots. It is scarcely credible, therefore, that individuals of *P. tabuensis* could have flown a distance of more than four hundred miles to the Tonga Islands. If the flight had been made at a remote time, when either the geography of this region or the power of flight of the *Prosopiea* ancestors was different, the forms found in the two groups of islands would certainly be very different, rather than conspecific. (2) The Tonga Islands are without native birds of a woodland inhabiting type. (3) The presence of several forms in Fiji suggests that the evolution of the group took place there.

The subspecific status of the introduced Tongan birds, to which the oldest name for the species unfortunately applies, is much more difficult to determine. In the combined Whitney and Rothschild collections there are fifteen skins of *Prosopiea tabuensis* from Eua Island, Tonga. They are intermediate between *P. t. atrogularis* and *P. t. koroensis* in all subspecific characters. The Eua skins never have as large a blue collar as does *atrogularis*, while in only one or two is it reduced to the extent normal in *koroensis*. Ten of the fifteen skins are without maroon on the rump feathers; four have a small amount, while one approaches *koroensis* in this respect.

References to descriptions of Tongan

material of *P. tabuensis* in the literature indicate that this population was formerly even more variable and unstable. Thus of eighteen skins from Eua examined by Finsch (1900–1901, Notes Leyden Mus., XXII, p. 136) no fewer than thirteen had some of the rump feathers tipped with maroon. Both Finsch and Wigglesworth (1891, Aves Poly., p. 5) recorded specimens in which the blue collar was apparently as large as in *atrogularis* and others in which it was reduced to a few bluish feathers. The type of *Conurus anna*, which Mr. de Schauensee has generously made available for the present study, is an example of the latter extreme. It has only a suggestion of a blue collar, the rump feathers are maroon-tipped, although not to the extent usual in *koroensis*. This type is without an original label. Since it was collected prior to 1837, it seems much more probable that it came from the Tongas than from Koro, Fiji. Bourjot St. Hilaire, when describing it, thought (or knew) that his specimen came from Tonga, as shown by his choice of the common name, "Perruche Anna Tabuane." Several other names were applied by early ornithologists to the variants occurring in this hybrid Tongan population.

It seems evident, then, that at least two races of this parrot were introduced into the Tonga Islands, where they became established on Eua. Recent material from Tonga seems less variable than that dating from the early nineteenth century or before. This fact, as well as some of the data presented by Finsch (*op. cit.*), suggests that the introduction from Fiji took place shortly before Captain Cook's arrival at Tongatabu in 1777. In view of the above evidence, I believe that neither *tabuensis* nor the other names applied to the hybrid Tongan birds can be correctly or satisfactorily used for any of the distinct Fijian subspecies of this parrot. On the other hand it does seem convenient to retain the name *tabuensis* for the Tongan birds.

The above situation is further complicated by the presence on Ngau Island, Fiji, of another population that is intermediate between *atrogularis* and *koroensis*. Our series from Ngau is quite uniform as regards the blue collar, which is always

intermediate in extent between the conditions found in the other two races. The Ngau series is also intermediate with respect to the occurrence of maroon tips on the rump feathers. Thus 57 per cent of them are without such markings; the others have a variable number of feathers so marked, but only one or two approach *koroensis* in the amount of maroon on the rump. I am unable to suggest whether the Ngau birds have developed their rather stable, though intermediate, characters during a long period of isolation, or whether they, like the Tonga population, are the hybrid result of the introduction of more than one other race by man.

In any event, the birds occurring at the present time on Ngau Island, Fiji, and Eua Island, Tonga, are indistinguishable. It would therefore be futile to name the Ngau birds, the more so since their characters are entirely intermediate. It seems best to apply the name *tabuensis* to them also.

**SUBSPECIFIC CHARACTERS OF *P. t. tabuensis*.**—Size large; blue collar narrower and less extensive on sides of neck than in

*atroglularis*, sometimes almost lacking; some of rump feathers tipped with maroon in about 50 per cent of individuals, but such markings rarely or never as extensive as in *koroensis*. Hence this race is intermediate between *atroglularis* and *koroensis*.

**WING.**—TONGA IDS.: Tongatabu: The type has the wing length of 241 mm., and a supposed cotype that of 253, according to Finsch (*op. cit.*, p. 141). Eua: ♂ 243–250 (247.2); ♀ 232–239 (236). FIJI IDS.: Ngau: ♂ 246–258 (251.8); ♀ 234–241 (236.9).

**TAIL.**—TONGA IDS.: Eua: ♂ 232, 234, 234; ♀ 225, 230. FIJI IDS.: Ngau: ♂ 224–236 (229); ♀ 230, 230, 233.

**CULMEN.**—TONGA IDS.: Eua: ♂ 32–35 (33.4); ♀ 28–29 (28.3). FIJI IDS.: Ngau: ♂ juv. 32, ads. 33–35 (34.1); ♀ 26–30 (28.2).

**RANGE.**—Tongatabu (formerly) and Eua, Tonga Islands, and Ngau, Fiji Islands. The Tonga birds are believed to be a mixture resulting from the introduction of two or more other races by man; the Ngau population may be a similar mixture.

#### NOTES ON *TYTO ALBA*

In the races of *Tyto alba* studied, males and females are of equal size, so the measurements are combined. The maxilla measurements are given because of the variation occurring in the Solomon Islands and the Bismarck Archipelago.

##### *Tyto alba lulu* (Peale)

**TYPE LOCALITY.**—Upolu, Samoa.

**SUBSPECIFIC CHARACTERS.**—Size small; under parts white, more or less spotted with black; upper parts, wing and tail medium gray, mottled and marked with ochraceous (the amount of ochraceous is variable, especially on the tail, which is entirely grayish in some individuals, while in others the ochraceous extends as far as the sub-terminal black band).

**WING.**—Samoa: 39 skins, 263–282 (272). Fiji: 11 skins, 262–282 (271). Tonga: 6 skins, 267–277 (272). Niue Is.: 272, 272. Fotuna Is.: 267, 272. Rotuma Is.: 264.

**TAIL.**—Samoa: 47 skins, 105–119 (112). Fiji: 12 skins, 109–119 (112). Tonga: 6 skins, 111–119 (115). Niue Is.: 114, 114. Fotuna Is.: 109, 114. Rotuma Is.: 109.

**DEPTH OF MAXILLA IN FRONT OF CERE.**—61 skins, 8.4–10.0 (9.29).

**RANGE.**—Samoa Islands (Olosinga, Ofu, Tau, Auhau, Tutuila, Savaii, Upolu), Fiji Islands (Ono ilau, Olorua, Aiwa, Taviuni, Vanua Levu, Viti Levu, Vanua Leile, Yasawa, Kandavu, Ndravuni, Vanua Kula), Tonga Islands (Haaono, Nomuka, Honga Hapai, Telekitonga, Uia, Uoleva), central Polynesian Islands (Niue, Fotuna, Rotuma, Niuafu).

J. R. Forster (1844, *Descrip. Animalium*, p. 157) reported seeing *Tyto alba* on Tupai, Society Islands, while accompanying Captain Cook's Expedition. This species has never been taken or seen in the Society Group since, so Forster's statement is almost certainly based on an error of

identification or locality. The Society Islands should not be included in the range of *T. alba*.

**COLOR VARIATION.**—Color variation among the island populations here united under the name *lulu* is very slight. However, birds from the eastern part of the range (the Samoan Islands) are somewhat darker than those from Fiji and the Tonga Islands. In the western groups the ochraceous markings, also, tend to be somewhat paler or even yellowish.

**REMARKS.**—The Australian race of the barn owl, *T. a. delicatula*, although having on the average slightly more ochraceous in the upper parts than *lulu*, is so similar that the two cannot be separated by color. But *delicatula* has longer wing and tail, although the bill is no deeper. Twenty-nine skins of *delicatula* measure: wing, 273–291 (284); tail, 109–120 (114); depth of maxilla before cere, 8.5–10.2 (9.27).

#### *Tyto alba interposita* Mayr

**TYPE LOCALITY.**—Vanikoro Island.

**SUBSPECIFIC CHARACTERS.**—Like *lulu*, but with the under parts more or less washed with ochraceous or buffy; upper parts more richly colored, gray darker, ochraceous markings deeper and more extensive.

**WING.**—Santa Cruz Ids.: 271, 273. Banks Ids.: 268. Northern New Hebrides: 262, 267, 275, 279, 279.

**TAIL.**—8 skins, 104–115 (109).

**DEPTH OF MAXILLA IN FRONT OF CERE.**—5 skins, 8.9–9.7 (9.34).

**RANGE.**—Santa Cruz Islands (Vanikoro), Banks Islands (Vanua Lava) and northern New Hebrides (Epi, Malekula, Espiritu Santo, Pentecost).

#### *Tyto alba lifuensis* Brasil

*Tyto alba lifuensis* BRASIL, 1916, Rev. Franc. d'Orn., IV, p. 202. Lifu, Loyalty Islands.

**SUBSPECIFIC CHARACTERS.**—Like *lulu*, but black spots on under parts averaging fewer and smaller (said sometimes to be absent); upper parts paler, suffused and mottled with pale ochraceous or yellowish buff, which usually extends over the head

and hind neck; gray mottlings on wing and especially on tail much reduced; areas between black bars on rectrices buffy with little gray remaining; outer pair of rectrices yellowish white, with black bars much reduced.

**WING.**—Lifu: 263, 263, 265, 265, 269, 269, 269, 272. Mare: 261, 268. New Caledonia: 264, 273, 273, 275, 278.

**TAIL.**—Lifu: 8 skins, 107–114 (111). Mare: 106, 108, 108. New Caledonia: 108, 110, 112, 112.

**DEPTH OF MAXILLA IN FRONT OF CERE.**—Lifu and Mare: 10 skins, 8.0–9.3 (8.8). New Caledonia: 5 skins, 8.5–10.0 (9.1).

**RANGE.**—Loyalty Islands (Lifu, Mare, Uvea) and New Caledonia. This species was observed on Uvea Island by Mr. L. Macmillan while collecting for the American Museum.

**REMARKS.**—The New Caledonian specimens are slightly grayer and also slightly larger than those of the Loyalty Islands but are much closer to *lifuensis* than to *lulu* (or *delicatula*), especially in the tail markings.

Brasil, in his original description of *lifuensis*, stated that it differs from *lulu* only in having immaculate under parts. This is not true of any of the fifteen skins examined, but other characters serve to separate *lifuensis*.

#### *Tyto alba* subspecies

The barn owls occurring in the southern islands of the New Hebrides are variable intergrades between the three surrounding races, *lulu*, *interposita* and *lifuensis*. Nine skins were examined (seven from Tanna, one from Aniwa, one from Futuna) of which some are like typical *lulu*, others like *interposita*, while some show suggestions of the paler coloration of *lifuensis*. The following measurements are of nine skins from Tanna, Aniwa and Futuna Islands.

**WING.**—263–278 (269).

**TAIL.**—109–116 (112).

**DEPTH OF MAXILLA IN FRONT OF CERE.**—7.7–9.4 (8.59).

A SPECIMEN OF *TYTO LONGIMEMBRIS* FROM NEW CALEDONIA

In 1878 the Layards (*Ibis*, p. 250) listed an owl from New Caledonia under the name *Strix castanops*. The specimen was said to agree with the description of *Strix novaehollandiae* (of which *castanops* is the Tasmanian race). E. L. Layard later stated (1880, *Ibis*, p. 223) that the make of this skin suggested that it belonged with a collection of skins from Lifu, Loyalty Islands, near New Caledonia, and was not from the latter island itself. In view of this uncertainty and in the absence of further specimens, later authors quite properly removed *Tyto novaehollandiae* from the list of New Caledonian birds.

Recently while examining the old Verreaux Collection of mounted birds in the American Museum, I noticed a barn owl for which the Verreaux label, which was as usual pasted on the bottom of the stand, reads as follows: "2572. *Strix castanops* Gould . . . *Strix Novae Hollandiae* Steph . . . Nouvelle Caledonie. ♀." This specimen, now American Museum No. 9669, is actually a specimen of the rare and little known grass owl, *Tyto longimembris*. It is not impossible that the Layards' specimen, which was said to be destined for the colonial museum at Noumea, New Caledonia, found its way to the Verreaux brothers in Paris and eventually was purchased for the American Museum. More probably the present bird is another New Caledonian specimen of this owl. The Verreaux Collection is unusually rich in birds from that island.

Mathews (1915, *Birds Australia*, V, p. 401) in writing of *Tyto longimembris* states, ". . . I might record the existence in the British Museum of a specimen labelled '*Strix novaehollandiae* N(ew) C(al- edonia),' which is the present species." This record was not mentioned in Peters' "Check-list" or in other subsequent lists, presumably because of the inadvisability of establishing an important record upon

a specimen whose origin is based partly on inference. Now, however, the two records, as well as the older one of the Layards, confirm each other and establish *T. longimembris* as a rare member of the New Caledonian avifauna. Its presence there is not entirely surprising. This species occurs on Viti Levu in the Fiji Islands, where it is also very rare. There it is one of a small group of four species which comprises the only representatives of the Australian grassland or open country avifauna in central Polynesia. Mayr (1939, *Proc. Sixth Pacific Sci. Congress*, IV, p. 208) noted that all of these four species except the grass owl occur in the intervening islands of southern Melanesia (New Caledonia and/or the New Hebrides). This puzzling exception is now removed. Presumably *T. longimembris* is restricted in Polynesia to the two largest islands of this Subregion, New Caledonia and Viti Levu, because of the lack of extensive grasslands on the smaller islands. Like the other grassland species it undoubtedly reached New Caledonia first and by means of this stepping stone eventually arrived in Fiji.

Fijian examples of this owl were given the name *Strix oustaleti* by Hartlaub (1879, *Proc. Zool. Soc. London*, p. 295), who, like the Layards, was unaware of the existence of *T. longimembris*. Sufficient material to determine whether Hartlaub's name may be applied to a separable Fijian race of this owl has never been available to an ornithologist. If *oustaleti* is a valid form, the New Caledonian birds may belong to this race. The present specimen, after being on exhibition for the better part of a century, is hardly suitable for subspecific identification, even if comparative specimens from Fiji were available. It does not appear to differ noticeably from five specimens of *T. longimembris walleri* (Diggle) from Australia and may provisionally be referred to that race.

NOTES ON THE GENUS *CACOMANTIS*

The forms of *C. pyrrophanus* occurring in Polynesia and of *C. variolosus* occurring in the Solomon Islands and in part of the Bismarck Archipelago are treated here. The former species is found in the Solomon Islands also, but only, it seems, as a migrant. Hence, although forms of these two species of cuckoos live together in Australia and in parts of New Guinea, but one breeding form exists on any of the islands to the northward. The relationships of the species of *Cacomantis* are still obscure. *C. variolosus* is smaller than *C. pyrrophanus*; I have found no other constant specific characters in the few forms of each species studied.

The bill in this genus was measured from the nostril to the tip of the maxilla. In some forms the bill varies subspecifically in depth and thickness. These differences are very difficult to measure accurately and have only been described. Among the forms studied, sexual differences in size and color do not seem to exist. A very small percentage of the specimens examined is sexed as female.

**NOMENCLATURE.**—There has been considerable debate concerning the names to be used for the two species called in this paper *Cacomantis pyrrophanus* (fan-tailed cuckoo) and *C. variolosus* (brush cuckoo). The evidence for the present use of the names may be summarized as follows:

1.—*Cuculus rufulus*. Under this name Vieillot (1817, *Nouv. Dict. Hist. Nat.*, nouv. éd., p. 234) described two specimens believed to be from Australia in the cabinet of M. Baillon. The description seems to be that of the juvenal plumage of some species of *Cacomantis*. Juvenals of the two species just mentioned are quite similar. Most authors, including Mathews and Hartert, have rejected the name *rufulus* as indeterminable. The latter believed that the description agrees better with the brush cuckoo. Mr. D. L. Serventy, on the other hand, has suggested (letter to E. Mayr) that *rufulus* be used for the fan-tailed cuckoo. After studying Vieillot's description with a series of juvenals of both species before me, I can

find nothing to justify restriction of the name to either.

The upper parts of *C. rufulus* were described as "variées de brun et de rous-sâtre." This suggests the more variegated pattern of the brush cuckoo. Those who would use the name for the fan-tailed cuckoo mention Vieillot's statement that the remiges are ashy, the rectrices similar but darker and blackish. Some juvenals of the brush cuckoo, however, could be described thus, although in general they have the tail feathers dark brownish rather than blackish. The description of the belly, "le ventre de deux gris, l'un presque blanc et l'autre fonce . . ." might apply to many individuals of either species. Other points mentioned by Vieillot are also the same in these two species (not to mention other possibilities, if the locality should be wrong). To summarize, it seems impossible from Vieillot's description to identify his *Cuculus rufulus*. The name has been universally rejected. To exhume it at this late date for any reason less than the discovery of the presumably lost types would cause needless confusion.

2.—*Cuculus pyrrophanus*. Vieillot described this as his next species on the same page with *C. rufulus*; it too was said to be from "Nouvelle Hollande." In 1852 Pucheran (*Rev. et Mag. Zool.*, p. 560), in redescribing Vieillot's types, stated that *C. pyrrophanus* had been collected by Labillardiere in Java. This naturalist accompanied expeditions led by D'Entrecasteaux. The atlas of these expeditions, published in Paris in 1800, contains a map showing that Java, Australia and New Caledonia (twice), among other places, were visited. It was eventually learned that the type of *C. pyrrophanus* is a specimen of the New Caledonian Fan-tailed Cuckoo. Apparently the specimen was originally without locality. Vieillot thought it was from Australia, while Pucheran, misled by a second specimen of this bird secured in 1818 from the dealer Leadbeater which was erroneously labeled as from Java, suggested that island. Mathews, unaware of the correction

necessary in the type locality, used the name *pyrrophanus* for the Australian Brush Cuckoo (1918-1919, Bds. of Aust., VII, p. 321). Hartert (1925, Novit. Zool., XXXII, p. 174) later examined the type of *C. pyrrophanus* Vieillot and found it to be unquestionably the New Caledonian Fan-tailed Cuckoo. Peters and most other recent authors have followed Hartert in accepting *pyrrophanus* for the fan-tailed cuckoo. Mathews, however, asserted (1926, Novit. Zool., XXXIII, p. 53, foll.) that Vieillot's description does not fit the fan-tailed cuckoo and that the type must be invalid. He continued to advocate the use of *pyrrophanus* for the brush cuckoo.

In evaluating Vieillot's description of *C. pyrrophanus* it is important to refer to the New Caledonian and not to the quite different Australian race of the fan-tailed cuckoo. The tail pattern of the former and of the brush cuckoo is similar, and there is nothing to choose in the description. More important is the statement that the entire under parts of the bird described were reddish. This is true of the New Caledonian bird but of neither Australian form. The choice of the name *pyrrophanus* with its implication of red or fiery coloration proves that Vieillot wished to emphasize the color of the under parts of this cuckoo. Surely he was not describing the grayish buff ventral surface of the brush cuckoo of Australia! Those who would apply the name *pyrrophanus* to the latter call attention to the description of the upper parts as brown (they are bluish black tinged with brown on the wing in the New Caledonian bird). However, similar discrepancies can be found in many descriptions dating from that period. Pucheran, with the type before him, corrected this statement which he apparently considered as a careless mistake on the part of the describer. He seems to have entertained no doubts about the validity of the type. And as Hartert remarked, Pucheran was in a much better position to know which were Vieillot's types than are modern authors.

Everything considered, Vieillot's *Cuculus pyrrophanus* applies better to the New

Caledonian Fan-tailed Cuckoo than to any Australian form. The fact, when buttressed by the presence in the Paris Museum of a specimen of this cuckoo labeled as the type of *Cuculus pyrrophanus* Vieillot and so considered by the authorities of that museum as far back as there is any record, would seem to preclude with finality the application of this name to any other species.

### **Cacomantis pyrrophanus**

#### **Cacomantis pyrrophanus pyrrophanus** (Vieillot)

*Cuculus pyrrophanus* VIEILLOT, 1817, Nouv. Dict. Hist. Nat., nouv. éd., VIII, p. 234, New Holland, error = New Caledonia.

*Cacomantis meeki* ROTHSCHILD AND HARTERT, 1902, Novit. Zool., IX, p. 586, Ysabel Island, Solomons.

SUBSPECIFIC CHARACTERS.—Wing and tail long; bill small; under parts deep rufous; upper parts black glossed with green; rectrices black, notched with white along their edges.

WING.—New Caledonia: ♂ 141, 143, 145. Vieillot's type in the Paris Museum has a wing length of 142 mm., *vide* Hartert (1925, Novit. Zool., XXXII, p. 174). Mare: ♂ 144. Lifu ♂ 139, 140, 141. Two others have wing lengths of 140, 140, *vide* Brasil (1916, Rev. Franc. d'Orn., IV, p. 203). Uvea: ♂ 142. Ysabel: ♂ 145; ♀ 143 (type of *meeki*). Bellona: ♀ 140.

TAIL.—New Caledonia: ♂ 149. Mare: ♂ 148. Lifu: ♂ 145, 147. Uvea: ♂ 147, 148. Ysabel: ♂ 154; ♀ 151 (type *meeki*). Bellona: ♀ 147.

BILL.—New Caledonia: ♂ 15.5, 16.5. Mare: ♂ 16. Lifu: ♂ 14.5, 15, 15. Uvea: ♂ 16, 16.5, 17. Ysabel: ♂ 16.5 (subad); ♀ 16.

WEIGHTS.—Mare: ♂ 46.55. Lifu: ♂ 43.5, 45.2, 45.6. Uvea: ♂ 50.4, 50.6, 55.8. Bellona: ♀ 54 (subad.).

Rothschild and Hartert (*loc. cit.*) recorded somewhat different measurements for the two adults from Ysabel Island. However, the writer and another independent observer agree on the lengths given above for these specimens.

RANGE.—New Caledonia and Loyalty Islands (Mare, Lifu, Uvea). Also known



from the Solomon Islands (Ysabel, Bellona) where it is probably a migrant.

PLUMAGES.—I have seen no individuals of this race in complete juvenal plumage. The female from Bellona Island (see Mayr, 1931, Amer. Mus. Novitates, No. 486, p. 14) and one male from Ysabel are in the late stages of the post-juvenal molt. The immature feathers which remain suggest that the juvenal plumage in *pyrrophanus* is like that described below for *schistaceigularis*. The Ysabel specimen is peculiar in having rectrices marked as in the adult, but with the light areas washed with brown. This may be an individual variation.

REMARKS.—When Rothschild and Hartert described *C. meeki* they had no material of *C. pyrrophanus* for comparison. While writing his later review of this genus, Hartert (*loc. cit.*) was able to make this comparison. He found the two to be very similar, but he was reluctant to unite birds from New Caledonia and from the Solomon Islands. Hence he recognized *meeki* tentatively, in the belief that more material might reveal slight average differences. The same material studied by Hartert has been available to me, except the borrowed type of *C. pyrrophanus*. In addition one more skin from the Solomon Islands, another from New Caledonia (three in all), and the fine series taken by the Whitney Expedition in the Loyalty Islands were available.

Hartert believed that *meeki* might have a slightly heavier bill. From the above measurements it will be noted that there is some variation in the bill length in this race. This is true of the thickness of the bill also. The bill of *meeki* falls in all respects within the range of variation shown in the comparative material. If valid geographical variation in the bill does occur within the range of this subspecies, it is on Lifu Island. All three skins from that island have appreciably shorter bills, but even if constant, this deviation is too slight to justify subspecific separation.

The additional comparative material has shown also that Solomon Islands birds do not differ in color from those found in the New Caledonia-Loyalty Island region.

If the latter are arranged in a series based on the brightness of the rufous on the under parts, the adults of *meeki* fall about in the middle of the series. There is considerable individual variation in the brightness of the under parts in this race, but the differences seem due in large part to wear and fading.

The above considerations make it necessary to consider *meeki* a synonym of *pyrrophanus*. The remarkable range thus established could be explained if we assume that this cuckoo occurs in the Solomon Islands only as a migrant. Favoring this assumption is the fact that it is known from there only in winter. Meek took his three specimens in June and July, and the Whitney Expedition one on May 30. Certainly not all individuals of this race migrate, for we have specimens from the Loyalty Islands taken in May, July and August. But the Australian race, *C. pyrrophanus prionurus*, is also only partly migratory. It has occurred in the Aru Islands in winter and leaves Tasmania at that season; still, most of them are resident in Australia.

If *C. p. pyrrophanus* migrates to the Solomon Islands, it is surprising that it is unknown from nearer and more or less intermediate islands such as the Santa Cruz Group. It is possible that the species has actually colonized the Solomon Islands so recently that no perceptible change in the birds has occurred. However, the migration hypothesis seems more probable. *C. variolosus addendus* is the common representative of this genus in the Solomon Islands, although the two species might both be resident there as they are in Australia and New Guinea.

#### WING/TAIL RATIOS IN SOME FORMS OF *CACOMANTIS*

FORM	NUMBER OF SPECIMENS	WING/ TAIL RATIO
<i>C. pyrrophanus pyrrophanus</i>	8	95.9
<i>C. pyrrophanus schistaceigularis</i>	18	97.1
<i>C. pyrrophanus simus</i>	5	94.5
<i>C. variolosus addendus</i>	14	88.1
<i>C. variolosus macrocerus</i>	20	96.5
<i>C. variolosus tabarensis</i>	2	95.9
<i>C. variolosus websteri</i>	5	94.3
<i>C. variolosus blandus</i>	7	97.7

**Cacomantis pyrrophanus schistaceigularis** Sharpe

TYPE LOCALITY.—Espiritu Santo Island, New Hebrides.

SUBSPECIFIC CHARACTERS.—Wing and tail shorter than in *pyrrophanus*; bill much heavier; gray of head extending across entire throat and, to some extent, over the upper breast; remainder of under parts, the upper parts and tail like *pyrrophanus*.

WING.—Tanna: ♂ 139; ♀ 134. Efate: ♂ 133, 137, 140; ♀ 132, 132, 139. Nguna: ♂ 132. Mai: ♂ 130, 133. Lopevi: ♂ 130, 133. Ambrym: ♂ 134. Malekula: ♀ 137. Malo: ♂ 129, 136. Espiritu Santo: ♂ 132, 134, 135, 136; ♀ 130. Gaua: ♀ 135. Valua: ♂ 135.

TAIL.—Tanna: ♂ 140, 144; ♀ 136. Erromango: ♂ 140. Efate: ♂ 138, 139, 141, 144; ♀ 133, 135, 148. Nguna: ♂ 136. Mai: ♂ 135. Lopevi: ♂ 135. Ambrym: ♂ 134. Malekula: ♀ 140. Malo: ♂ 138, 140. Espiritu Santo: ♂ 138, 145. Gaua: ♀ 148. Valua: ♂ 143.

BILL.—16–17.5.

RANGE.—New Hebrides (Tanna, Erromango, Efate, Nguna, Mai, Epi [no specimens seen], Lopevi, Pauuma, Ambrym, Malekula, Malo, Espiritu Santo), Banks Islands (Gaua, Vanua Lava, Valua).

No geographical variation in size and little if any in color can be detected in the material from the above islands. Ten skins from Espiritu Santo do appear unusually yellowish and buffy. Most of them were taken in December, and the differences may be the result of fading and bleaching. I can see no difference between a series from Tanna and Erromango at the southern limit of the range and one from the Banks Islands at the northern.

PLUMAGES.—Several juvenals of this race were available, including some that were still being fed by their foster parent, *Petroica multicolor*. In the juvenal plumage of *schistaceigularis* the feathers are blackish, heavily mottled and tipped with brown or (on the belly) white. A barred pattern is thus produced, especially on the under parts. Both primaries and secondaries are tipped with brown, and the markings on the rectrices are brown, not white

as in the adult. Moreover, the markings on the tail feathers are much more extensive in the juvenal plumage. The outer pair of rectrices has complete bars, and the next two pairs have them on the distal end of the feathers. Of fifty-seven skins of *schistaceigularis*, six are in this full juvenal plumage. They were taken in May, June, November, December and January.

The post-juvenal body molt is evidently a rapid process, for only one skin (July) shows it. This bird has acquired most of the adult body plumage, but there are still several barred feathers in the under parts. The molt of the juvenal wing and tail, on the other hand, seems to be a prolonged process. No fewer than twenty-three skins taken over a large part of the year have adult body plumage but retain all or part of the juvenal wing and tail feathers. The wing seems usually to molt last.

**Cacomantis pyrrophanus simus** (Peale)

*Cuculus simus* PEALE, 1848, U. S. Expl. Exped., VIII, p. 134, Sandalwood Bay, Fiji.

*Culculus infuscatus* HARTLAUB, 1866, Ibis, p. 172, Viti Levu, Fiji.

SUBSPECIFIC CHARACTERS.—Size small; bill very broad; tail feathers, especially the outer ones, with prominent white markings which produce a barred pattern ventrally; upper parts dark greenish olive, less blackish than *pyrrophanus*; under parts like *pyrrophanus*. Occurs also in a melanistic phase.

WING.—Taviuni: ♂ 129, 130, 133, 133. Vanua Levu: ♂ 128?, 132. Viti Levu: ♂ 133. Kandavu: ♂ 131, 131, 132.

TAIL.—Taviuni: ♂ 134, 138. Vanua Levu: ♂ 139. Viti Levu: ♂ 140, 145. Kandavu: ♂ 135?, 141, 143.

BILL.—♂ 14.5–16.5.

RANGE.—FIJI ISLANDS: Kandavu Group: Vanua Kula, Kandavu. Viti Levu Group: Yasawa, Navandra, Mbenga, Vatu ira, Viti Levu, Ovalau, Makongai, Wakaya. Vanua Levu Group: Taviuni, Vanua Levu, Mathuata. The Whitney expedition did not take *simus* on Wakaya or Mathuata.

REMARKS.—Stresemann (1924, Jour. für Ornith., LXXII, pp. 77–79) concluded that *C. infuscatus* is only a melanistic phase of *C. p. simus*, under which name all

the Fijian cuckoos of this genus should be united. Study of the present series of forty-eight specimens confirms his conclusion. It is believed the following discussion will aid in the understanding of the plumages of *simus*.

Of forty-eight skins, fifteen are adults in normal plumage, with no trace of melanism. Another five skins are molting into this normal adult plumage. In these, chestnut feathers are appearing below and greenish olive ones on the back, but all five have some of the juvenal feathers still present. Of interest in these skins is the absence of brown tips on the remaining juvenal remiges, and especially the reduction of the pattern in the rectrices to small brownish white tips and marks (sometimes lacking) along the edges of the feathers. Hence although adults of *simus* in normal phase have prominently barred rectrices, juvenals have almost solidly blackish rectrices.

Ten other skins, all juvenals, have the under parts entirely barred. They agree with the molting birds just described in lacking brown tips on the remiges and in having very little brownish white in the rectrices. However, the outer pair of tail feathers has rather extensive markings in one or two of these juvenals. This seems to be an individual variation, which occurs also in some of the melanistic individuals. Some of these juvenals have much brown in the plumage, especially across the breast, thus resembling the juvenal plumage of *schistaceigularis* described above. Others have less brown on the tail and under parts, producing a plumage that is gray barred with dull white (juvenals of the Australian race also vary in the amount of brown in the plumage). Probably all ten of these juvenals would have molted into normal

adult plumage, for even the grayest of them does not show any definite melanism.

The remaining seven skins show varying degrees of melanism. Two have the greater part of the under parts barred, but a few of the breast feathers are largely or entirely blackish. There is such a gradual transition from normal juvenals to these two that it is difficult to say whether the latter would have molted into a normal adult plumage or into a melanistic adult plumage not unlike their juvenal plumage. The latter is more likely. Four other birds are mostly black but have a few barred feathers on the under parts, especially on the breast. None of the four is fully adult. One which is well along in the post-juvenal molt has new barred feathers coming in on the breast, showing that Stresemann was correct in saying that the juvenal and adult plumages are similar in the melanistic phase. Finally, there is one juvenal that is entirely blackish excepting the "specific" white patches in the wing.

To summarize, forty-one of forty-eight specimens of *simus* represent the normal plumage (one or two juvenals being doubtful). This normal plumage always finds complete expression in the adults. If any chestnut adult feathers appear in the under parts the bird always becomes a normal adult with chestnut under parts and black and white tail. The melanistic phase, on the other hand, intergrades more or less completely with the juvenal plumage. If melanism is present, but not to a sufficient degree to "submerge" all the barred juvenal feathers, such feathers apparently continue to appear in subsequent adult plumages, instead of the expected chestnut feathers.

The reduction of the tail pattern in all juvenals of *simus* may be compared with the condition in some other members of the species as follows:

#### CACOMANTIS PYRROPHANUS

	AMOUNT OF WHITE (OR BROWN EQUIVALENT) IN TAIL OF JUVENALS	AMOUNT OF WHITE IN TAIL OF ADULTS
<i>prionurus</i> (Australia)	Prominent barred pattern	Prominent barred pattern (same as juvenals)
<i>schistaceigularis</i> (also <i>excitus</i> of New Guinea, and probably <i>pyrrophanus</i> )	Prominent barred pattern	Much reduced; small white marks
<i>simus</i> (normal phase)	Very little; small tips	Prominent barred pattern
<i>simus</i> (melanistic phase)	" " " "	Very little; small tips

The suppression of the light pattern in juvenal *simus* may have nothing to do with the melanism occurring in this race. The juvenal plumages in this genus are confusing and not fully understood.

### *Cacomantis variolosus*

#### *Cacomantis variolosus addendus* Rothschild and Hartert

**SUBSPECIFIC CHARACTERS.**—Size large; wing relatively short (see below); rectrices with conspicuous white pattern, with complete bars on the outer pair and smaller markings on the others; back blackish glossed with olive; under parts variable, buffy or rufous, more or less washed with brownish gray; under tail coverts rufous; upper throat slightly grayish.

**WING.**—Bougainville: ♂ 120, 120, 120, 120, 122, 122; ♀ 119, 122. Kulambangra: ♂ 116, 120 (type). New Georgia: ♂ 123, 123, 124, 126. Malaita: ♂ 123, 125, 125. Guadalcanar: ♀ 124. San Cristobal: ♂ 118?, 123.

**TAIL.**—Bougainville: ♂ 139, 139, 141, 148; ♀ 140. Kulambangra: ♂ 138 (type). New Georgia: ♂ 136, 136, 138, 140, 141. Ysabel: ♀ 143. Malaita: ♂ 135, 136. Guadalcanar: ♀ 140. San Cristobal: ♂ 137.

**BILL.**—14–14.5.

**WEIGHTS.**—Malaita: ♂ 39, 40, 41, 42. San Cristobal: ♂ 34, 36, 36, 37.

**RANGE.**—Solomon Islands (Bougainville, Ysabel, Kulambangra, New Georgia [Rubiana], Malaita, Guadalcanar, San Cristobal).

**COLOR VARIATION.**—Some geographical variation in the color of the under parts may be observed, although more material would be needed from several of the islands to determine how constant the trends are. Eight skins from Bougainville are uniformly dully colored, being tinged with grayish brown on the breast. A single skin from Ysabel, three from Guadalcanar and three from San Cristobal conform closely with the Bougainville series. Meek's typical series from Kulambangra (two skins) and the nearby island of New Georgia (six skins) are slightly less grayish and brighter rufous. Four of five skins from

Malaita are distinctly pale and buffy. The fifth, however, is not separable from Bougainville specimens. None of this color differentiation on the various islands has proceeded far enough to warrant subdivision of the race *addendus*.

**REMARKS.**—As shown in the accompanying table, *C. v. addendus* differs from all other forms of *Cacomantis* studied in having a wing/tail ratio of about 88, instead of about 96. It is desirable to know whether this different ratio is a result of a change in the wing length or in the tail length. A means of determining this is provided by the weights available of *addendus*, and of one of the forms with wing/tail ratio 96, viz., *C. p. pyrrophanus*. But since the weight of a bird, like the volume, is dependent upon the cube of its linear dimensions, the cube root of the weights must be taken before a significant comparison with the linear measurements can be made. The average weight of male *C. p. pyrrophanus* is 48.2,  $\sqrt[3]{48.2}$  is 3.64; for *C. v. addendus* weight of males is 37.9,  $\sqrt[3]{37.9}$  is 3.36. Now if the mean wing and tail lengths of *pyrrophanus* and *addendus* are divided, respectively, by 3.64 and 3.36, the results will be directly comparable, thus:

<i>C. p. pyrrophanus</i>	Wing 39.07 units	Tail 40.74 units
<i>C. variolosus addendus</i>	Wing 36.25 units	Tail 41.31 units

These values show that, when their different size (as expressed by body weight) is taken into consideration, *pyrrophanus* and *addendus* have almost the same tail length, but that the wing of the latter is significantly shorter. Hence the aberrant wing/tail ratio of *addendus* has been produced by a shortening of the wing. It is a "short-winged," not a "long-tailed," race. Any method of thus determining which appendages of an animal have undergone genetic and evolutionary modifications is of value in studying many problems.

#### *Cacomantis variolosus macrocercus* Stresemann

**TYPE LOCALITY.**—Blanche Bay, New Britain.

**SUBSPECIFIC CHARACTERS.**—Size rather

large; tail feathers without complete white bars but with conspicuous white notches along their inner edges; back dark grayish olive, but less blackish than in *addendus*; under parts slate color, usually washed with more or less cinnamon brown from the mid-breast down, becoming brighter on the under tail coverts, which are rufous.

WING.—New Britain: ♂ 121, 122, 123, 123, 124, 125, 125, 126, 126, 126, 128, 128, 130, 131; ♀ 128. Duke of York Is.: ♂ 126. New Ireland: ♂ 125, 129. Lihir Is.: ♂ 120, 121, 121, 123, 123, 124, 126, 128. Masahet Is. (Lihirs): ♂ 121. Boang Is. (Tanga Group): ♂ 129, 129.

TAIL.—New Britain: ♂ 127, 127, 129, 129, 130, 131, 132, 134, 138, 140, 140; ♀ 133. Duke of York Is.: ♂ 135. New Ireland: ♂ 124, 124; sex ? 130. Lihir Is.: ♂ 125, 125, 126, 128, 128, 132, 137. Masahet Is.: ♂ 127. Boang Is.: ♂ 129, 134.

BILL.—13–15.5 (16.5 once from New Ireland).

The unusually long-billed specimen from New Ireland suggests that some infiltration by the following long-billed race, *tabarensis*, has occurred, or perhaps *tabarensis* is the form occurring on the long, narrow northern peninsula of New Ireland. The New Ireland skins are without more specific locality.

RANGE.—Known from the following islands in the eastern Bismarck Archipelago: New Britain, Duke of York, New Ireland, Lihir Group (Lihir, Masahet), Tanga Group (Boang).

REMARKS.—There is much individual variation in the color of the under parts in

*macrocerus*. The single specimen from Duke of York Island is unusually rufous, but it is matched by one from Lihir Island. Others from Lihir represent the gray extreme of coloration.

***Cacomantis variolosus tabarensis*,**  
new subspecies

TYPE.—No. 335452, Amer. Mus. Nat. Hist.; ♂ ad.; Tabar Island, Bismarck Archipelago; January 15, 1935; Whitney South Sea Expedition (W. F. Coultas).

SUBSPECIFIC CHARACTERS.—Like *macrocerus* but with a longer and heavier bill.

WING.—132 (type), 127.

TAIL.—139 (type), 131.

BILL.—17, 17.

COLOR OF SOFT PARTS.—“Iris—tan; bill—black, base—tan; corner of mouth—orange; feet—chrome yellow.”

RANGE.—Known only from Tabar Island, Tabar Group, Bismarck Archipelago.

REMARKS.—Only two specimens, both adult males, were secured of this new race. The bill of both of these is so much larger than that of any other race of *Cacomantis variolosus* that the description of the new race, *tabarensis*, seems justified. Although the large size of the bill is the principal character of the Tabar form, further material may show that it has a somewhat longer wing length than *macrocerus*. The under parts of both specimens of *tabarensis* are like the gray extreme of *macrocerus*. It is impossible now to say whether this grayness will prove to be constant. Of the two neighboring races, *macrocerus* has variable under parts, while the small race *websteri* of New Hanover seems always to be gray below.





