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BIRDS COLLECTED DURING THE WHITNEY SOUTH SEA EXPEDITION. XX¹

NOTES ON THICKHEADS (*PACHYCEPHALA*) FROM THE SOLOMON ISLANDS

BY ERNST MAYR

There is no group of birds in the Solomon Islands with more pronounced geographic and individual variation than the thickheads. The study of these birds gains interest because of the great number of unusual and puzzling plumages found among them. The working out of all these problems has been very satisfying to me, although further work will be needed to confirm my conclusions. I have extended my revision to the thickheads occurring in eastern Melanesia and in Polynesia, and the problems presented there were in many cases the same, thus facilitating my work. The results of this study will be published in my next paper.

I am indebted to my colleagues, J. T. Zimmer and J. P. Chapin, for much valuable advice. Measurements of wing and tail were taken as described in Amer. Mus. Novit., No. 516, p. 1; the culmen is measured from the forehead; all measurements are in millimeters.

In the mountains of the islands Guadalcanar and Bougainville we find the species *Pachycephala implicata*, which was discovered by the Whitney Expedition. All the other thickheads of the Solomon Islands are representatives of *Pachycephala pectoralis*.

Pachycephala implicata

RANGE.—Mountains of Guadalcanar and Bougainville, Solomon Islands.

***Pachycephala implicata implicata* Hartert**

Pachycephala implicata HARTERT, 1929, Amer. Mus. Novit., No. 364, p. 13, Guadalcanar Island.

TYPE.—No. 218045, Amer. Mus. Nat. Hist.; ♂ imm.; Guadalcanar Island, British Solomon Islands; July 25, 1927; R. H. Beck.

¹Previous 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, and 520.

ADULT MALE.—Forehead, crown and hind neck glossy black; throat ash-gray; sides of head and ear-coverts gradually changing from black of crown to gray of throat; back, rump, scapulars, edges of wing-coverts, and secondaries (olivaceous) citrine; abdomen and flanks similar, but lighter and more yellowish; upper tail-coverts rufous olive; tail-feathers black, basal part of outer web edged with dusky olive; primaries edged with grayish or cinnamon-olive; axillaries olive, under wing-coverts olivaceous gray.

IMMATURE MALE.—As described by Hartert (*op. cit.*, p. 14) under "adult male."

ADULT FEMALE.—Forehead, crown, hind neck, and ear-coverts dark gray, tinged with olive on hind neck; back, rump, scapulars and edges of wing-coverts brownish olive (between orange-citrine and dark citrine, R. IV); throat and sides of throat white, some feathers with pale grayish tips, on lower throat pale buffy gray; breast and flanks dirty (ochre) yellow with a tinge of olive; middle of abdomen more golden yellow; under tail-coverts and lower flanks ochraceous cinnamon; edges of wing- and tail-feathers brownish.

Iris brown, bill black, feet gray.

Culmen 21, tarsus 25-26.

	WING	TAIL
1 ♂ ad.	90	69
7 ♂ imm.	85-94(89.4)	66-72(69.3)
2 ♀ ad.	88, 92	68
2 ♀ imm.	86, 86	67, 67

RANGE.—Mountains of Guadalcanar Island, British Solomon Islands.

An error occurred during the printing of the original description of this species and a part of the description was omitted, while a part of the description of *whitneyi* (*op. cit.*, p. 14, lines 14-32) was added. However, on specimen No. 218045 is written "type of *implicata*," in Hartert's own handwriting, so there can never be any doubt about the identity of this species. Hartert saw but four of the twelve specimens and not the only adult male. I have therefore given a detailed description of this specimen.

The immature male plumages are very puzzling. Several specimens still have on the hind neck apparent remnants of the nestling plumage, which is not represented in the series; it will be described under the next subspecies. The individual variation in these immature birds is very considerable: some have very soft and pointed tails, others (like the type) have a tail very much like the adult except for the coloration. The underside (breast, abdomen, flanks, and under tail-coverts) also varies considerably. In some specimens it is more greenish yellow, approaching the coloration of the adult male; in other specimens more ochraceous, like the adult female. My material is not sufficient to draw any further conclusions. This question will be dealt with again in connection with the immature plumages of *Pachycephala pectoralis*.

***Pachycephala implicata richardsi*, new subspecies**

TYPE.—No. 226339, Amer. Mus. Nat. Hist.; ♂ ad.; Bougainville Island, Solomon Islands; January 5, 1928; F. P. Drowne, H. Hamlin, and G. Richards.

ADULT MALE.—Head, sides of head, throat, and upper breast black; back, rump, scapulars, edges of wing-coverts and wing-feathers yellowish olive; sides of throat, breast, and lower abdomen dull yellow (wax-yellow, R. XVI) with a light olive tinge; crissum, thighs, and under tail-coverts more strongly washed with brownish olive; axillaries light gray with yellowish edges, under wing-coverts gray with narrow yellowish-olive edges; inner edges of wing-feathers whitish or pale buff; outer edges of primaries olive-gray or drab; tail-feathers black, narrowly edged with olive.

ADULT FEMALE.—Similar to male, except in the coloration of head and throat; feathers of crown dark ash-gray, with darker centers and lighter edges; on nape slightly washed with olive; lores and ear-coverts chestnut-drab (R. XLVI); chin, cheeks, and upper throat whitish, some feathers with blackish shafts; lower throat and upper breast pale buffy gray (drab-gray).

IMMATURE MALE (first-year plumage).—Similar to adult female, but generally lighter.

JUVENAL (nestling).—All feathers very loose and fluffy; crown dark olive, ear-coverts duller; back rufous brown, somewhat mixed with olive; cinnamon nuchal collar indicated; chin whitish; throat mixed rufous, olive and grayish; rest of underside tawny; edges of wing- and tail-feathers olive-green.

Iris, brown, bill black, feet grayish brown.

Culmen 19–20, tarsus 24–25.

	WING	TAIL
15 ♂ ad.	91–95(93.2)	65–72(68.1)
4 ♂ imm.	87–90(88.5)	65–69(66.2)
14 ♀	86–91 ¹ (89.1)	64–68(66.3)

RANGE.—Mountains of Bougainville Island, Solomon Islands.

This interesting new form is named in honor of Mr. Guy Richards, who was a member of the party that so successfully explored the mountains of Bougainville Island.

This subspecies is at first glance very different from *implicata*, so that it might be regarded as a separate species by some other taxonomist. A closer examination of the two forms shows, however, that they are both representatives of one species.

Pachycephala pectoralis

RANGE.—From New Guinea westward to eastern Java,² Kalao tuah, Peling Island, and northern Moluccas, southward to Australia, Tasmania, and New Caledonia, eastward to Central Polynesia, and northward to the Solomon Islands, St. Matthias Island, and Admiralty Islands.

¹Once 94.

²The subspecies that live in the western part of the range have been listed by Rensch, 1931, Mitt. Zool. Mus. Berlin, XVII, p. 583.

Within this wide range the species has developed about seventy geographic forms and easily surpasses by this figure any other species of bird. The arrangement of so many representatives meets with various difficulties and cannot be accomplished satisfactorily. No two ornithologists would probably come to the same conclusions, working on this difficult group.

Although all these forms represent each other, they have been separated by earlier authors into about fifteen species, and apparently with good reason. We can distinguish certain groups of closely related forms, and other forms that stand more apart. However, there is much evidence to support the viewpoint that I present in this paper. These forms are not as distinct as they may appear, but they can all be regarded as subspecies of one species.

I advocated in earlier papers (Amer. Mus. Novit., Nos. 469 and 502) the use of superspecies to unite, into one group, representatives that are too different in their characters to be regarded as subspecies. The differences between some of the subspecies listed in the following discussions are just as striking, and I attempted, at first, to recognize one superspecies with several species. I abandoned this plan, however, as I did not succeed in outlining distinct species. All the forms are somehow connected with others, and any arrangement that regards some as species and some as subspecies would be artificial.

Some of the characters to which specific value has been attributed in the past are not as important as they seem. For example, Hartert, when he described *melanonota* regarded the black back as a specific character opposed to the olive back of *orioloides*. However, we find forms with a black back at several other places in the range of *P. pectoralis*, as for example in the Santa Cruz group and the Lau Archipelago (Fiji).

The adult males of *Pachycephala p. christophori* from San Cristobal (Solomon Islands) have sometimes a black, sometimes an olive crown.

The male of *P. p. sanfordi* from Malaita (Solomon Islands) has a very distinct appearance because of the lack of the black breast-band, but the female is rather similar to that of *cinnamomea*. The male of *cinnamomea* is practically indistinguishable from that of *orioloides*, but the females of the two forms differ more from each other than the females of *cinnamomea* and *sanfordi*. We have here the interesting case in which the wide gap between the male plumages of two forms is overbridged by the female plumage. The importance of the black breast-band is doubtful, anyhow, as in other species of birds we find it also much in-

fluenced by geographical variation.¹ Furthermore, we find in the Fiji group certain islands with intermediates, which will be discussed in my next paper.

The character of "hen-feathering in males" that I found in *feminina* from Rennell Island is less important than it appears at first sight. *Pachycephala pectoralis xanthoprocta* from Norfolk Island has also hen-feathered males. The tendency to have subspecies with hen-feathered males seems to exist in several genera, for example in *Cyornis*. I do not think that this character is sufficient to establish *feminina* as a distinct species, especially since *feminina* (♂ and ♀) is very similar to the females of *centralis*.

In cases of island-birds that differ greatly from each other, the argument is often brought forward that they would not hybridize should they come together somewhere. In the species *Pachycephala pectoralis* we have, however, two instances where two widely different forms meet on one island, and freely hybridize. *Pachycephala pectoralis whitneyi* Hartert is nothing but a hybrid population, and several of the Fiji subspecies are also hybrid populations. The evidence for this will be discussed in connection with these forms. Central Polynesia and the Solomon Islands were originally inhabited by yellow-throated thick-heads. However, by later immigration from the west, white-throated birds reached these regions and hybridized freely with the yellow-throated species on small islands where their influence would not entirely disappear in a large population of original inhabitants.

In *Pachycephala pectoralis* we find very commonly the phenomenon to which Hellmayr² recently drew attention: "In certain genera [of Formicariidæ] the females of nearly allied forms present well-marked characters, whereas the males are not or barely distinguishable from one another. Variation of this kind, for which I now propose the technical term heterogynism, is as a rule geographical. . . ." In the Solomon Islands as well as in the New Hebrides and Santa Cruz Islands live groups of closely allied subspecies that can not, or at least not as well, be defined in the males as in the females. If, under the term heterogynism, we include all the cases where taxonomic characters are more strongly pronounced in females than in males, we find that this phenomenon is not at all rare in birds.

The forms united by me as subspecies of *pectoralis* have rather unequal value, but I believe that the uniting of all these representatives

¹See Chapman, 1923, 'Mutation Among Birds in the Genus *Buarremon*.' Bull. Amer. Mus. Nat. Hist., XLVIII, pp. 243-278.

²Journ. f. Ornith., 1929, II, p. 41.

into one species is the most logical solution. I do not claim that it is the only one, and I am willing to accept any solution that is really an improvement of the classification proposed here.

The eleven subspecies from the Solomon Islands recognized by me belong to three groups:

- I.—Edges of wing-feathers of females olive; males without distinct nuchal collar, but throat yellow; crown and tail not deep glossy black; small.
christophori.
- II.—Very variable (hybrids); edges of wing-feathers of females olivaceous; males with distinct nuchal collar; throat yellow or white; crown and tail deep glossy black, small or large. *whitneyi*.
- III.—Edges of wing-feathers of females russet. 1.
 - 1.—Sexual dimorphism not present. *feminina*.
Sexual dimorphism present. 2.
 - 2.—Black breast-band in males not present. *sanfordi*.
Black breast-band in males present. 3.
 - 3.—Back of males black. *melanonota*.
Back of males olive. 4.
 - 4.—Length of wing in males below 100 mm. *centralis*.
Length of wing in males above 100 mm. 5.
 - 5.—Secondaries broadly edged with olive.
bougainvillei, orioloides, pavu, and cinnamomea.
Secondaries black. *melanoptera*.

Pachycephala pectoralis has been found in all parts of the Solomon Islands except on some smaller islands, as Ramos and Mono. It is found in the lowlands and on the mountains, but on some islands it is rather scarce in the lowlands, as on Bougainville and Malaita. In eight days of collecting at Buin, south Bougainville, we did not encounter this species. In western Choiseul, however, on the other side of Bougainville Strait, it was extremely common.

As I mentioned above, the form *whitneyi* is a hybrid between a white-throated and a yellow-throated *Pachycephala*. The white-throated form that is closest to *whitneyi*, geographically as well as in appearance, seems to be *Pachycephala pectoralis dahli* Reichenow. This subspecies was originally described from the Credner Islands, off the north coast of New Britain, but, according to Hartert,¹ it is also the form that occurs on Nissan. Considering the extreme localization in the subspecies of this bird, I am somewhat doubtful if the birds from Credner and Nissan Islands are really identical. Having no series from Credner Island, I content myself with describing my Nissan specimens.

¹1926, Nov. Zool., XXXIII, p. 46.

***Pachycephala pectoralis* cf. *dahli* Reichenow**

Pachycephala melanura dahli REICHENOW, 1897, Orn. Monatsb., V, p. 178, Credner Island, Bismarck Archipelago.

ADULT MALE (8 specimens).—Head and breast-band black; chin and throat white; rest of underside lemon-chrome; yellow nuchal collar narrow, but well developed; back light, yellowish olive, somewhat more olivaceous than sulphine yellow (R. IV); upper tail-coverts black with broad buffy-citrine edges; tail black, all feathers with narrow, pale olive tips, outermost tail-feather with a narrow pale olive edge; axillaries and under wing-coverts white with a pale yellowish tinge on the tips; wing-feathers black, inner edges whitish or pale cinnamon; outer edges of primaries pale gray near the base, pale cinnamon-gray nearer the tip; edges of secondaries pale olive-gray; lesser and median wing-coverts edged with the color of the back, greater wing-coverts edged with grayish olive; alula and primary-coverts black.

There is some individual variation: the yellow underneath is sometimes more lemon, sometimes more chrome; the upperside sometimes more olivaceous, sometimes more yellowish, and the cinnamon tinge on the gray edges of the primaries is sometimes more or less developed, but none of my eight specimens has any olive tones on the primaries.

ADULT FEMALE (3 specimens).—Crown ash-gray with a slight olive tinge and dusky shaft-streaks; chin and upper throat white with narrow grayish shaft-streaks and tips; lower throat buffy with broad grayish shaft-streaks; rest of underside breast, abdomen, and under tail-coverts lemon-chrome; sides of head hair-brown; upper back citrine-drab (R. XL), lower back brighter, more yellowish olive; upper tail-coverts brownish olive; basal part of tail-feathers brownish olive, lower part black with narrow, pale tips; wing-coverts and wing-feathers brownish black; wing-coverts edged with grayish olive; alula and primary-coverts with ash-gray edges; primaries with pale cinnamon, near the base pale cinnamon-gray edges; secondaries with pale cinnamon and olive edges; axillaries and under wing-coverts white with pale gray centers, and sometimes pale yellow tips.

■ FEMALE IMMATURE (1 specimen).—Similar to adult female, but less pigmented; bill brown, not black; belly pale yellow, with a buffy tinge; back dull olive-gray, tail brownish black.

Iris brown, bill black, feet grayish.

Culmen 19–21, tarsus 23–24.

	WING	TAIL	WEIGHT
8 ♂ ad.	89–94(91.5)	65–68(65.9)	27–32(29.1)
3 ♀ ad.	88, 88, 89	64, 64, 64,	27, 28, 29
1 ♀ imm.	86	61	26

RANGE.—Credner Island, Palikuru, and (fide Hartert) also Nissan.

The twelve specimens discussed above were collected by Hamlin and Mayr on Nissan Island in August 1929.

***Pachycephala pectoralis whitneyi* Hartert**

Pachycephala pectoralis whitneyi HARTERT, 1929, Amer. Mus. Novit., No. 364, p. 14, Whitney Island, west of Shortland Island, British Solomon Islands.

ADULT MALES.—Differ from the males of *dahli* (Nissan series) in the following points: the white throat has often an admixture of yellow, the yellow of the under

side is on the average richer, more orange, the black breast-band wider, the back darker olive, the edges of the secondaries (and primaries) are much more olive, and the inner edges of the wing-feathers pure white not buffy white. *Pachycephala pectoralis whitneyi* differs from *bougainvillei* in the following points: chin always whitish, not black; throat in most specimens mixed with whitish, edges of outer primaries more grayish, smaller of size, citrine edges of upper tail-coverts broader.

On account of the high variability of this "subspecies," it is necessary to describe all the nine adult males in the collection.

WHITNEY ISLAND (December 8 and 9, 1927).

No. 219997.—Throat white, a few yellowish feathers, abdomen pale lemon-yellow; edges of primaries grayish, upper tail-coverts black with broad olive edges.

No. 219998.—Throat pure white; abdomen golden yellow; basal edge of primaries partly mixed with olive; upper tail-coverts black with narrow citrine edges.

No. 219999 (type).—Throat (except for the white chin) yellowish; abdomen rich lemon-chrome; edges of inner primaries and basal part of edges of outer primaries olivaceous; upper tail-coverts with broad olive edges.

No. 222784.—Throat white, with three or four pale yellow feathers; abdomen lemon-yellow; edges of primaries strongly mixed with yellow.

MOMALUFU (December 10, 1927).

No. 219970.—Throat yellow, slightly paler than abdomen, chin whitish with a few blackish feathers; upper tail-coverts with narrow brownish-olive edges; lower part of outermost five primaries pale gray, upper part with olive.

No. 219971.—Throat pale lemon, distinctly paler than abdomen, white bases of feathers visible; chin whitish, upper tail-coverts with broad brownish-olive edges; lower part of some of the outermost primaries pale cinnamon-gray.

No. 222786 (molting from immature into adult plumage).—Throat white with yellowish tips on just a few feathers; some feathers on the middle of the throat with grayish tips; otherwise like No. 219971.

AKIKI (December 10, 1927).

No. 219977.—Throat yellow, paler than abdomen; chin whitish; edges of primary-coverts and primaries much mixed with olive; otherwise like No. 219971.

No. 222785.—Throat white, with broad pale yellow tips on the sides and in lower part; primary-coverts black; edges of primaries light gray, of secondaries grayish olive.

ADULT FEMALE.—Differ from *dahli* (Nissan series) in the following points: the crown is less grayish, more brownish olive, thus less contrasting against the back; the back is duller, more brownish olive, not so greenish olive; the central tail-feathers and broad edges on the outer tail-feathers are olive, whereas in *dahli* the distal part of the tail-feathers is blackish, and the basal part brownish olive. On the underside the yellow is less rich and less extended toward the breast; the buffy or buffy vinaceous breast-band is much broader than in *dahli*; the edges of the secondaries and wing-coverts are more brownish. Differs from the females of *P. p. bougainvillei* in the following points; back and rump purer olive, less brownish; crown grayish, not brownish olive; tail mixed with blackish, not entirely olive; edges of wing-feathers not rufous brown; throat and breast are colored differently from abdomen, while in *bougainvillei* throat, breast, and abdomen are more or less of the same color.

INDIVIDUAL VARIATION

WHITNEY ISLAND.

Four of the females are typical and agree more or less with the description Hartert gives (*op. cit.*, p. 15) (Nos. 220001, 220002, 220003, and 222787). Two specimens (Nos. 220000 and 220005) are very worn; the yellow of the belly is pale, and the grayish shaft-streaks of lower breast and flanks rather distinct; the buffy breast-band is bleached to a pale grayish-white; the upperside is very grayish. No. 220004 is like the four typical females, but the belly is pale yellow and rather heavily streaked.

AKIKI.

No. 222788.—A single female from Akiki is rather brownish on ear-coverts, crown and wings; breast and flanks are very heavily streaked; the specimen is worn and molting.

MOMALUFU.

No. 219972.—A female from Momalufu agrees in the coloration of the upperside with some of the typical birds although it is very dull and brownish; however, it is very different underneath, showing almost no traces of yellow on the belly, which is buffy; under tail-coverts yellowish buff; breast grayish-buff; ear-coverts rufous; secondaries and wing-coverts rather brownish.

		WING	TAIL	CULMEN
Whitney Island	4 ♂ ad.	89, 89.5, 92.5, 96	61, 65, 67	20, 20, 21
Momalufu Island	3 ♂ ad.	94, 97, 98	64, 68, 69	22, 22
Akiki Island	2 ♂ ad.	96, 103	70, 70	21, 22

It is remarkable that the birds with more yellow on the throat, that is, the birds that are more similar to *bougainvillei*, are also larger.

		WING	TAIL	CULMEN
Throat white	2 ♂	89, 89.5	61	20, 20
Throat whitish	2 ♂	92.5, 94	64, 65	21, 22
Throat yellowish	3 ♂	96, 96, 98	67, 68, 70	21, 22
Throat yellow	2 ♂	97, 103	69, 70	22

The linkage of characters is, however, not complete, as the specimens Nos. 219997 and 222785, with yellow on the throat, have the edges of the primaries grayer than any of the white-throated specimens.

		WING	TAIL	CULMEN
Whitney Island	7 ♀	87.5-92(89.6)	65-67(66.0)	19-20(19.4)
Momalufu Island	1 ♀	94	65	21
Akiki Island	1 ♀	96	67	

Tarsus in males 23-24; in females 22-23 mm.

RANGE.—Whitney Island, Momalufu, and Akiki. These three little islands, two and a half miles west of Shortland and eight and a half miles south of Bougainville, are apparently the entire range of this bird. However, it is possible that this form also occurs on other islands of

Bougainville Straits, as Hartert mentions a white-throated *Pachycephala* from Munia Island (Nov. Zool., XXXIII, p. 46).

I think in most cases it is not advisable to give a subspecific name to a hybrid population, but it may be defended in a case like that of *P. p. whitneyi*, where this population shows certain characters of its own and is isolated on an island or a group of islands.

The hybrid nature of *whitneyi* is proven by its high individual variation between both extremes, the characters of *dahli* and *bougainvillei*. The readiness with which the yellow-throated and the white-throated *Pachycephala* mix obliges us to include the *orioloides* group into the species *Pachycephala pectoralis*. The same phenomenon (hybridization of white-throated and yellow-throated *Pachycephala*) occurs also in the Fiji Islands and will be treated in my next paper.

P. orioloides group

Pachycephala pectoralis bougainvillei, new subspecies

TYPE.—No. 222852, Amer. Mus. Nat. Hist.; ♀ ad.; Bougainville Island, Solomon Islands; January 26, 1928; Drowne, Hamlin, and Richards.

ADULT MALE.—Almost perfectly like the males of *orioloides*, but in the average the lower belly more golden yellow, the back more citrine olive, and the black breast-band broader. These differences are only visible in the series.

ADULT FEMALE.—Differs from the females of *orioloides* by having almost no yellow tones on the underside, which is strongly washed with grayish; upperside also duller olive.

TYPE (adult female).—Upperside dull brownish-olive, more brownish on the crown, more olive on lower back and rump; upper tail-coverts and tail-feathers olive-citrine; scapulars washed with rufous; chin and upper throat whitish with narrow gray bars, lower cheeks with a yellowish wash; ear-coverts brownish; lower throat and breast pale (olive-) gray, feathers with yellowish edges and faint darker gray bars; flanks grayish, feathers with narrow yellowish edges; middle of lower belly yellowish; under tail-coverts yellow with gray centers; primaries, secondaries, and upper wing-coverts as in *orioloides* females, but axillaries and under wing-coverts whitish, not yellowish.

MALE IMMATURE (I. Phase; 4 specimens).—Wings brown, soft, wing-coverts very fluffy, first primary rounded; underside grayish, with pronounced shaft-streaks. In four specimens one is without any traces of yellow underneath, except for the yellowish under tail-coverts; two have yellowish cheeks and narrow yellow edges to all the feathers underneath; and one has the whole underside washed with pale lemon-yellow. The upperside varies greatly also: in one bird it is rufous brown with an olive tinge; in two birds it is olive with a rufous tinge; and in one grayish olive. The tail-feathers are narrow, soft, and strongly pointed. From the young males of *orioloides* they differ by the strong grayish wash of the underside, and by not being rich golden-yellow underneath and warm olive or rufous olive above; *bougainvillei* is, in females and young males, decidedly poorer in lipochromes.

MALE IMMATURE (II. Phase; 4 specimens).—Similar in coloration of the body plumage to the immature plumage (I. Phase), but generally with somewhat more lipochrome; thus the yellow wash of the underside is stronger and the olive of the upperside richer; wing- and tail-feathers approaching in their structure that of adult birds; the tail-feathers are broader and less pointed. The primaries pointed as in the adult bird, but still brown; in two of four specimens some of the secondaries are blackish with olive or brownish-olive edges, although undoubtedly belonging to the same generation of feathers as those with brown edges.

If the sexing done by the Whitney Expedition is correct, then there are apparently no definite differences between immature females and immature males (I. Phase), and between adult females and immature males (II. Phase), although the females have less lipochrome than most of the males. Two specimens (immature female and male) have practically no trace of yellow or olive on the underside and resemble in that respect females of *P. p. cinnamomea*. However, these two birds are much duller, darker, and less olive on the upperside than specimens of *cinnamomea*.

I described two types of plumages in immature males. One (I. Phase) is undoubtedly the normal immature plumage, but it is hard to say what the other immature plumage (II. Phase) is. The gonads are given as small or juvenal in all four birds, but the structure of wing- and tail-feathers is very much like in adult birds. Not all the birds of the two immature plumages are exactly like each other, and in a few specimens of this and the other Solomon Islands subspecies it is rather difficult to say to which phase they belong. I have no opportunity at present to go more into details, but apparently these two plumages have also to be treated in the chapter: "progressive" and "retarded" plumages.¹ Some of these birds in "immature" plumage (II. Phase) are apparently adult (retarded plumage) (see p. 13).

I was not able to find the nestling plumage of this subspecies; but admixture of brown tints does not always seem to be a sign of greater immaturity, although, on the average, younger birds have more brownish in the plumage.

The larger size of the Bougainville specimens may be due to the fact that most of them were collected in the mountains, while the Buka and Shortland birds were taken in the lowlands. During eight days of collecting in the plains of southern Bougainville (Buin), we did not meet a single *Pachycephala*.

The only adult female from Shortland Island is distinctly streaked on the underside, more than the Bougainville female and most of the

¹See also Mayr, 1931, Amer. Mus. Novit., No. 504, p. 7.

immature males, and approaches in that respect *orioloides* females from Choiseul. This one is, however, more grayish and much less yellowish on the underside than Choiseul birds.

		WING	TAIL
Buka	4 ♂ ad.	98-105(101.8)	69-74(71.8)
Bougainville	15 ♂ ad.	102-108(104.0)	70-77(73.8)
Shortland	5 ♂ ad.	100-105(102.0)	67-75(71.1)
Bougainville	4 ♂ imm. (II. Phase)	96-101(99.2)	71-73(72.2)
Bougainville	4 ♂ imm. (I. Phase)	94-101(97.5)	71-74(72.6)
Bougainville	1 ♀ ad. (type)	99.5	72
Shortland	1 ♀ ad.	99	69
Shortland	1 ♀ imm.	96	73
Bougainville	1 ♀ imm.	94	68

Culmen (adult males), 22-24, tarsus 23-25.

RANGE.—Buka, Bougainville, and Shortland Islands, Solomon Islands

Pachycephala pectoralis orioloides Pucheran

Pachycephala orioloides PUCHERAN, 1853, 'Voy. Pôle Sud,' Zool., III, p. 57, "fles Salomon (San Jorge)," based, *op. cit.*, Atlas Zool., Pl. v, fig. 3 (pie grièche loriot).

Pachycephala astrolabi BONAPARTE, 1851, Cons. Gen. Av., I, p. 329 (*nomen nudum*).

ADULT MALE.—Head (forehead, crown, hind neck, lores, chin, and ear-coverts) and broad throat-band black; upper throat, narrow nuchal band, breast, abdomen, and under tail-coverts bright golden-yellow; back, scapulars, rump, and edges of upper tail-coverts and upper wing-coverts citrine olive; wings and tail blackish; tips of tail-feathers and narrow edge on outermost tail-feather pale olive; edges of alula, primary-coverts, and most wing-feathers olive; whole edge of the first two primaries and lower part of the edge of primaries three to six grayish; axillaries and lesser under wing-coverts yellow.

Individual variation occurs mainly in the following characters: width of yellow nuchal and black throat-bands, tinge of olive on the back, size of the black spot on the chin, and color of the edges of the primaries. The gray edges of the primaries and some of the secondaries are strongly washed with brownish in a few specimens. In one specimen the feathers of the black breast-band are broadly edged with yellow, and in another one several feathers of the crown are partly black and partly olive-brown.

IMMATURE MALES (I. Phase).—Upperside olive, duller and more brownish on crown, pure on rump; yellowish-olive nuchal collar scarcely indicated; fore-back and scapulars more or less mixed with rufous brown; ear-coverts rufous; lores and circumocular feathers yellowish buff; underside golden yellow, on the sides of the throat, on breast and flanks more or less strongly mixed with rufous brown; (in one specimen from Choiseul the feathers of the underside have grayish-olive shaft-streaks). Axillaries and under wing-coverts yellowish white to rufous olive; tail-feathers dull olive, strongly pointed with buffy tips; edges of wing-feathers and wing-coverts rufous brown, slightly mixed with olive on lesser and middle wing-coverts

and on the outermost primaries; wing-coverts very soft, first primary rounded; bill dark brown.

IMMATURE MALES (II. Phase).—Structure and consistency of plumage very much as in adult birds; almost no rufous on back and underside; a few black or blackish feathers on crown and breast; tail-feathers either brownish olive, or dull olive, or partly black partly olive; edges of wing-feathers and wing-coverts very varying, some feathers rufous brown, some olive, some mixed. Bill dark brown. In some of these birds which are molting their wing-feathers, it can be seen that this plumage is a retarded second-year plumage. I doubt, however, if all individuals need three molts to acquire the fully adult dress.

ADULT FEMALES.—Very variable. Upperside dull olive to brownish olive; underside yellow, paler on throat; breast and flanks often washed with olive; breast, flanks, and under tail-coverts in some specimens washed with rufous; feathers of underside in some of the Choiseul specimens with indistinct grayish-olive shaft-streaks; tail brownish olive; wing-feathers blackish brown; edges of wing-feathers and wing-coverts generally russet, only some of the lesser wing-coverts edged with russet and olive; the outermost primaries pale russet with a tinge of olive-cinnamon.

IMMATURE FEMALES.—Tail-feathers pointed, first primary rounded; wing-feathers loose and fluffy; otherwise no definite difference from the adult female. A few specimens are somewhat intermediate in the characters of wing and tail between immature and adult birds.

		WING	TAIL	WEIGHT
Choiseul	21 ♂ ad.	100-106(102.9)	68-74(71.8)	46-55(49.9)
Choiseul	4 ♂ imm. (II. Phase)	101-104(101.8)	71-73(72.5)	47
Choiseul	4 ♂ imm. (I. Phase)	97-98(97.8)	72-74(73.2)	43, 48
Choiseul	13 ♀ ad.	96-102(98.6)	66-73(69.8)	42, 44, 50
Choiseul	6 ♀ imm.	91-98(95.3)	66-73(72.0)	
Ysabel	7 ♂ ad.	103-108(105.7)	71-76(74.0)	
Ysabel	6 ♀ ad.	94-104(98.9)	66-74(68.7)	
Florida	7 ♂ ad.	105-111(107.9)	72-79(76.3)	
Florida	1 ♀ ad.	101	73	

RANGE.—Choiseul, Molakobi, Ysabel, and Florida, British Solomon Islands.

This subspecies is, in the plumage of the adult male, practically indistinguishable from *P. p. bougainvillei* and *P. p. cinnamomea*. Heterogynism, however, makes a satisfactory classification possible. The characters of one adult female and two immature males prove that Florida birds belong to *orioloides*. A series of females and immature males from Choiseul does not agree entirely with a typical series from Ysabel. Choiseul birds show a tendency toward *bougainvillei* by having breast and flanks often distinctly streaked, or with an olive wash. Furthermore, Choiseul birds have less often than Ysabel birds a russet wash on back and breast.

***Pachycephala pectoralis cinnamomea* (Ramsay)**

Pseudorectes cinnamomeum RAMSAY, 1879 (June 5), Nature, p. 125, Guadalcanar [Guadalcanar], British Solomon Islands.

ADULT MALE.—Indistinguishable from that of *Pachycephala pectoralis oriolooides*.

ADULT FEMALE.—Very different from the females of *oriolooides* and *pavuvu*; underside very light, buffy, only faintly tinged with yellow; breast and flanks with pale grayish streaks and more or less washed with cinnamon or pale russet; under tail-coverts and thighs pale yellow, strongly contrasting with the whitish belly; upperside also poor on lipochromes, dull grayish-olive, in most specimens heavily washed with rufous; edges of wing-coverts and wing-feathers lighter rufous than in *oriolooides*, and primaries with almost no olive tinge; axillaries (grayish) white, sometimes with pale yellow tips; feathers on bend of wing pale yellow.

IMMATURE MALES.—Three of the five immature males are (except for the usual juvenal characters of feather structure) very similar to adult females; they differ only by being somewhat more distinctly streaked underneath, and by being purer (less rufous) olive on the upperside. However, two other immature males have the underside strongly washed with pale lemon-yellow, and the upperside much richer olive, similar to that of adult females of *pavuvu*. Both specimens show all the characters of immature birds, such as pointed tail-feathers, rounded first primaries, and fluffy wing-coverts.

IMMATURE FEMALES (5 specimens).—Similar to adult females, but very conspicuously washed with russet on the upperside; underside whitish in two specimens, pale yellowish in three; breast (and flanks) washed with light rufous, under tail-coverts yellow.

Culmen 22, tarsus 24–26 (in adult males).

	WING	TAIL
19 ♂ ad.	102–110(105.3)	74–81(77.9)
5 ♂ imm.	99–101(100.2)	78–81(79.4)
7 ♀ ad.	97–103(100.1)	72–76(74.0)
5 ♀ imm.	94–101(97.0)	72–80(75.0)

RANGE.—Guadalcanar and Beagle Island, British Solomon Islands.

The female of this form was described by Ramsay, in Nature, 1879, as a species distinct from *Pachycephala oriolooides*, with the words, “of a rich cinnamon colour, with whitish throat, yellow crissum and ochre-yellow under tail-coverts.” In the final report on the Cockerell collection the “new species” is omitted, as the author apparently in the meantime had recognized the specimens as the females of *P. oriolooides*. However, the splendid material of the Whitney Expedition shows clearly that the females from Guadalcanar are entirely different from typical *oriolooides* females, and Ramsay’s name must be used for the newly distinguished Guadalcanar form.

***Pachycephala pectoralis pavuvu*, new subspecies**

TYPE.—No. 218101, Amer. Mus. Nat. Hist.; ♀ ad.; Banika Island, Pavuvu or Russel group, British Solomon Islands; Aug. 1, 1927; R. H. Beck and F. P. Drowne.

MALE ADULT.—Very similar to *orioloides*, but back on the average lighter olive; upper tail-coverts more broadly edged with olive, and tail-feathers in most specimens with yellow bases.

FEMALE ADULT.—Similar to the female of *orioloides* (Ysabel), but bill yellow, not brownish; yellow of underside paler, no specimen strongly washed with russet; olive or rufous olive of upperside much lighter; russet on edges of wing-feathers and wing-coverts also much lighter, more cinnamon, strongly washed with olive, especially on the lesser coverts and on the primaries.

The same differences (yellow bill, paler yellow underparts, a lighter upper surface, and more cinnamon-olive in the wing) distinguish the immature birds from those of *orioloides*.

	WING	TAIL
14 ♂ ad.	104-108(105.9)	69-75(71.5)
6 ♂ imm.	101-108	70-75
13 ♀ ad.	99-103(100.8)	65-70(67.9)
7 ♀ imm.	94-98	65-73

RANGE.—Banika, Pavuvu, and Moie, Pavuvu or Russel group, British Solomon Islands.

The four subspecies described above (*bougainvillei*, *orioloides*, *cinnamomea*, and *pavuvu*) form the *orioloides* group, characterized by heterogynism. The males are practically indistinguishable, while the females show well-developed subspecific characters.

In the central group of the Solomon Islands live three subspecies which are well characterized in both sexes.

***Pachycephala pectoralis centralis*, new subspecies**

TYPE.—No. 222899, Amer. Mus. Nat. Hist.; ♀ ad.; Vangunu Island, central Solomon Islands; July 26, 1928; Hannibal Hamlin.

ADULT MALE.—Similar to the male of *orioloides*, but smaller; back more greenish, less olive; yellow nuchal collar narrower, often almost obsolete.

ADULT FEMALE.—On the underside pale yellow, similar to the females of *pavuvu*, but throat in most specimens whitish; breast and flanks washed with olive; upperside much darker than in *pavuvu* and even darker than in *orioloides*; back dark greenish-olive, head more rufous or brownish, in most specimens strongly contrasting against the back; no indication of a light nuchal band as in *pavuvu* and *orioloides*; wing similar to that of *pavuvu*, the edges of the primaries also strongly washed with olive; very variable in coloration; size small; bill yellowish brown.

Two females are somewhat abnormally colored; one (No. 226363) is rather rich yellow underneath, and has the plumage much mixed with rufous (on head, throat, back, and wings); the other (No. 222903) has very little lipochrome on the underside, which is conspicuously streaked with grayish olive; the lower belly is washed with rufous, and the wings and tail are dark rufous-brown.

IMMATURE MALE (I. Phase).—Very similar to adult female but on the average paler underneath and more distinctly streaked on breast and flanks; above a shade darker; more greenish, less rufous or brownish on the crown.

IMMATURE MALE (II. Phase).—All stages of plumage between that of a typical immature and that of an adult bird are represented. As in most cases the bill is black, wing and tail have the shape as in adults, and the gonads are indicated as large. I assume that all these birds are adults in retarded plumage.

IMMATURE FEMALE.—Similar to adult females, but lighter above and below.

Culmen 22-23, tarsus 24-25 (in adult males).

		WING	TAIL
Vangunu	12 ♂ ad.	94-99(95.9)	65-73(69.5)
Gatukai	8 ♂ ad.	96-98(96.7)	66-71(69.4)
New Georgia	15 ♂ ad.	90-98(94.6)	64-71(67.6)
Kulambangra	6 ♂ ad.	96-104(99.2)	68-74(71.5)
From the four islands	4 ♂ imm. (I. Phase)	91-94(93.0)	66, 66, 70
	18 ♀ ad.	89-96(92.3)	64-70(67.0)
	3 ♀ imm.	89, 90, 91	65, 68, 68

RANGE.—Eastern part of the central Solomon Islands (Kulambangra, New Georgia, Vangunu, and Gatukai).

Pachycephala pectoralis melanonota Hartert

Pachycephala melanonota HARTERT, 1908, Bull. Brit. Orn. Club, XXI, p. 106, Vella Lavella Island, British Solomon Islands.

ADULT MALE.—Upperside, wings, tail, sides of head, chin, and very broad breast-band black; throat, abdomen, and under tail-coverts golden yellow.

The other plumages of this subspecies are rather puzzling, as has been remarked already by Hartert (1929, Amer. Mus. Novit., No. 364, p. 15). Before I express my opinion about the probable sequence of plumages, I will give a short description of the twelve specimens of this subspecies in the Whitney Collection that are not adult males.

VELLA LAVELLA (6 specimens).

No. 222986 (sexed by Dr. Drowne as female with swelling ovary). Upperside blackish, feathers on hind neck with narrow olive-rusty edges; rump (blackish) olive, upper tail-coverts dark rusty; lores and circumocular feathers yellowish buff; ear-coverts and narrow superciliary stripe dark russet; chin and throat lemon-chrome, feathers with faint blackish shaft-streaks, which are more pronounced on cheeks and lower throat; narrow black breast-band; sides of breast blackish yellow; abdomen and under tail-coverts lemon-chrome with a few narrow shaft-streaks, scapulars, lower and middle wing-coverts, and basal edges of secondaries black; other wing-feathers dusky with dark rufous-brown edges; tail brownish olive; maxilla blackish, mandible horn-colored.

No. 222987 (sexed by R. H. Beck as female with swelling ovary). Similar to preceding, but still more blackish; black breast-band broad, ear-coverts blackish brown; bases of feathers on flanks blackish.

No. 222990 (sexed by R. H. Beck as female with small ovary). Crown, ear-coverts and hind neck russet; back dark greenish-olive, with a brownish tinge and indistinct blackish spots; upper tail-coverts cinnamon with blackish centers; tail dull olive; underside lemon-chrome; throat paler, breast-feathers with faint blackish bars, wing-feathers and wing-coverts with rufous-brown edges.

No. 222988 (sexed by R. H. Beck as female with small ovary). Similar to preceding, but whole back and underside strongly washed with rufous; yellow of the amber-brown underside visible only on the bases of the feathers and in the middle of the abdomen. Blackish marks on back and breast missing.

No. 219993 (sexed by R. H. Beck as male with small testes). Very similar to No. 222990, but back and tail more brownish; underside deeper yellow; fine blackish bars on throat and breast more distinct.

No. 222989 (sexed by Polynesian assistant as male with small testes). Similar to No. 219993, but still more washed with rufous especially on throat, breast, and flanks; feathers of wing and tail obviously immature.

GANONGA (6 specimens).

No. 222802 (sexed by R. H. Beck as female with rather large ovary). Somewhat similar to normal females from Vella Lavella, but pronounced olive-brownish breast-band; under tail-coverts rufous, rest of underside rich yellow, with faint olive staff-streaks, a slight rufous wash and olive flanks; crown rusty olive, not russet; back without blackish or russet; bill black.

No. 222801 (sexed by R. H. Beck as male with large testes). Feathers of upperside either black or olive or both; wing- and tail-feathers half black, half olive-brown; underside like No. 222986; ear-coverts blackish olive-brown, not russet; bill black.

No. 219987 (sexed by F. P. Drowne as juvenal male). Crown and hind neck (rufous) olive. Superciliary, ear-coverts and sides of neck russet; back and tail dull olive; rump brighter; underside (pale) yellow, all feathers with dusky centers, more pronounced on the breast; these grayish centers make the whole underside look somewhat olivaceous; edges of wing-coverts and wing-feathers brownish, more brownish olive on lesser wing-coverts and primaries.

No. 219985, 219986 (both sexed as juv. males) and No. 219988 (sex doubtful). Very similar to No. 219987, but No. 219985 has still the remainder of the nestling plumage in form of rufous feathers on the sides of the throat, on the hind neck and on the under tail-coverts.

The female (Meek Coll.) described by Hartert (in Amer. Mus. Novit., No. 364, p. 15) seems to connect somewhat the two female plumages. We probably have to consider these females with blackish breast-band and back as melanistic specimens. Complete melanism is shown by the adult male No. 329088, in which the entire plumage is black.

In my opinion the plumages of *melanonota* that I described above, and also the plumages from the Meek Collection mentioned by E. Hartert, can be divided into the following groups.

I.—Adult males.

II.—Immature males (II. Phase): No. 222801.

III.—Immature males (I. Phase): Nos. 219993, 222983, 219985–219988.

IV.—Adult females (normal coloration): Nos. 222988, 222990, 222802.

V.—Adult females (melanistic): Nos. 222986, 222987.

VI.—Immature females.

		WING	TAIL
Vella Lavella	7 ♂ ad.	95–101(98.0)	66–72(68.2)
	4 ♀ ad.	96–98(96.5)	68, 68, 69
	2 ♂ imm.	97, 97	69, 69
Ganonga	14 ♂ ad.	95–102(98.3)	67–74(69.9)
	1 ♀ ad.	93	68
	5 ♂ imm.	88–96(92.2)	67–70(68.4)

RANGE.—Vella Lavella and Ganonga, western part of the central Solomon Islands.

The birds from Ganonga do not perfectly agree with typical Vella Lavella birds. Several of the adult males have olive edges on the wing-feathers, the adult female and the immature males lack the russet crown, and the four immature males have a distinct olive pattern on the underside, lacking in typical birds. My material, however, is not sufficient to justify a separation of the Ganonga birds.

***Pachycephala pectoralis melanoptera*, new subspecies**

TYPE.—No. 226318, Amer. Mus. Nat. Hist.; ♂ ad.; Tetipari, central Solomon Islands; August 4, 1928; Hannibal Hamlin.

ADULT MALE.—Differs from *orioloides* by having the yellow nuchal collar indistinct; the back less olive, more greenish and often intermixed with blackish spots, the bill longer; and the wing of a different coloration. The wing is deep black, except the edges of the lesser upper wing-coverts, which are olive, and the edges of some of the primaries, which are grayish; in some specimens also the greater upper wing-coverts and a few of the innermost secondaries are narrowly edged with olive. Differs from *centralis* by its size and the color of the wing.

ADULT FEMALE.—On under- and upperside strongly washed with russet; in general style of coloration somewhat intermediate between female, No. 222988, of *melanonota* (see p. 17) and the females of *cinnamomea*. Bill black; crown rufous brown (argus brown, R. III); back rufous brown mixed with dull olive, especially on rump; upper tail-coverts and tail dull olive with rufous tinge; underside cinnamon-rufous mixed on abdomen with pale yellow; wing-feathers dusky edged with russet or olivaceous russet). Females from Rendova have the cinnamon-rufous of the underside more concentrated on the breast.

IMMATURE MALE.—Similar to adult female, but with less russet on back and abdomen.

Culmen 23–25, tarsus 25–26 (in adult males).

		WING	TAIL
Rendova	10 ♂ ad.	102-108(104.5)	69-77(73.7)
	4 ♀ ad.	97-101(98.8)	68-72(70.2)
Tetipari	13 ♂ ad.	104-109(106.3)	70-78(74.2)
	3 ♀ ad.	103, 103, 104	73, 75, 75

RANGE.—Rendova and Tetipari Islands, southern part of central Solomon Islands.

This very distinct subspecies is another proof of the endemic character of the bird-life of Rendova and Tetipari. Rendova is only two miles away from Rubiana (New Georgia group) and only five miles from the mainland of New Georgia, inhabited by *centralis*. This illustrates the sedentary character of the members of this species.

The revision of the forms of *Pachycephala pectoralis* in the Solomon Islands and in the Santa Cruz group enables me now to give a more definite statement concerning the relationship of *Pachycephala feminina*. I found, somewhat to my surprise that both sexes of *feminina* are very similar to the female of *centralis*, in fact, more similar than the females of any member of the *orioloides* group are to the females of *centralis*. There is no doubt in my mind that *feminina* has its next relative in *centralis*, and should, accordingly, in a classification, be arranged somewhere near it.

The phenomenon that *feminina* shows no sexual dimorphism does not prevent me from including it in the species *pectoralis* (see also p. 5). We know from experimental genetics that the factor of "hen-feathering in males" may be of small importance, caused by one or two genes only.

***Pachycephala pectoralis feminina* Mayr**

Pachycephala feminina MAYR, 1931, Amer. Mus. Novit., No. 486, p. 25.

RANGE.—Rennell Island.

For description and measurements see Novitates No. 486.

***Pachycephala pectoralis christophori* Tristram**

Pachycephala christophori TRISTRAM, 1879, Ibis, p. 441, Makira Harbour, San Cristobal Island, British Solomon Islands.

ADULT MALE.—Crown dark citrine, blackish-olive or entirely black; ear-coverts olivaceous cinnamon to black; underside lemon-yellow except for the black breast-band; feathers in lower and lateral part of black breast-band sometimes with yellow or olive tips; yellow of lower breast sometimes mixed with brownish; sides of neck yellow or light olive, forming an interrupted nuchal band; back, scapulars, edges of wing-coverts, secondaries and inner primaries, and tail, olive; tail-feathers in some

specimens more or less black, with olive edges and tips; edges of outermost primaries grayish or drab; bill black or dark brown.

IMMATURE MALE.—Similar to adult female, but wing-coverts and secondaries edged with russet; tail pointed. One specimen still has some of the loose feathers of the nestling plumage; they are rufous brown on ear-coverts, lower belly, and under tail-coverts, and brownish olive on crown and neck. Two males (one sexed as female) have wing and tail of adult birds, but only an indication of the black breast-band; they seem to correspond to the plumage I have described as immature plumage (II. Phase) in other subspecies of *pectoralis*.

ADULT FEMALE.—Upperside olive, sides of head more brownish; underside yellowish with more or less distinct olive breast band.

Culmen 21, tarsus 24–25 (in adult males).

		WING	TAIL	WEIGHT
San Cristobal	12 ♂ ad.	87–89(87.8)	59–61(60.2)	33, 35, 35
	7 ♀ ad.	84–90(86.1)	57–61(59.4)	33, 34
Santa Anna	6 ♂ ad.	87–90(88.5)	57–60(58.7)	34, 35, 35
	8 ♀ ad.	84–88(85.8)	55–59(56.8)	29, 32, 33

RANGE.—San Cristobal and Santa Anna, British Solomon Islands. From Ugi Island reported by Ramsay.

The individual variation in the coloration of the males of this species is very remarkable. In the original description the species is described as having the whole upperside olive. Meek, however, collected some specimens with the crown perfectly black (Hartert, 1929, Amer. Mus. Novit., No. 364, p. 15). In the fourteen adult males from San Cristobal that I have at hand, three have the crown citrine-olive and the ear-coverts cinnamon, two have crown and ear-coverts entirely black, while the other nine birds show all the intermediate stages of melanization. All these birds were collected in the eastern part of the north coast (Star Harbour, Wanoni Bay, and Kira-Kira).

A series of six adult males from Santa Anna Island falls within the range of individual variation of the San Cristobal birds. However, these birds form a very uniform series. They all have the rufous-brown patch on the lower breast, and have the blackish color of the head reduced to the loreal region and a blackish tinge of the brownish ear-coverts. Females from Santa Anna are absolutely identical with those from San Cristobal.

This form is rather different from its representatives on the other islands of the Solomon group and usually has been regarded, therefore, as a distinct species. However, this bird does not differ from its representatives in its behavior.

***Pachycephala pectoralis sanfordi* Mayr**

Pachycephala sanfordi MAYR, 1931, Amer. Mus. Novit., No. 504, p. 22, Malaita Island.

RANGE.—Malaita Island, British Solomon Islands.

For description and measurements see American Museum Novitates No. 504.

I described this bird originally as a distinct species. However, since I make subspecies of all the representatives of *pectoralis*, *sanfordi* also has to be included. The male is very distinct indeed by having no black pectoral band; yet the female is rather similar to that of *cinnamomea*. It differs mainly by having almost no rufous or russet color on the upperside, which is more or less dull greenish-olive, and by having no rufous or buffy colors on the underside, which is distinctly streaked on throat, breast, and flanks.

I did not mention anything about the immature plumages of this subspecies in the original description, as I wanted to study these plumages first in the related forms. Besides a series of adult males and females, we collected two males that have more or less of the feather structure and coloration of adult birds, but have on crown, wings, and tail a coloration intermediate between those of immature and adult. They are probably adult birds in retarded plumage.

Another bird (No. 227336) is sexed as female with small ovary, and has the plumage characters of an adult bird, but combines in its coloration the characters of male and female. The underside is yellowish, except for some female feathers on throat, breast, flanks, and under tail-coverts; the back is dull greenish-olive like that of the females, but the crown and sides of the head are mixed with blackish; tail and wings blackish with olive or rufous-olive edges. The bird is probably a cock-feathered female.

A series of immature females shows that the immature female plumage is very much like that of the adult except for the juvenal wing and tail.

This concludes the forms of *Pachycephala* known from the Solomon Islands. However, I think it necessary to say a few words about a bird named *P. salomonis* by Oustalet¹ and described as follows:

Un autre spécimen, rapporté des îles Salomon par MM. Hombron et Jacquinot, appartient sans doute à la même espèce [*P. vanikorensis*]: il a précisément les mêmes dimensions; mais les bordures des pennes secondaires et des couvertures ont une teinte légèrement différente plus grisâtre et moins olivâtre; peut-être cependant est-ce une variété qu'on pourrait désigner sous le nom de *P. salomonis*.

¹Oustalet, 1877, 'Sur le genre *Pachycephala*,' Bull. Soc. Philomath., Paris, (6) XI, p. 95.

The locality, Solomon Islands, assigned to this species by Oustalet is undoubtedly wrong. The 'Astrolabe' Expedition which collected the specimen never stopped at the Solomon Islands.

Mr. Berlioz has very kindly given me extensive information concerning the type of *P. salomonis* which, I hope, will somewhat facilitate the classification of this species.

Mr. Berlioz writes me that the type is a male which is rather similar to the males of *P. p. vanikorensis*, but has, as Oustalet correctly states, the edges of the wing-feathers grayish instead of olive. I have looked through the large series of *vanikorensis* in the American Museum and find very little variation in the color of the wing-feathers which always have olive edges. Furthermore, the type of *salomonis* is, according to Berlioz, deeper yellow underneath, more yellowish olive than dark olive on the back, and slightly larger. Mr. Berlioz suggests, therefore, that *P. salomonis* is perhaps identical with *P. p. dahli* Reichenow, which differs from *vanikorensis* in the same characters. A series of males of *vanikorensis* have a wing-length of 85–87 mm., while I find that *dahli* has a wing-length of 89–94 mm. The possibility that *salomonis* is the same as *dahli* is strengthened by the fact that the 'Astrolabe' Expedition collected on New Ireland. However, considering the great number of very similar subspecies of *P. pectoralis*, some of which can not be distinguished at all in the male sex, it would be hazardous to synonymize *P. p. dahli* Reichenow with *P. salomonis*, a bird without locality. *P. salomonis* will have to be put in the list of unidentifiable species.