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# BIRDS COLLECTED DURING THE WHITNEY SOUTH SEA EXPEDITION. XII<sup>1</sup>

#### NOTES ON HALCYON CHLORIS AND SOME OF ITS SUBSPECIES

#### By Ernst Mayr

In spite of several recent papers dealing with this species, we are still far from understanding thoroughly its geographical variation. While endeavoring to classify the specimens collected by the Whitney South Sea Expedition on Rennell Island, I was forced to review all the eastern subspecies (New Hebrides, Banks, and Santa Cruz groups). Systematic work on this group of kingfishers is greatly handicapped by extreme individual variation within the species, which is well demonstrated in the large series at my disposal.

Wiglesworth, in his very useful compilation of the Polynesian birds ('Aves Polynesiæ,' 1891, p. 14), records not less than three species of white-collared kingfisher (*H. sancta, chloris,* and *juliæ*) from the New Hebrides and remarks very truly: "All this is very suggestive of one highly variable species." Oberholser, in his review of the species (1919, Proc. U. S. Nat. Mus., LV, pp. 351–395), unfortunately overlooked this possibility completely, and gave the kingfisher of the New Hebrides a new name, believing that *Halcyon chloris* and *juliæ* were two distinct species. As there is still much uncertainty about the final arrangement of *H. chloris* and its allies, I shall attempt to outline the real relationship of this species.

Halcyon chloris has an extremely wide range, extending from Africa (H. c. abyssinica)<sup>2</sup> eastward to Polynesia. All over this range the species tends to develop numerous subspecies that are sometimes so different from the usual type of the species that they have not been thus far understood. The birds at the outposts, especially at the periphery of distribution, show advanced characters that lead to pronounced differences in appearance. To be able to reach definite zoögeographical conclusions, it is therefore necessary to review all the related forms.

<sup>&</sup>lt;sup>1</sup>Previous papers in this series comprise American Museum Novitates, Nos. 115, 124, 149, 322, 337, 350, 356, 364, 365, 370, and 419.

<sup>2</sup>Halcyon (from ἡ ἀλκυών, the kingfisher, 'Iliad,' 9, p. 563) is feminine.

### Superspecies Halcyon chloris

Rensch¹ has recently introduced into ornithology the term "Arten-kreis," for a systematic unit that was called "Formengruppe," "Arten-gruppe," etc., by several earlier German authors. As there is just about as much difference between Artenkreis and species as there is between species and subspecies, I propose for Artenkreis the more convenient term, Superspecies. I define superspecies as a systematic unit containing geographically representative species that have developed characters too distinct to permit the birds to be regarded as subspecies of one species.

It is quite possible that the use of superspecies will not be necessary in the far distant future, after the theories of heredity have found a wider application in ornithology, but for the time being I regard superspecies as a convenient compromise between diverse schools of ornithologists, the extremely modern ones, on one side, who want to put together as a species all geographical representatives, disregarding the most striking morphological differences, and the conservatives, on the other side, who demand perfect intergradation as a criterion.

The normal (and perhaps most primitive) pattern of coloration in *H. chloris* is that of the type-subspecies which has a white supraloral spot, and sometimes white feathers on the superciliary and in the nape. There is a tendency in the eastern forms to enlarge the area of these white markings. In some cases the white spot in the nape becomes very large and conspicuous (as in nusæ); in other cases (as in juliæ and sacra) the superciliary stripe widens and gains in length until it touches the supraloral spot and joins in the nape with the stripe of the other side. These forms have been called subspecies by most of the modern authors, but the representatives of *Halcyon chloris* that show a still further development of this tendency have been put in the wrong place. There are three species, *Halcyon pealei*, *H. matthiæ*, and *H. owstoni*, that show still more white on the pileum, so that there are left, only on the center of the crown, patches of black or greenish-blue feathers. The limit of this line of evolution is *Halcyon albicilla*, which has a pure white crown.

Stresemann (1923, Arch. f. Naturg., LXXXIX, A. 8, p. 39) considers saurophaga, admiralitatis, matthiæ, albicilla, and godeffroyi as subspecies of one species, and this arrangement has been left almost untouched in the latest reviews (Hartert, 1924, Nov. Zool., p. 277, and Mathews, 1927, 'Syst. Av. Australas.,' p. 376). Hartert, however, has proved that Halcyon matthiæ and Halcyon "albicilla" saurophaga occur

on the same island (Squally Isl.) and therefore cannot belong to one species. In my opinion, the forms reviewed by Stresemann belong to three different species: (1) Halcyon saurophaga (with admiralitatis); (2) superspecies chloris (with albicilla and matthix); and (3) godeffroyi, which belongs to the "Todirhamphus" group of Polynesian kingfishers. I do not suggest that Halcyon matthix, pealei, and albicilla are more closely related to each other than to Halcyon chloris (sensu strictione) but, on the contrary, I believe them to be independent, polytope expressions of the same latent tendency.

Halcyon sancta of Middle and South Australia quite apparently belongs to the same superspecies. I do not recall one record of sancta and chloris having been found breeding in the same area; although during the migration season Halcyon sancta occurs in wide parts of the range of Halcyon chloris.

The final arrangement of the superspecies *Halcyon chloris*, according to the previous remarks, is:

Halcyon chloris (from Abyssinia over India, Andaman and Nicobar Islands, Sunda Islands, Moluccas, North Australia, New Guinea, Bismarck Archipelago, Solomon Islands, New Hebrides to Fiji, Philippine Islands, and Pelew Islands).

 ${\it Halcyon\ sancta}$  (Middle and South Australia, Tasmania, New Zealand, New Caledonia).

Halcyon pealei (Samoa).

Halcyon matthix (St. Matthias and Squally Islands).

Halcyon owstoni (Southern Marianne Islands).

Halcyon albicilla (Northern Marianne Islands).

# Subspecies of *Halcyon chloris* in the New Hebrides, Banks Islands, and Santa Cruz Group

The following measurements are given in millimeters: the wings pressed against the ruler; the tail means the length of the central feathers; and the bill is measured from the anterior part of the nostril to the tip. For comparison of colors I have used only freshly molted specimens, because wear changes the colors completely. The rusty or buff tinge of underside and superciliary fades, and these parts become almost pure white. On the upperside the greenish-blue color becomes blue by the abrasion of the phæomelanotic feather-tips which are responsible for the green tinge. The molt seems to take place from March to May.

To simplify the descriptions I introduce the following terms which are herewith described:

RINGBAND.—The white, or rust-colored band which encircles the pileum, beginning at the supraloral spot, passing the eyebrow to meet the band of the other side at the nape.

NUCHAL BAND.—The black or bluish-black band beginning at the cheeks, passing the ear-coverts to join the band of the other side, forming a black collar.

Collar.—The white or rust-stained band on the hind-neck, connecting both sides of the neck.

These three bands are very important, as they show considerable individual and geographic variation.

I have material before me of more than 200 skins from eastern Melanesia, but unfortunately no specimens from the three southern islands of the New Hebrides. The conclusions concerning these islands are based on the study of the literature and are, therefore, only approximately correct.

### Halcyon chloris subspecies

Dacelo grayi Schlegel, 1863, 'Mus. Pays Bas,' III, Alced., p. 37 [nec Sauropatis grayi Cabanis and Heine, 1860 = Halcyon chloris grayi (C. and H.)] ("dans les Nouvelles Hébrides," terra typica restricta: Aneiteum).

Schlegel's description is based on two specimens from Aneiteum. He states that a third specimen he had from the New Hebrides [without exact locality, but perhaps from Tanna] was rust-colored underneath, and thus different from his typical grayi.

I do not name the Aneiteum subspecies, as it seems to be indistinguishable from typical *julix*. Only the distribution keeps me, for the present, from uniting it immediately with *julix*.

DISTRIBUTION.—Aneiteum (? Eromanga).

## Halcyon chloris tannensis Sharpe

Halcyon tannensis Sharpe, 1892, 'Cat. Birds, B. M.,' XVII, p. 266 (terra typica: Tanna Island, New Hebrides).

According to Sharpe's description this subspecies is fulvous to orange-buff underneath.

The measurements of the type specimen are: wing, 95; tail, 68; culmen, 43.

DISTRIBUTION.—Tanna Island, New Hebrides.

## Halcyon chloris juliæ (Heine)

Sauropatis juliæ Heine, 1860, Journ. f. Ornith., VIII, p. 184 ("In insul. novis Hebridis (Frank)") [terra typica restricta: Havannah Harbor, Efate (Vaté)].

Nec Sauropatis chloris hyperpontia Oberholser, 1919, Proc. U. S. Nat. Museum, LV, p. 386 (Havannah Harbor, Vaté Isl.).

MALE ADULT.—Pileum, back and scapulars jasper-green<sup>1</sup> (Ridgway, 33); wing-coverts, wing-feathers, rump and tail blue (in various shades); upper cheeks, ear-

<sup>&</sup>lt;sup>1</sup>All the bluish and greenish colors of these kingfishers are described as seen with the light. These colors are of a somewhat prismatic nature; they change considerably with the angle of light, are extremely difficult to describe, and never match exactly the colors in Ridgway's tables.

coverts and nuchal band black with a distinct tinge of bluish green. The whole underside white, but lower cheeks, sides of breast, axillaries, under wing-coverts, flanks, crissum and under tail-coverts sometimes light buff. The ringband is wide, dull ochraceous-orange more or less mixed with white, the collar is white with some buff feather-tips. The feathers of the side of the breast have black edges in freshly molted specimens.

There is great variation in the bluish tinge of the pileum, back, and nuchal band, in the buff tinge of the underside and of the ringband, and in the width of ringband, nuchal band and collar. In some cases the ringband is partially obsolete.

FEMALE ADULT.—Similar to the male, but pileum light Danube-green (R. 32), back dusky olive-green (R. 41), ear-coverts and nuchal band black with a faint greenish tinge; ringband white, sometimes mixed with buff; underside white, feathers on the side of the breast with black edges. The color of pileum, back, ringband, ear-coverts, nuchal band and sides of the breast vary considerably.

Male Juvenal.—Similar to male adult, but color of the upperside very variable; feathers of forehead and wing-coverts edged with buff; lower cheeks, flanks, and under tail-coverts washed with buff; under wing-coverts ochraceous buff.

FEMALE JUVENAL.—Similar to adult, but color of the upperside very variable (from bluish green to brownish olive-green); feathers of forehead and wing-coverts edged with buff; ringband ochraceous buff, underside washed with light buff; flanks and under wing-coverts buff; feathers of the breast with dusky edges.

#### Measurements

		Wing	TAIL	Bill
Efate Isl.	$6\sigma^{\!\scriptscriptstyle{11}}$	96-100(97.8)	63-68(65.2)	34- 39( 35.4)
	5 ♀	93-102( 98.4)	62- 70( 65.8)	35- 39( 37)
Nguna Isl. (near Efate)	1♀	96	61	34
Leleppa Isl. (near Efate)	1♀	99	67	34
Makura Isl.	$2\sigma$	95-96	63- 64	34- 35
	1 🍳	96	67	36
Mai Isl.	$2\sigma$	95-97	64- 67	38
	6♀	96-101(98.5)	65-68(66.5)	33- 37( 35.8)
Tongoa Isl.	1♂	97	65	36
Epi Isl.	$2\sigma$	97- 99	67- 68	36
	1♀	98	63	36
Lopevi Isl.	1♂	98	65	33
Pauuma Isl.	1♂	99	63	34
	1♀	100	68	37
Ambrym Isl.	1 ♂	98	65	35
	4♀	99-103(100.5)	66-72(68)	35- 38( 36.8)
Pentecost Isl.	$2\sigma$	94- 98	64- 68	34- 35
(Aragh Aragh Isl.)				
Aoba Isl.	3♂	97–103( 99.7)	65- 68( 66.7)	<b>35</b> - <b>3</b> 6
	1♀	100	68	37
Malekula Isl.	6 రౌ	98-104(100.8)	65- 68( 66.2)	36- 37( 36.5)
	2♀	103	68- 70	37- 38

<sup>&</sup>lt;sup>1</sup>As males are slightly smaller than females, the measurements of males and females are given separately; only adult specimens are listed here.

The first kingfisher described from the New Hebrides was Sauropatis juliæ. Heine describes a young bird, and his description agrees perfectly with the series of young birds that I have before me. As the island of Efate (Vaté) has the most visited harbors of the group (Havannah Harbor and Port Fila), I restrict the terra typica of juliæ to Efate Island.

Halcyon chloris hyperpontia Oberholser (type examined) is apparently a synonym of sordida. It was described from a specimen from the Tristram Collection without original label, and the locality, "Havannah Harbour, Vaté," is undoubtedly wrong. The type agrees almost perfectly with specimens of sordida that I have seen.

Halcyon sancta has been recorded from the New Hebrides by some of the earlier ornithologists (cf. Wiglesworth, op. cit., p. 13) but in all these cases, apparently due to mistake (with Halcyon chloris subsp.), I cannot find one authentic or reliable record, and the Whitney South Sea Expedition, which has spent so much time in this group of islands, has not collected a single specimen of this conspicuous bird.

The range of *juliæ*, as outlined above, does not contain a perfectly uniform population. I have given the measurements of the birds from different islands separately, and it can be seen that the average size is larger on some islands (e.g., Malekula), on others smaller than on Efate.

The coloration, also, is not quite uniform, and I unite the birds from Pentecost and Aoba Islands only tentatively with *julia*, as the lighter and more bluish tinge on the upper side may be due to abrasion.

#### DATES OF COLLECTING

1926.—Efate (June, July, Dec.); Leleppa (Dec.); Nguna (July); Mau (July); Makura (July); Mai (July); Tongoa (July); Epi (Aug.); Malekula (Aug.); Lopevi (Aug.); Pauuma (Aug.); Ambrym (Aug., Dec.).

1927.—Pentecost (Jan.); Aoba (Jan.).

#### Halcyon chloris santoensis, new subspecies

Type.—No. 215610, Amer. Mus. Nat. Hist.; & ad.; Espiritu Santo Island, New Hebrides; September 3, 1926; R. H. Beck and J. G. Correia.

Subspecific Characters. Male Adult.—Similar to *julia*, but slightly larger, decidedly lighter, and more bluish on the pileum and back. The ringband is narrower and in some cases obsolete.

Female Adult.—Similar to julix female, but fore-back lighter, without blackish tone; the cheeks and nuchal band are usually more mixed with bluish green than in Efate females. The black edges of the feathers on the sides of the breast are less pronounced.

# Measurements

		Wing	TAIL .	Bill
NEW HEBRIDES GROUP				
Santo	11 ♂	97-104(100.5)	64-71(67.6)	36- 39( 37.4)
	5 ♀	98-104(101)	65-71(67.4)	36- 39( 37.8)
Dolphin	3♂	100-102(101)	68	36-39(37)
	1♀	103	69	37
BANKS GROUP				
Melapav	3♂	94-96(95.3)	63-65(64)	34- 36( 34.7)
Gaua	3 ♂	98-101( 99.6)	66-69(67.7)	37
•	1♀	96	66	<b>3</b> 6
Vanua Lava	3♂	92-97(94.7)	60-65(63)	33- 36( 34.3)
	1♀	95	66	34
Valua	3 ♂	95-100(97)	62-67(64.3)	32- 35( 33)
	1♀	99	67	32
Bligh	9♂	94-99(95.7)	62- 68( 65.6)	28-36(32.4)
	1♀	99	67	32

LOCALITIES.—Melapav Island (Meralav Isl.) (Sept. 1926); Gaua Isl. (Sept., Nov. 1926); Vanua Lava Isl. (Nov. 1926); Valua Isl. (Sept. 1926); Ureparapara Isl. (Bligh Isl.) (Nov. 1926).

Stresemann ('Nova Caledonia,' I, p. 74) was the first to point out the differences between the Santo Island form and other New Hebrides The differences in coloration between Santo and Efate specimens are very striking, but somewhat overbridged by specimens from various other islands of the group. The birds from Dolphin Island (near Santo) and from the Banks group are not quite so light and bluish as typical santoensis, but are certainly close to it. There is a great deal of variation in size, and the averages are different on every island. For example, the birds from Meralav Island (Banks group) are distinctly smaller than those from Santo, but the birds from the other islands of the Banks group are intermediate in size. Birds from Bligh Island have a very small bill. All this illustrates, again, the well-known fact that nature does not quite follow our ideas of systematic classification. It would be almost impossible to find two island populations that agree perfectly. However, it would lead too far to split up santoensis (as defined above) into a group of subspecies on account of the slight differences I have mentioned.

#### Halcyon chloris torresiana, new subspecies

Type.—No. 215636, Amer. Mus. Nat. Hist.;  $\sigma$  ad.; Hiu Island, Torres gro up November 3, 1926; R. H. Beck and J. G. Correia.

Subspecific Characters.—Similar to santoensis, but still brighter and more bluish above: subraloral spot small, ringband narrow and sometimes obsolete; ear-

coverts and nuchal band much more bluish (not bluish black as in santoensis and juliæ); white collar very wide; average size smaller than santoensis.

Males.—Supraloral spot and ringband very light, almost white; underside and flanks white.

FEMALES.—Much lighter and more brilliant green on the back, without a brown-ish-olive tinge as in *santoensis* females. The width of the ringband varies considerably in both sexes.

	Wing	TAIL	Bill
14♂	95-100(97.8)	61-69(65.2)	33-37(35.3)
8 ♀	93-101(97.5)	62-68(65.4)	35-38(36.6)

Localities.—Torres group (Nov. 1926); Toga, Lo, and Hiu Islands. There seem to be no differences between the birds of the various islands of the group. Some of the specimens are rather worn already, but the molting time seems to be from December to April.

#### Halcyon chloris subspecies

	Wing	TAIL	$\mathbf{B_{ILL}}$
$2\sigma$	94, 99	65, 67	32, 33
2♀	96, 98	65, 66	32, 35

Locality.—Tucopia Island (Feb. 1927).

These four specimens are so extremely worn that it is quite impossible to say anything about their systematic position. The males seem to be rather bluish and the underside slightly washed with buff.

#### Halcyon chloris melanodera, new subspecies

Type.—No. 213846, Amer. Mus. Nat. Hist.; & ad.; Vanikoro Island, Santa Cruz group; September 24, 1926; R. H. Beck and J. G. Correia.

Subspecific Characters.—Very blackish throughout and with a heavy bill; ear-coverts, nuchal band, the forehead and the tips of breast-feathers and under wing-coverts blackish; supraloral spot small; ringband almost obsolete.

Male.—Above slightly more greenish than santoensis, but not as much as julix. Female.—Above more bluish than santoensis, but not at all so bluish as torresiana.

	Wing	TAIL	$\mathbf{Bill}$
3♂	92-94(93.3)	62-65(63.3)	35-38(36.3)
3 ♀	95-97(96)	65-66(65.6)	37–38(37.6)

Locality.—Vanikoro Island (Oct. 1926).

#### Halcyon chloris utupuæ, new subspecies

Type.—No. 213853, Amer. Mus. Nat. Hist.; ♂ ad.; Utupua Island, Santa Cruz group; September 30, 1926; R. H. Beck and J. G. Correia.

Subspecific Characters.—The supraloral spots are very large and in some specimens meet in the middle of the forehead; the ringband, also, is very wide; the bill is large and heavy.

Males.—Except in the characters just mentioned, the males are rather similar to *santoensis*, but on the upperside not as bright; flanks and sides of the breast purer white; ringband very dark (pale amber-brown).

FEMALES.—On the upperside without the brownish-olive tinge of santoensis females, but not so bright bluish as torresiana; the green on the back very much like that of melanodera, but without any black.

JUVENAL.—Very narrow buff edges to the wing-coverts (as in melanodera).

	WING	TAIL	Bill
7♂	92-96(94.3)	60-67(63.7)	35-38 (36.7)
6♀	92-97(94.8)	59-68(63.5)	37-41 (38.8)

Locality.—Utupua Island, Santa Cruz group (Sept. 1926).

It is very interesting to find between Vanikoro Island and Santa Cruz Island (both of which have very peculiar forms) a subspecies that resembles, so much, santoensis from the New Hebrides.

#### Halcyon chloris ornata, new subspecies

Type.—No. 213870, Amer. Mus. Nat. Hist.; 👩 ad.; Santa Cruz Island, Santa Cruz group; October 18, 1926; R. H. Beck and J. G. Correia.

Subspecific Characters.—Bill long and strong.

Males.—While in all the subspecies hitherto mentioned the underside is white or whitish, in *ornata* the lower cheeks, collar, breast, belly, flanks, axillars and under wing-coverts are bright ochraceous. Throat and middle of belly are whitish, supraloral spots and ringband are pale amber-brown. The upperside is bright greenishblue, about as in *utupux*; supraloral spot large and ringband wide.

FEMALES.—Upper side similar to *utupuæ*, but brighter; collar blackish; ringband, axillars and under wing-coverts sometimes buff.

		Wing	TAIL	$\mathbf{Bill}$
Santa Cruz	8♂	94-101 (97.9)	64-68(66.5)	37-40(37.7)
	6♀	93-101(98.3)	64-70(67.3)	35-41(37.7)
Tinakula	1♂	97	66	<b>3</b> 8
	1 Ω	101	66	37

LOCALITIES.—Santa Cruz group: Santa Cruz Island (Oct. 1926 and Feb. 1927) and Tinakula Island (March, 1927).

The Tinakula specimens ( $1 \circlearrowleft$  ad.,  $1 \circlearrowleft$  ad. and  $3 \circlearrowleft$  juv.) are very worn, but they seem to agree with typical *ornata*.

#### Halcyon chloris brachyura, new subspecies

Type.—No. 215655, Amer. Mus. Nat. Hist.; on ad.; Fenualoa Island, Reef Islands or Swallow group; October 11, 1926; R. H. Beck and J. G. Correia.

Subspecific Characters.—Relatively short tail; while in males of *ornata* the tail-wing index is 66-70.2 (68), in *brachyura* it is 62.2-67.4 (64.7). The bill is small, the ringband narrow.

MALES.—Upperside brighter and more bluish than ornata, about as in santoensis; underside light buff, intensifying toward warm buff on the flanks and under wing-coverts; throat and middle of belly whitish; ringband and collar pale buff.

FEMALES.—Ringband, lower cheeks, collar, flanks and under wing-coverts very light buff, upperside slightly lighter than *ornata*.

	Wing	TAIL	Bill
7♂	92 - 98(96)	61 - 64(62)	32-36(34.3)
2♀	97, 98	63, 64	35, 35

Localities.—Reef Islands or Swallow group: Fenualoa Island and Lomlom Island (October 1926).

#### Halcyon chloris vicina, new subspecies

Type.—No. 215631, Amer. Mus. Nat. Hist.;  $\sigma$  ad.; Disappointment Island, Duff group; October 4, 1926; R. H. Beck and J. G. Correia.

Subspecific Characters.—Nearest to brachyura, but larger; tail relatively longer (index 66.3).

Males.—Underneath much lighter; just breast, lower cheeks, collar, flanks, and under wing-coverts with a light buff tinge. Supraloral spots and ringband wide, pale amber-brown, darker than in brachyura.

FEMALES.—More greenish above than brachyura; cheeks and nuchal band blackish; underside white.

	Wing	TAIL	$\mathbf{Bill}$
3♂	97-100(98.7)	64-67(65.3)	33-37(34.6)
2♀	99, 100	66, 66	35, 37

Locality.—Disappointment Island, Duff group (Oct. 1926).

#### Halcyon chloris amoena, new subspecies

Type.—No. 226435, Amer. Mus. Nat. Hist.;  $\circlearrowleft$  ad.; Rennell Island, British Solomon Isls.; May 21, 1930; H. Hamlin, W. F. Coultas and W. J. Eyerdam.

Subspecific Characters.—Smallest subspecies of *Halcyon chloris*. Supraloral spots small, ringband and collar narrow.

Males.—Bluish-green above, darker than santoensis; supraloral spots and ringband dark ochraceous-buff. Cheeks and auriculars bluish, nuchal band (bluish-) black; collar light buff; underside white, except sides of throat and breast, which are buff.

Females.—On the back jasper-green (R. 33), pileum more bluish; supraloral spots and ringband white; cheeks and anterior part of ear-coverts bluish green, nuchal band (greenish-) black.

JUVENAL.—Underneath whitish, buff edges of wing-coverts very narrow.

	Wing	TAIL	Bill
5♂	86-89(87.2)	58-59(58.6)	34-36(35.4)
2 ♀	89, 91	60, 65	36, 39

LOCALITY.—Rennell Island (British Solomon Isls.) (Aug. 1928), (May 1930).

Although Rennell Island politically belongs to the British Solomon Islands, zoögeographically it is a district for itself as I shall show in my paper on the Rennell Island birds. Its kingfisher has nothing to do with the kingfishers (solomonis and alberti) from the Solomon Islands, but it is related to those of the New Hebrides and Santa Cruz group.