

THE BIRDS
OF THE BELGIAN CONGO
PART II

THE BIRDS OF THE BELGIAN CONGO. PART II¹

BY JAMES P. CHAPIN

PLATE I (FRONTISPIECE); PLATES II TO XXI; TEXT FIGURES 1 TO 38

INTRODUCTION

This second volume on the avifauna of the Belgian Congo includes the families Rallidæ to Picidæ. It is expected that the Passeriformes will require two more volumes.

While bringing the manuscript up to date, I have had the privilege of spending ten months at the Musée du Congo Belge, where the Director, Dr. H. Schouteden, has aided me in every way to study its abundant ornithological collections. No other museum in the world has such a splendid representation of Congo birds. There I had the great good fortune to discover two mounted specimens of *Afropavo congensis*,² and this remarkable bird is figured in color as the frontispiece of the present volume. My gratitude to Dr. Schouteden is difficult to express in full. Unfailing support and encouragement in my work have been given by Dr. Frank M. Chapman.

All my other friends in the ornithological world have given me their fullest coöperation, willingly examining specimens under their charge, loaning them to me whenever required, and helping with valuable advice. I wish to express my appreciation of this assistance, and in particular that rendered me by Professor Erwin Stresemann, Dr. David A. Bannerman, Mr. J. Berlioz, Dr. Herbert Friedmann, Mr. J. L. Peters, Dr. Witmer Stone, Professor Oscar Neumann, Dr. Moriz Sassi, Count Nils Gyldenstolpe, Mr. W. W. Bowen, Mr. W. E. Clyde Todd, and Mr. John T. Zimmer.

To Miss Ruth M. Campbell and Mrs. Mary Gardner I am most deeply obliged for their efficient secretarial assistance, and Doctor Ernst Mayr and Mr. Charles E. O'Brien have aided me greatly by putting the Rothschild Collection at my disposition. To the Works Progress Administration I am also indebted for the very efficient help it provided.

The expense of printing the present volume has been borne by my good friend Charles W. Boise, who has helped me so generously in other ways, and especially in the investigation of the Congo peacock.

In order to economize space in the lists of references it has been neces-

¹ Scientific results of the Congo Expedition. Ornithology, No. 13.

² Chapin, 1936, Rev. Zool. Bot. Afr., XXIX, p. 2 (Sankuru district, Belg. Congo).

sary to omit most repetitions of place-names. Every locality in the Belgian Congo from which the species or race has been reported is mentioned, usually in connection with the reference where it first appeared. Subsequent mention of the same locality by the same or a different author is not noted, unless there be some special reason for so doing. Furthermore, the names of books and journals are cited in more abbreviated form than in Volume I. A list of the shorter abbreviations is as follows:

- Afr. Rep. Liberia Belg. Congo = The African Republic of Liberia and the Belgian Congo
 A. M. Journ. = American Museum Journal
 A. M. Nov. = American Museum Novitates
 Ann. Naturh. Hofmus. Wien = Annalen k. k. Naturhistorischen Hofmuseums, Wien
 Ann. Transvaal Mus. = Annals of the Transvaal Museum
 Atlas Vogelzug. = Atlas des Vogelzuges nach den Beringungsergebnissen bei palæarktischen Vögeln
 Birds Afr. = Birds of Africa
 Birds S. Afr. = Birds of South Africa
 Birds Trop. W. Afr. = Birds of Tropical West Africa
 Birds W. Afr. = Birds of Western Africa
 B. B. O. C. = Bulletin of the British Ornithologists' Club
 Bull. A. M. N. H. = Bulletin of the American Museum of Natural History
 Bull. C. Z. C. = Bulletin du Cercle Zoologique Congolais (published in *Rev. Z. A.*, with separate pagination)
 Bull. M. C. Z. = Bulletin of the Museum of Comparative Zoölogy
 Check-List = Check-List of the Birds of the World
 C. R. Acad. = Comptes-Rendus de l'Académie
 Emin Pasha Centr. Afr. = Emin Pasha in Central Africa
 Journ. E. Afr. Ug. N. H. Soc. = Journal of the East Africa and Uganda Natural History Society
 Journ. Ecology = Journal of Ecology
 J. f. O. = Journal für Ornithologie
 Journ. Linn. Soc. Lond., Zoöl. = Journal of the Linnaean Society of London, Zoölogy
 K. Svenska Vet. Akad. Handl. = Kungl. Svenska Vetenskapsakademiens Handlingar, Stockholm
 Narr. Exp. R. Zaire = Narrative of an Expedition to Explore the River Zaire
 Nov. Zool. = Novitates Zoologicae
 Ois. = L'Oiseau
 Ois. R. F. O. = L'Oiseau et la Revue Française d'Ornithologie
 O. Mb. = Ornithologische Monatsberichte
 Ool. Rec. = Oologists' Record
 P. Z. S. Lond. = Proceedings of the Zoological Society of London
 Rep. Faunal Survey N. Rhod. = A Report on a Faunal Survey of Northern Rhodesia
 Rev. Fr. O. = Revue Française d'Ornithologie
 Rev. Z. A. = Revue Zoologique Africaine, and Revue de Zoologie et de Botanique Africaines

Story of Rear Column = The Story of the Rear Column of the Emin Pasha Relief Expedition

Syst. Av. Æth. = Systema Avium Æthiopicarum

Tageb. Emin Pascha = Die Tagebücher von Dr. Emin Pascha

Tr. Z. S. Lond. = Transactions of the Zoological Society of London

Vög. Afr. = Die Vögel Afrikas

Vög. pal. Fauna = Die Vögel der paläarktischen Fauna

Wiss. Ergeb. D. Z.-Afr. Exp. = Wissenschaftliche Ergebnisse der Deutschen Zentral-Afrika-Expedition 1907-1908 unter führung Adolf Friedrichs, Herzogs zu Mecklenburg

App. = Appendix; pt. = part; f. = fascicule

SECTION B (continued).—SYSTEMATIC LIST OF SPECIES AND RACES, WITH NOTES ON DISTRIBUTION, HABITS, AND FOOD

Names of forms known to occur within the Belgian Congo or Mandated Territory are printed in heavy type. Those enclosed in square brackets have been reported from adjacent areas, so that a number of them may be expected to reach our territory.

The references in the synonymies are complete to the end of 1936, and include some for the year 1937, as well as a few records from just outside our limits.

I regret that because this volume went to press in 1937 it has been impossible to include references to the very important recent reports on Congo birds by Doctor Schouteden¹ and by Admiral Lynes,² or to J. L. Peters, 'Check-List of the Birds of the World, III.'

ORDER RALLIFORMES

FAMILY Rallidæ. RAILS, CRAKES, GALLINULES, COOTS

KEY TO THE GENERA OF RALLIDÆ REPRESENTED IN OR NEAR THE CONGO

- 1.—With well-marked lobes at sides of toes, plumage mainly dark slate-gray; wing at least 210 mm. long. **FULICA**, p. 33.
No lobes on toes, plumage sometimes slate-gray, more often not. 2.
- 2.—With a noticeable frontal shield or patch of bare skin on forehead. 3.
No frontal shield or bare skin on forehead. 5.
- 3.—Hind claw (along lower side) not exceeding one-half remainder of toe; underparts light gray to deep slate-gray in adults; outermost flank-feathers striped with white. **GALLINULA**, p. 30.
Hind claw (beneath) exceeding one-half remainder of toe; underparts deep blue in adults; flank-feathers unstriped. 4.
- 4.—Wing more than 200 mm. long. **PORPHYRIO**, p. 32.
Wing less than 200 mm. long. **PORPHYRULA**, p. 31.
- 5.—Culmen more than 30 mm. long. 6.
Culmen less than 30 mm. long. 8.

¹ 1938, 'Exploration du Parc National Albert. Mission G. F. de Witte (1933-1935),' f. 9, Oiseau pp. 1-197, Frontispiece, Pls. I-XI, map.

² 1938, 'Contribution to the Ornithology of the Southern Congo Basin. Lynes-Vincent tour of 1933-34,' Rev. Z. A., XXXI, pp. 1-129, Pls. I-XIII, Fig. 6.

- 6.—Wing-length 200 mm. or more; metatarsus more than 70 mm.; general coloration brown, often washed with gray on breast. HIMANTORNIS, p. 26.
 Wing-length less than 200 mm.; metatarsus less than 70 mm. 7.
- 7.—White spots or bars on the remiges and some of the wing-coverts.
 CANIRALLUS, p. 6.
 Wings uniform brown. RALLUS, p. 6.
- 8.—Back uniform slaty black or very dark olive-brown. LIMNOCORAX, p. 10.
 Back not uniform blackish or dark brown in adults. 9.
- 9.—Feathers of back with blackish centers and broad margins of light yellowish brown or olive-brown, but not streaked or spotted with white. 10.
 Feathers of back with round white or rufous spots, or barred with ochreous or rufous, or with streaking, flecking or vermiculation of white, buff, or light rufous. 11.
- 10.—Under wing-coverts barred with blackish gray and white. . . CRECOPSIS, p. 12.
 Under wing-coverts rufous or rufous-buff. CREX, p. 13.
- 11.—Wing more than 95 mm. long. PORZANA, p. 8.
 Wing less than 95 mm. long. 12.
- 12.—Sides of head uniform gray or buffy, tail not bushy. PORZANA, p. 8.
 Sides of head rufous, or speckled or streaked with black on a whitish, buff, or rufous ground; tail usually thick and bushy. SAROTHRURA, p. 14.

Subfamily Rallinæ

Rallus caerulescens Gmelin

Rallus caerulescens Gmelin, 1789, 'Syst. Nat.', I, pt. 2, p. 716 (type locality: Cape of Good Hope). MOURITZ, 1914, Ibis, p. 36 (headwaters Musoshi R.). BOWEN, 1933, Ecology, XIV, p. 268, Fig. 11A (highlands S. E. Congo).—*Rallus caerulescens* SCHOUTEDEN, 1932, Bull. C. Z. C., VIII, p. 80 (Tenke).

DISTRIBUTION.—From Cape Province north to northern Angola and to Nairobi in Kenya Colony; also on the island of São Tomé. Not known from the Kasai or Kivu districts, but it does occur in the Upper Katanga, where Mouritz believed he saw it. The specimen reported by Doctor Schouteden was collected by G. F. de Witte, and there is another Katanga specimen in the collection of J. De Riemaecker.

The Kaffir rail is secretive in habits, dwelling in marshes, and nesting in very wet spots amid rushes. Its eggs are described as creamy white with profuse spotting of red-brown, purple, and gray, especially toward the obtuse end, $33.5 - 34.3 \times 27.9$ mm. It was found nesting in Natal by A. D. Millar, during August and December, laying sets of two and of four eggs.

Canirallus oculeus (Hartlaub)

Gallinula oculea HARTLAUB, 1855, J. f. O., p. 357 (type locality: Rio Boutry, Gold Coast).—*Canirallus* CHAPIN, 1915, A. M. Journ., p. 281 (Congo forest).—*Canirallus oculeus* CHAPIN, 1921, A. M. Nov., No. 17, p. 14 (Gamangui; Medje;

Niapu); 1927, Bull. A. M. N. H., LIII, p. 538 (food). SCHOUTEDEN, 1932, Bull. C. Z. C., IX, p. 57 (Lukolela); 1935, idem, XI, p. 96 (Buta); 1936, Ann. Mus. Congo, Zool., I, f. 2, p. 67.—*Canirallus oculus batesi* W. L. SCLATER, 1924, 'Syst. Av. Æth.', pt. 1, p. 100 (Ituri distr.). PETERS, 1934, 'Check-List,' II, p. 180.

SPECIMENS.—Niapu, 2 ♂, Dec. 9, 20; ♀, Dec. 9. Gamangui, 4 ♂, Jan. 31, Feb. 1, 2, 24; 2 ♀, Feb. 19, 20. Medje, ♀, May 6.

ADULTS.—Iris red or brownish red, rim of eyelids light brown; base of mandible and sides of maxilla near base green, rest of bill blackish; feet rufous-brown or grayish brown.

DISTRIBUTION.—West African forest region from Liberia east to the Ituri district, and south to the Gaboon coast and Lukolela on the middle Congo River. I doubt the validity of *C. o. batesi* Sharpe,¹ for I have seen specimens from Liberia which were darker on the breast than some of ours from the Ituri, and at best it may only be said that Upper Guinea specimens are possibly a little lighter green above than those from the Cameroon. The wings of eight males from the Belgian Congo measure 170–180 mm., and of four females 172–185. mm.

In our series males tend to have the gray of the cheeks extending back over the ear-coverts, while in females the rufous of the neck comes up over the ear to the lower eyelid. The type of *batesi* seems to be a female.

Canirallus oculus is a wood rail, and all our specimens were obtained from traps in much the same situations as those of *Himantornis*, along small watercourses and swamps in the forest. In August, 1930, two males were secured alive from a native boy at Lukolela. During the few days I kept them alive one bird occasionally uttered a fairly loud snore, lasting about two seconds. When handled it also gave a brief "coo," and another short note like "chunk." Four stomachs examined by us contained pebbles, small snails (in three cases), slugs (in one), a small crab, a millipede, and insect-remains, including two maggot-like larvæ and a green caterpillar.

At Niapu on December 9 two specimens were in breeding condition, while a female at Lukolela on November 16 had recently laid two or three eggs. In both regions dry-season specimens were non-breeding. Likewise, in southern Cameroon, Bates was shown a nest beside a stream on April 7. He obtained a downy black chick on March 2, and a larger young bird on July 27. Breeding is therefore indicated over the greater part of the rainy season.

¹ 1900, B. B. O. C., X, p. lvi (Rio Benito).

Two eggs obtained by Bates¹ were buff-cream, spotted with lavender and mauve-brown, measuring 44×31.5 and 43.5×30.5 mm.

KEY TO THE SPECIES OF *PORZANA* WHICH MAY OCCUR IN THE CONGO

- 1.—Under tail-coverts uniform buff or rufous; wing 100–122 mm.; metatarsus 30–36..... 2.
Under tail-coverts barred with white; wing 81–111 mm.; metatarsus 27–33... 3.
- 2.—White spots on hind-neck, chest, and some other parts of plumage; axillaries barred with white; middle toe (with claw) less than 40 mm.... *P. porzana*.
No white spots on hind-neck or chest; but feathers of back and upper wing-coverts margined laterally with white; axillaries without light barring; middle toe (with claw) more than 40 mm..... *P. marginalis*.
- 3.—Wing more than 98 mm. long, innermost secondaries fall short of primaries by at least 25 mm.; metatarsus 29–33 mm..... *P. parva*.
Wing less than 93 mm. long, innermost secondaries, when wing is folded, do not fall short of tips of primaries by more than 15 mm.; metatarsus 25–28 mm.
..... *P. pusilla*.

[*Porzana pusilla obscura* Neumann]

Porzana obscura NEUMANN, 1897, O. Mb., p. 191 (type locality: Kibaya, Tanganyika Territory).—*Porzana intermedia* O.-GRANT, 1905, Ibis, p. 205 (L. Karege, S. W. Ankole).—*Ortygometra pusilla obscura* REICHENOW, 1911, 'Wiss. Ergeb. D. Z.-Afr. Exp.,' III, p. 248.

The species inhabits the greater part of the Palearctic Region, and extends to Cape Province, Madagascar, Australia, and New Zealand. The resident East and South African race, *obscura*, is somewhat darker than the European form of Baillon's crake, *P. p. intermedia* (Hermann), and is found from Kenya Colony and Uganda, to Angola, Cape Province, and Madagascar. It does not occur in the forests of western or central Africa, nor is it yet recorded from any point within the limits of the Belgian Congo. It may well be looked for on the western shore of Lake Albert, since there was a specimen in the Jackson Collection from Butiaba on the east shore, taken on December 7, 1901. It will probably be found in Ruanda or the Kivu District, and possibly in the Katanga.

[*Porzana parva parva* (Scopoli)]

Rallus parvus SCOPOLI, 1769, Ann. I, Hist. Nat., p. 108 (type locality: Carniola).—*Zapornia parva* SHARPE, 1894, 'Cat. Birds Brit. Mus.,' XXIII, p. 89 (Uganda).

Breeds from Europe to central Asia, and possibly in Algeria, migrating south to Sind and the Sudan. There is a specimen in the British

¹ 1927, Ibis, p. 11, Pl. II, fig. 20.

Museum said to have been obtained by Piaggia in Uganda, so it is possible that the little crane may occasionally reach the northern Congo.

[*Porzana porzana* (Linnæus)]

Rallus porzana LINNÆUS, 1766, 'Syst. Nat.,' 12th Ed., I, p. 262 (Europe; restricted type locality: France).

Breeds in Europe and western Asia, migrating to the Canaries, the Sudan, and through East Africa to Bechuanaland and Damaraland; also to India. It should occasionally reach the eastern Congo border, for a specimen of the spotted crane was collected by Dr. F. E. Stoehr at Ntambwa, Northeast Rhodesia, in February, 1904.¹

Porzana marginalis Hartlaub

Porzana marginalis HARTLAUB, 1857, 'Syst. Orn. Westafr.,' p. 241 (type locality: Gaboon). BANNERMAN, 1931, 'Birds Trop. W. Afr.,' II, p. 17, Fig. 7 (Fort Roseberry, N. Rhodesia). Schouteden, 1935, Bull. C. Z. C., XI, p. 69.—*Limnobaenus marginatus* SCHOUTEDEN, 1933, Bull. C. Z. C., X, p. 32 (Buta).—*Limnobaenus marginalis* LYNES AND SCLATER, 1934, Ibis, p. 37 (Fort Roseberry). SCHOUTEDEN, 1936, Ann. Mus. Congo., Zool., I, f. 2, p. 68.—*Aenigmatolimnas marginalis*, PETERS, 1934, 'Check-List,' II, p. 197.

The genus *Aenigmatolimnas*, proposed by J. L. Peters for this rail, was based on its deeper, more compressed bill and long hind toe; but I prefer not to separate it from *Porzana*.

DISTRIBUTION.—Here and there from Cape Province and Natal north to the vicinity of Mombasa, Cameroon, and Northern Nigeria; one record from Biskra in Algeria, another from Aldabra Island. Hartert² argued that the breeding range might be in Europe or western Asia; but females almost ready to lay have recently been taken by Bates³ in Nigeria, on June 30, and by Admiral Lynes in Northern Rhodesia on December 3.

This rail was to be expected in the Belgian Congo, and on May 29, 1927, at Rutshuru in the Kivu district, a native brought me a male, freshly killed, from a grassy spot well away from water. Its plumage was rather brownish as compared with some of the grayer specimens I have examined, especially on the sides of head and neck, and on the chest. One of these gray specimens, in the Museum of Comparative Zoölogy, from Sakbayeme, Cameroon, was sexed as female.

In 1933 and 1934, Brother Joseph Hutsebaut sent four skins of *P. marginalis* from Buta, Lower Uelle, to the Congo Museum. One was

¹ Stoehr and Sclater, 1906, Journ. S. Afr. Orn. Union, II, p. 114; Grote, 1930, Mitt. Zool. Mus. Berlin, XVI, p. 106.

² 1921, 'Vög. pal. Fauna,' III, p. 1834.

³ 1927, Ibis, p. 10.

brownish, stated to be male; and one of the grayish birds was labeled as a female. One might rather have expected the grayer specimens to be males, if the difference were sexual. The brownish examples do not seem to be young, whereas one of Brother Hutsebaut's gray specimens has plumage suggesting immaturity. Near Elisabethville on December 20, 1933, De Riemaeker obtained an adult in grayish plumage which he also sexed as a female. Wings of six Congo specimens measure 103–112 mm., tails, 47–49, exposed culmen, 16–18, metatarsus, 32–36, middle toe with claw, 45–49.

The species may be expected to occur in many other savanna regions of the Congo, particularly the Kasai, and possibly also the Lower Congo. Eggs in the Nehrkorn and other collections from Lake Nyasa and Southwest Africa, attributed to this elusive species, are believed by Schönwetter¹ to be correctly identified.

Limnocolax flavirostra (Swainson)

Gallinula flavirostra SWAINSON, 1837, 'Birds W. Afr.,' II, p. 244, Pl. XXVIII (type locality: Senegal).—*Ortygometra nigra* HARTLAUB, 1881, Abhandl. Naturwiss. Verein Bremen, VII, pp. 85, 119 (Mahagi). PELZELN, 1881, Verh. Zool. Bot. Ges. Wien, p. 156. SCHALOW, 1886, J. f. O., pp. 420, 433 ("Lualaba" [= Luvua R.]; Likulwe R.). MATSCHIE, 1887, J. f. O., p. 145. EMIN, 1919, in Stuhlmann, 'Tageb. Emin Pascha,' II, p. 79.—*Limnocolax nigra* DUBOIS, 1886, Bull. Mus. Roy. Hist. Nat. Belg., IV, p. 149 (L. Tanganyika).—*Limnocolax niger* DE SOUSA, 1887, Journ. Sci. Lisboa, XII, p. 85 (Cahungula). REICHENOW, 1900, 'Vög. Afr.,' I, p. 279; 1911, 'Wiss. Ergeb. D. Z.-Afr. Exp.,' III, p. 248 (L. Mohasi; L. Edward; Usumbura; L. Kivu). DUBOIS, 1905, Ann. Mus. Congo, Zool., I, f. 1, p. 24 (Moliro). SALVADORI, 1907, Boll. Mus. Zool. Anat. Torino, XXII, No. 570, p. 9 (Lukonzolwa). NEAVE, 1910, Ibis, p. 89 (Bunkeya R.). SASSI, 1912, Ann. Naturh. Hofmus., XXVI, p. 354 (Urundi; L. Edward). LÖNNBERG, 1917, Arkiv f. Zool., X, No. 24, p. 7 (L. Edward; Rutshuru). SCHOUTEDEN, 1918, Rev. Z. A., V, p. 221 (Kabare; Zambo; Beni; Baraka). SCLATER AND M.-PRAED, 1920, Ibis, p. 824 (Yambio). SCHUBOTZ, 1921, 'Tageb. Emin Pascha,' VI, pt. 2, p. 54 (Mundu; Tingasi). GYLDENSTOLPE, 1924, 'K. Svenska Vet. Akad. Handl.,' (3) I, No. 3, p. 302 (L. Edward).—*Limnocolax flavirostris* SCHOUTEDEN, 1923, Rev. Z. A., XI, pp. 316, 389 (Kasai R.; Lulua R.; Tshikapapa; Kwamouth); 1924, idem, XII, pp. 262, 409 (Stanley Pool; Kidada; Ruki R.: Bamania; Tondou); 1925, idem, XIII, p. 6 (Mongende); 1926, idem, XIII, p. 187 (Moanda; Vista; Boma).—*Limnocolax flavirostra* FRIEDMANN, 1930, 'Afr. Rep. Liberia Belg. Congo,' II, p. 751 (Bukavu). SCHOUTEDEN, 1932, 'Rev. Z. A.,' XXII, p. 249 (Lulenga; Ngoma); 1935, idem, XXVII, p. 401 (Kadjudju); 1936, Ann. Mus. Congo, Zool., I, f. 2, p. 68 (Kotili; Buta; Bambili; Rungu; Niangara; Faradje; Mahagi Port); 1937, Bull. C. Z. C., XIII, p. 36. BOWEN, 1932, Proc. Acad. Nat. Sci. Phila., LXXXIV, p. 284.

¹ 1928, Beitr. Fortpfl.-biol. Vögel, IV, pp. 89, 90.

SPECIMENS.—Stanleyville, ♀, Aug. 11. Avakubi, ♂, Dec. 13; ♀, Jan. 31; ♀ juv., Dec. 9. Pawa, ♀, ♂ juv., July 12. Niangara, 2 ♂, Nov. 18, Dec. 6; 2 ♀, Nov. 18, Dec. 1. Faradje, 4 ♂, Mar. 21, 24, Aug. 22, Dec. 12; 7 ♀, Mar. 1, 21, 24, 31, May 6.

ADULTS.—Iris orange-red, rim of eyelids red; bill light yellowish green; feet dull red, with dusky brownish claws.

Adult males, as a rule, are noticeably larger than females. The exposed culmen measures 24.5–27 mm. in seven males from the Belgian Congo, and 19.6–24.7 mm. in eleven females. Wings of seven males from the same country 100–111 mm., and of eleven females 96–106 mm. W. W. Bowen measured a series of 88 skins from the entire range of the species and found the wings varying from 96 to 115 mm. (both sexes), but not in such a way as to indicate any valid geographic races.

DISTRIBUTION.—All Africa, from the Senegal River, Bahr-el-Ghazal, and Abyssinia southward to the Cape. Generally distributed throughout the Congo, but less common in heavily wooded districts. In the Kivu region it is found abundantly on lakes as high as 6700 feet above the sea.

The black crane is usually much more common than it appears, skulking in the long grass, unless the forest comes right down to the water's edge. When it does venture out into the open by day or goes walking jacana-like over floating vegetation, it scoots to cover at the first sign of danger, and can seldom be made to take wing. In the papyrus swamps near Faradje, when standing in wait or shy reed-warblers, I frequently watched pairs or small family parties of *Limnocorax* wending their way through their favorite haunts, or as evening came on, climbing up inclined stalks of papyrus, probably to spend the night on a perch a couple of yards above the water.

Besides low "chucks" uttered from time to time while walking about, this crane has a characteristic call, which sounds as though several birds gave it in unison. Perhaps they do, for they are seldom single. These notes begin with low but excited clucking or chattering sounds, and then follows a resonant "k-k-r-rung" that is almost bullfrog-like. This is the most characteristic part of the performance, and may be repeated two or three times. From this, no doubt, came the Mangbetu name for the bird: "Nekipworondo." Occasionally when wicker fish-traps with a conical entrance are lying on the shore, these birds will make their way inside and find themselves unable to get out.

I have never found the nest, but it is known to be built of dry rushes in tussocks or bushes close to the water.¹ The eggs, numbering from

¹ See Reichenow, 1900, 'Vög. Afr.', I, p. 281; Selater, 1906, 'Birds S. Afr.', IV, p. 261; Granvik, 1923, J. f. O., Sonderheft, p. 41; Lynes, 1925, Ibis, p. 372; and Pitman, 1929, Ool. Rec., IX, pp. 37–41, 1 photograph.

two to five, are yellowish white or buffy, speckled throughout, and more thickly spotted with brown at the larger end. They measure 29.5–36 mm. \times 22–25.5.

The breeding-season, in the northeastern Congo, does not seem to be very clearly defined, since birds with enlarged reproductive organs were collected in March, July, August, November, and December. The young are at first clothed in black down; then they assume a gray juvenal plumage, much lighter than that of the adult, and even whitish on the throat. At this stage the iris is dark greenish gray, and the bill bears a curious color pattern, being black with whitish tip, and a pink area above and behind each nostril.

The sequence of plumages, therefore, as well as the coloration of the adult, is suggestive of the gallinules. The adult male taken at Niangara, December 6, was molting all its remiges at once, as well as the alula-quills and most of the rectrices.¹ Such a molt is probably normal in this species, though certainly not in most genera of rails.

Food.—Only five stomachs were examined: one contained finely-divided insect-remains and small stones; two, insects, small seeds, and bits of stone; the remaining two, only small seeds. According to Heuglin,² their diet includes small fish, spawn, snails, larvæ, insects, worms, duckweed, and seeds of aquatic plants.

Crecopsis egregia (Peters)

Ortygometra (*Crex*) *egregia* PETERS, 1854, Monatsber. Akad. Wiss. Berlin, p. 134 (type locality: Tete, Zambesi R.).—*Ortygometra egregia* SHARPE AND BOUVIER, 1878, Bull. Soc. Zool. France, III, p. 79 (Boma). HARTLAUB, 1881, Abhandl. Naturwiss. Verein Bremen, VII, pp. 85, 119 (Mahagi). PELZELN, 1881, Verh. Zool. Bot. Ges. Wien, p. 155. BOCAGE, 1881, 'Orn. Angola,' pt. 2, p. 479. DUBOIS, 1886, Bull. Mus. Roy. Hist. Nat. Belg., IV, p. 149 (L. Tanganyika). SCHWEINFURTH AND RATZEL, 1888, 'Emin-Pascha,' German Ed., pp. 149, 156. EMIN, 1888, 'Emin Pasha Centr. Afr.,' p. 149; 1919, in Stuhlmann, 'Tageb. Emin Pascha,' II, p. 78.—*Crex egregia* REICHENOW, 1900, 'Vög. Afr.,' I, p. 278. DUBOIS, 1905, Ann. Mus. Congo, Zool., I, f. 1, p. 24 (Ruzizi-Kivu; Tanganyika). O.-GRANT, 1910, Tr. Z. S. Lond., XIX, p. 446 (Mokia, W. Uganda). SCHOUTEDEN, 1918, Rev. Z. A., V, p. 221 (L. Edward; Uvira; Baraka; Ruzizi).—*Crecopsis egregia* MENEGAUX, 1918, Rev. Fr. O., V, p. 252 (Zambi). SCHOUTEDEN, 1923, Rev. Z. A., XI, p. 316 (Luebo); 1930, idem, XVIII, p. 280 (near Elisabethville); 1933, idem, XXII, p. 381 (Kisenyi); 1936, Ann. Mus. Congo, Zool., I, f. 2, p. 68 (Buta). PETIT, 1926, 'Dix Années de Chasses,' p. 121 (Boma). BERLIOZ, 1935, Bull. Mus. Nat. Hist. Paris, VII, p. 159 (Kadjudju near L. Kivu).—*Crecopsis egregia* CHAPIN, 1927, Bull. A. M. N. H., LIII, p. 476 (Ngayu).

¹ C. H. B. Grant, 1915, Ibis, p. 46, describes an adult female from East Africa in a similar molt.

² 1873, 'Orn. Nordost-Afr.,' p. 1239.

SPECIMENS.—Boma, ♀, Jan. 7. Ngayu, ♂, Dec. 19; ♀, July 24. Niangara, ♂, Dec. 25. Garamba, ♀, June 13.

ADULTS.—Iris orange-red to bright scarlet; rim of eyelids red; bill purplish red at base, outer portion gray, with culmen dusky; feet brown.

DISTRIBUTION.—From the Gambia and the southern Sudan south to Damaraland and Natal; rare or absent in heavily forested regions and on the higher mountains.

In so far as my personal observation goes, this is very much of a land-crake, found in grassy situations often far from water, and difficult to flush. It did not seem numerous anywhere in the northeastern Congo. One which had been seen to enter a patch of grass and weeds on the edge of the village at Ngayu was surrounded by our native workers, and took wing only as a last resort, when the men were so close that one of them knocked it down and caught it. It had eaten insects and many tiny snails. At Garamba one was taken in a wetter situation, a grassy marsh.

Near Boma, on January 7, another was put up from some long grass in a dry hollow, and flew rapidly away. It was a female, and in the oviduct was found a broken whitish egg, spotted with rufous, very heavily marked at one end. About Luluabourg, in the Kasai district, this crake must be common, for Father Callewaert sent us ten skins, including one of a bird in juvenal dress taken on May 7. Conover and Zimmer also collected this species at Katobwe on the Lualaba River.

A nest found by Paget-Wilkes¹ in the Trans-Nzoia District of Kenya Colony on June 26, was made of bents and grasses, in a depression in the ground amid tall grass, not far from a small stream. The set of eggs numbered five. Shuel² in Northern Nigeria found several nests in July and August with seven eggs each. These he described as light cream or dull white, with blotches and dots of reddish brown and lilac, 32–37 mm. × 22.5–26.

Crex crex (Linnæus)

Rallus crex LINNÆUS, 1758, 'Syst. Nat.,' 10th Ed., p. 153 (Europe; restricted type locality: Sweden).—*Crex pratensis* SCHWEINFURTH AND RATZEL, 1888, 'Emin-Pascha,' German Ed., p. 394 (L. Albert). EMIN, 1888, 'Emin Pasha Centr. Afr.,' p. 395. DE RIEMAECKER, 1927, Rev. Z. A., XIV, p. 258 (Lubumbashi Valley).—*Ortygometra crex* EMIN, 1892, Zool. Jahrb., VI, p. 150 (W. shore L. Albert).—*Crex crex* REICHENOW, 1900, 'Vög. Afr.,' I, p. 276; 1911, 'Wiss. Ergeb. D. Z.-Afr. Exp.,' III, p. 248 (L. Kivu). O.-GRANT, 1908, Ibis, p. 316 (L. Kivu). F. DE SCHAECK, 1927, Bull. Soc. Zool. Genève, III, f. 6, p. 79 (Luluabourg). GROTE, 1930, Mitt.

¹ 1929, Ool. Rec., IX, pp. 11, 12.

² 1938, Ibis, p. 234.

Zool. Mus. Berlin, XVI, p. 107. BANNERMAN, 1931, 'Birds Trop. W. Afr.,' II, p. 10, Fig. 4. VANDERYST, 1931, Bull. Inst. Roy. Colonial Belge, p. 286 (near Kanda-Kanda, W. Lomami distr.). SCHÜZ AND WEIGOLD, 1931, Atlas Vogelzug., p. 37, Pl. 55. SCHOUTEDEN, 1934, Bull. C. Z. C., XI, p. 44 (Buta); 1935, Rev. Z. A., XXVII, p. 401 (Baudouinvillie); 1936, Ann. Mus. Congo, Zool., I, f. 2, p. 68 (Buta).

SPECIMEN.—Niagara, ♀, Nov. 21.

DISTRIBUTION.—During the northern summer, Europe and northern and central Asia. On the southern migration the corn-crake visits Arabia and a large part of Africa, especially in the east, reaching South Africa, but rare in the Cape Province. Though known from South Africa mainly during the southern summer, from December to March, it has sometimes been suspected of breeding there too.¹

In the Congo it is not a common visitor, but is recorded from the northern border of the forest, as well as the eastern and southern grasslands. Father Callewaert has taken two examples for us at Luluabourg in December, and Rockefeller and Murphy obtained one at Lubenga in the Marungu district on March 11. Besides our specimen captured by natives near Niagara, I flushed one there myself in April, 1913, in a field of grass. It went off with labored flight, dropped back into the grass, and could not be found again.

The two specimens reported from the vicinity of Kanda-Kanda by Father Vanderyst were captured by natives, and bore bands affixed at Helgoland and in Sweden. Grote² mentioned a "Swedish corn-crake on the lower Congo," but I cannot find any record from that district.

KEY TO THE AFRICAN SPECIES OF *SAROTHRURA*

Adults of both sexes

- 1.—Crown and cheeks bright rufous or chestnut, unspotted. 2.
Crown and cheeks buff, brown, or blackish, speckled or streaked; or if dull rufous then always with blackish markings. 8.
- 2.—Back blackish with regular cross-bars of ochreous or light rufous. *S. pulchra* ♀.
Back blackish with longitudinal streaks of whitish, or rounded spots of white, ochreous, or rufous. 3.
- 3.—Back and wing-coverts with rounded spots. 4.
Back and wing-coverts with streaks, and sometimes a few small spots as well. 5.
- 4.—Spots on back white, metatarsus at least 29 mm. long. *S. pulchra* ♂.
Spots on back ochreous or light rufous, metatarsus not more than 27 mm. long. *S. elegans* ♂.
- 5.—Tail rufous, middle toe (with claw) 21–25 mm. *S. lineata* ♂.
Tail black, usually with small whitish markings. 6.

¹ Selater, 1906, 'Birds S. Afr.,' IV, p. 248; Chubb, 1914, Ann. Durban Mus., I, p. 34; Roberts, 1932, Ostrich, III, p. 101.

² 1931, Mitt. Zool. Mus. Berlin, XVII, p. 407.

- 6.—Rufous coloration not extending across fore-neck or upper breast, which are streaked, black and white.....*S. lugens* ♂.
Fore-neck, and often upper breast, rufous..... 7.
- 7.—Tail black, spotted with white; middle toe (with claw) at least 27 mm. long.....*S. rufa* ♂.
Tail black, narrowly streaked with white; middle toe (with claw) less than 24 mm. long.....*S. böhmi* ♂.
- 8.—Ground-color of back brown, with rounded ochreous spots, bordered in front and behind with black.....*S. elegans* ♀.
Back black or dark brown, more irregularly spotted, mottled, or streaked with brown, buff, or white..... 9.
- 9.—Middle toe (with claw) less than 26 mm. long..... 10.
Middle toe (with claw) more than 27 mm. long..... 11.
- 10.—Wing, 71–78 mm., metatarsus, 18–21 mm..... 12.
Wing, 83–86 mm., metatarsus, 22–24 mm.....*S. böhmi* ♀.
- 11.—Ground-color of crown and cheeks distinctly rufous, and streaked or speckled with blackish, thus in contrast to the whitish streaking or spotting of the back.....*S. lugens* ♀.
Color of crown more like back, the lighter markings of both are ochreous or light brown, not rufous.....*S. rufa* ♀.
- 12.—General coloration distinctly brownish, tail brown with lighter barring.....*S. lineata* ♀.
General coloration more blackish, tail nearly pure black.....*S. lynesii* ♀.

The species of *Sarothrura* differ markedly in the relative length of the feet, so that this character is of great value in identifying females and young. Arranged in order of proportional length of metatarsus to wing, they stand approximately as follows: *lineata* 25%, *böhmi* 26%, *insularis* 29%, *elegans* 29%, *lugens* 30%, *rufa* 31%, *pulchra* 40%. The last-named species is thus the longest-legged; and *Sarothrura watersii* (Bartlett) of Madagascar, for which Salomonsen has proposed a monotypic genus, *Lemurolimnas*, has the metatarsus only 34% as long as the wing.

[*Sarothrura lynesii* Grant and M.-Praed]

Sarothrura lineata lynesii GRANT AND M.-PRAED, 1934, B. B. O. C., LV, p. 17 (type locality: Nsombo, N. W. corner of L. Bangweolo).—*Sarothrura rufa* subsp.? SCLATER AND LYNES, 1934, Ibis, p. 37.—*Sarothrura lynesii* M.-Praed and Grant, 1937, Ibis, p. 629, Pl. XIII.

The two females on which this rail was described are much more blackish above than females of *S. l. lineata* (Swainson) of South Africa. *S. antonii* Madarász and Neumann¹ has been shown by C. H. B. Grant to be merely a northern race of *lineata*. It ranges from the Zambesi to East Africa, reaching the alpine meadows of Mt. Kenya; and males often have the fore-neck rufous.

¹ 1911, O. Mb., p. 186 (Ndassekera, E. of L. Victoria).

S. lynesi may thus prove to be a distinct species, as suggested by the blackness of the tail. The female of *S. l. antonii* has a brownish tail, more or less barred with rufous. The dimensions of *lynesi* are too small for the female of *S. böhmi*. It may be expected that this small crane of Lake Bangweolo will occur in marshy areas of the adjacent Katanga Province.

Sarothrura böhmi böhmi Reichenow

Sarothrura böhmi REICHENOW, 1900, 'Vög. Afr.,' I, p. 290 (type locality: Likulwe R., Katanga distr., Congo).—*Crex lugens* SCHALOW, 1886, J. f. O., p. 433 (Likulwe R.).—*Corethrura lugens* MATSCHIE, 1887, J. f. O., p. 145.—*Sarothrura böhmi böhmi* BANNERMAN, 1921, Ibis, pp. 118, 119 (Likulwe, Faradje; Medje); 1931, 'Birds Trop. W. Afr.,' II, p. 26. W. L. SCLATER, 1924, 'Syst. Av. Æth.,' pt. 1, p. 106. PETERS, 1934, 'Check-List,' II, p. 196. SCHOUTEDEN, 1936, Ann. Mus. Congo, Zool., I, f. 2, p. 69.

SPECIMENS.—Medje, im., July 15. Faradje, ♂, Nov. 24.

ADULT MALE.—Iris brown; bill brown, lighter on mandible; feet greenish brown.

DISTRIBUTION OF THE SPECIES.—From the coast of French Guinea to the Upper Uelle, Kenya Colony, and Nyasaland. The existence of a dark race, *S. b. danei* Bannerman,¹ in Upper Guinea is proved by a single specimen captured on shipboard. *S. b. böhmi* is now known to range westward at least to southern Cameroon, occurring at Bitye, in a forest clearing, and eastward to Matchakos, Kenya Colony, whence came the female described as *S. somereni* Bannerman.²

I have compared the type from the Katanga with males from the Uelle and Nairobi, and I am convinced that *somereni* is not a valid race. The adult female plumage seems to be known only from the type of *somereni*. Dimensions of four adult males: wing, 83–86 mm.; tail, 30–35; metatarsus, 22–23.

Our first specimen was an adult male, which I flushed at Faradje in 1911 on the edge of an open marsh, where the grass was only waist-high. Its flight was strong and direct, perhaps not so rapid as that of a quail. No doubt this species is quite as apt to skulk as most of the others, for Böhm noted that "it allowed itself to be caught with the hand." Our young bird from Medje was secured through natives. A possible specialization in feeding habits was suggested by the stomach contents of the adult bird, small seeds exclusively.

A nest with four white eggs found by Captain H. F. Stoneham³ in the

¹ 1920, B. B. O. C., XLI, p. 3 (off coast of French Guinea).

² 1919, B. B. O. C., XL, pp. 8, 28.

³ 1928, Ibis, p. 170; Paget-Wilkes, 1929, Ool. Rec., IX, p. 12.

Cherangani district, Kenya Colony, was attributed to this species. But in view of his remarks on the call of the bird—plainly that of *S. elegans*—the identification would seem to be erroneous.¹

Sarothrura lugens (Böhm)

Crex lugens BÖHM, 1884, J. f. O., p. 176 (type locality: Ugalla distr., E. of L. Tanganyika).—*Sarothrura lugens* MILLER, 1924, Bull. A. M. N. H., L, p. 308. W. L. SCLATER, 1924, 'Syst. Av. Æth.', p. 105. SCHOUTEDEN, 1936, Ann. Mus. Congo, Zool., I, f. 2, p. 69.—*Sarothrura lugens* PETERS, 1934, 'Check-List,' II, p. 195 (Faradje).

SPECIMENS.—Faradje, 3 ♂, Feb. 17, 23, Apr. 19; ♀, Feb. 22.

The adult male is here described for the first time, since Böhm's type was a female, and the specimen which Matschie² took to be the male of *lugens* proved to be *S. böhmi*.

ADULT MALE.—The rich rufous coloration of crown, malar region, cheeks, and hind-neck does not extend across the front of the neck or throat. Back black, finely streaked with white, two lines on each feather; on the black tail these markings become broken into spots. The smallest wing-coverts (marginals) are largely whitish, but the remainder have the color of the back. Primaries dark brown, outermost primary and alula-quills edged with white; under wing-coverts dark brownish gray. Throat whitish, feathers of upper breast black, with a broad white streak at each side; lower down, the tips become white as well, and the pattern becomes more lunulate. Middle of the underparts mottled with gray and white; under tail-coverts blackish, lightly streaked with white. Iris dark grayish brown; bill dusky brown, with lower side of mandible whitish; feet very dark brown.

Measurements of two adult males from Faradje: wing, 78, 81 mm.; tail, 47, 53; exposed culmen, 12.5, 12.5; metatarsus, 23.5, 24; middle toe with claw, 28.5, 28.5.

Our single adult female shows the following dimensions: wing, 82 mm.; tail, 52; culmen, 13; metatarsus, 24.5; middle toe with claw, 30.5.

The female specimen has been compared with Böhm's type in the Berlin Museum, no difference being found which might even be regarded as subspecific. The rufous ground-color of crown and cheeks is not quite so deep in the type specimen. Both birds have the spotting on the back white. The spotted rufous-brown hood of the female is its most distinctive marking; and the narrow elevated culmen, rising as it approaches the forehead, is another good character in both sexes. The male cannot be confused with any other species of *Sarothrura*, not even with *S. l. lineata* of South Africa, for it has the tail black, instead of rufous.

DISTRIBUTION.—Known only from the region of the Ugalla River, the neighborhood of Faradje in the Upper Uelle district, and the Bihé Province of Angola. It will certainly be found to inhabit some of the intervening territory, probably along the western side of Lake Victoria or the eastern Congo border. The occurrence in Angola is proved by a spirit specimen from Chitau, 70 miles north of Silva Porta, collected by

¹ According to Jackson and Selater, 1938, 'Birds of Kenya and Uganda,' I, p. 297, the eggs were those of *S. lineata antonii*.

² 1887, J. f. O., p. 145.

Rudyard Boulton in August, 1925. It is in adult male plumage and has lost only its remiges and its tail.

In the open savanna country about Faradje, papyrus swamps are numerous and extensive, but *Sarothrura lugens* was found rather in the grass-grown marshes, where the mud was not so deep. The densely packed vegetation, largely grasses and marantaceous plants, is anywhere from waist to shoulder-high. The birds' ways are secretive and typically ralline, our specimens being trapped, not shot, for when they flew up it was always unexpected, and they went but a short distance before dropping back out of sight. Thereafter they refused to take wing again. No calls were ever identified with certainty. Only one stomach was examined. It contained finely divided insect-remains and two hard seeds.

***Sarothrura rufa rufa* (Vieillot)**

Rallus rufus VIEILLOT, 1819, 'Nouv. Dict. Hist. Nat.,' XXVIII, p. 564 (Africa; restricted type locality: Cape Province).

DISTRIBUTION OF THE SPECIES.—More or less locally from Sierra Leone, Cameroon, the Uelle district, Uganda, Nairobi, and Usambara, south to eastern Cape Province.

Four races have been admitted by Selater,¹ but one of them, *S. r. ansorgei* van Someren, is probably not valid. Specimens from Upper Guinea, Cameroon, and Gaboon are smaller than those from other regions of Africa.

The males of the different races of *Sarothrura rufa* show few differences in coloration, and even in the same region there is often so much variation with regard to the rufous tone of the neck, or the extent of white streaking, that the more specimens one examines the less distinct do the races seem.² The white streaking of the upperparts is broadest in males of *S. r. bonapartii*, ranging from the Gaboon and Cameroon to Sierra Leone; and in males from north of the equatorial forest, perhaps also from Gaboon, there is apt to be more whitish in the mid-line of the breast.

In the females, however, the color characters are better marked; and it is *bonapartii* which has the lightest coloration. Instead of small broken bars and spots on the back, there are wide crescentic marks of ochreous-brown or rufous-buff; and the wing-coverts are likewise more broadly barred or mottled with the lighter color. The blackish ground-

¹ 1924, 'Syst. Av. Æth.,' pt. 1, pp. 104, 105.

² I cannot however agree with the conclusions of M.-Præd and Grant, 1937, *Ibis*, p. 629.

color is much restricted, but the tail is still dusky, with numerous brown markings on its coverts. Throat and middle of breast are ochreous-white, with blackish spots at the sides of the chest, but none in the middle. Flanks of a richer buff, barred with dusky.¹

The female of *S. r. rufa* of South Africa is much darker, with finer light markings on the back. *S. r. ansorgei* van Someren² of Angola was described as still more finely marked with buff above in the female, the wings less spotted, and the tail uniform black. I have examined the two females on which this form was based, and feel that the lack of buff markings on the wings, and also perhaps on the tail-coverts, is simply a sign of immaturity. Our female from Luluabourg in the southern Congo is generously spotted with buff on the back, and barred on many of the wing-coverts. I have also examined three females from Angola that are brown-spotted on the back.

Somewhat intermediate in color between typical *rufa* and *bonapartii* is *S. r. elizabethæ* of the region northeast and north of Lake Victoria. This is best illustrated in females. It is to this subspecies that I refer our specimens from the northeastern Congo, after comparison with those collected by Heller at Kaimosi, Kenya Colony, for the U. S. National Museum. There is a general agreement in color between the females, but the Congo specimens are smaller, showing an approach to *bonapartii*.

The equatorial forest belt is a partial barrier only in the separation of the races, for *bonapartii* extends across it from the Cameroon to the Gaboon. The pair of birds from which this race was described is preserved in the Paris Museum. The wing of the male measures only 66 mm., that of the female 69. Possibly this form reaches the western Belgian Congo.

S. r. rufa appears to range northward from the Cape Province to Usambara, the Kivu district, and the Kasai. Three specimens here referred to *S. r. rufa* were obtained by Father Callewaert at Luluabourg: a male assuming adult plumage (wing, 77 mm.), an adult female (wing, 80 mm.), and a young bird with remiges not yet full-grown. This young individual, taken on August 23, indicates that eggs are laid in the early part of the dry season; but the male bird, captured on May 11, and perhaps three or four months old, may show that a breeding season is not well defined. An adult male with wing 78 mm. long has also been received by the Congo Museum from Kashusha near Costermansville, in the neighborhood of Lake Kivu.

¹ Description from adult females in Carnegie Museum, from Lolodorf, Cameroon.

² 1919, B. B. O. C., XL, p. 20 (Duque de Braganza).

***Sarothrura rufa elizabethæ* van Someren**

Sarothrura rufa elizabethæ VAN SOMEREN, 1919, B. B. O. C., XL, p. 20 (type locality: Kisumu and Kakamegoes, N. Kavirondo, Kenya Colony). MILLER, 1924, Bull. A. M. N. H., L, p. 308. PETERS, 1934, 'Check-List,' II, p. 195 (N. Ituri distr.). SCHOUTEDEN, 1936, Ann. Mus. Congo, Zool., I, f. 2, p. 68 (Uelle).

SPECIMENS.—Pawa, 4 ♂, July 8, 9, 13; 2 ♀, July 12. Faradje, ♀, Mar. 30.

ADULTS OF BOTH SEXES.—Iris dark brown; upper part of maxilla dusky, rest of bill light blue; feet dark grayish brown.

Males from Pawa have wings only 71–74 mm., and females from that locality, 69.5, 74. The female from Faradje has the wing 76 mm. long, and thus approaches the measurements of Uganda and Kavirondo birds more closely.

DISTRIBUTION.—From Nairobi to Kakamega in Kenya Colony and across Uganda to the northeastern Congo. It is not at all unlikely that *elizabethæ* occurs also along the eastern Congo border in the vicinity of Lake Edward.

The single specimen from Faradje was trapped by a native in a grassy marsh. Those collected in the northern Ituri were secured in July in the quaking bogs near Pawa, at the northern edge of the forest.

The Mabudu people showed me how to capture these little rails, much as they hunt rats in the grass. Scattering about in the marsh, they would listen for the quarry. From time to time the rails are accustomed to utter a feeble "t-wī, t-wī, t-wī. . ." lasting but a few seconds, and often accompanied by a low grunting sound. The whole party, men, women, and children, to the number of about eighty, would next surround the spot from which one seemed to call; and gradually the circle closed in, the vegetation being carefully searched with the hands. Sometimes the bird took flight, but its pursuers ran at once to the spot where it re-alighted, and proceeded again in the same manner. This time it would probably elect to hide, and would be caught in the hand. Four were thus secured, and two more shot.¹

Of the four stomachs examined, three contained insect-remains mixed with small seeds, a fourth having small seeds only.

The state of the reproductive organs indicated that at this date, July 12, they were ready to breed, if not already nesting. In the case of *S. r. bonapartii*, living in approximately the same latitude, farther west, the breeding season begins a little earlier, for two specimens in the Carnegie Museum, taken on May 14, are in juvenal plumage with the wing-quills not quite fully grown.

From Djaposten, Cameroon, Mr. H. C. Raven has brought me a

¹ As Mr. Bates himself has pointed out (1909, Ibis, p. 7), his early notes (1907, Ibis, p. 421), under the heading *Sarothrura bonapartei*, really applied in part to *S. elegans reichenovi*, and possibly in the matter of voice—I think—to *S. pulchra*.

newly hatched *Sarothrura* chick, clothed in black down. Its middle toe is so much longer than its metatarsus that it is certainly *S. r. bonapartii*. This chick was taken from a nest made of grasses in a clearing, amid grass about waist-high on dry ground. In the same nest was one addled white egg, measuring 26.4×19.5 mm. A pure white egg of the South African race, *S. r. rufa*, which Atmore took from the body of a female and sent to Layard,¹ measured 27.5×21 mm.

[*Sarothrura rufa bonapartii* (Bonaparte)]

Corethrura bonapartii BONAPARTE, 1856, C. R. Acad. Sci. Paris, XLIII, p. 599 (type locality: Gaboon).

Probably to be expected, as explained above under *S. r. rufa*, in marshy spots of the Lower Congo, and possibly near the Ubangi River.

Sarothrura elegans reichenovi (Sharpe)

Corethrura reichenovi SHARPE, 1894, 'Cat. Birds. Brit. Mus.,' XXIII, p. 121 (type locality: Cameroons, W. Africa).—*Sarothrura pulchra* SCHOUTEDEN, 1918, Rev. Z. A., V, p. 221 (Kilo).—*Sarothrura elegans* DEW. MILLER, 1924, Bull. A. M. N. H., L, p. 308.—*Sarothrura elegans reichenovi* CHAPIN, 1927, Bull. A. M. N. H., LIII, p. 476.—*Sarothrura elegans reichenovi* BANNERMAN, 1931, 'Birds. Trop. W. Afr.,' II, p. 24, Pl. II, figs. 1, 2 (Mayombe). PETERS, 1934, 'Check-List,' II, p. 196 (L. Albert).

SPECIMENS.—Avakubi, 2 ♂, July 4, Sept. 16. Babonde, ♂, July 20. Medje, 3 ♂, Mar. 26, Apr. 12, Sept. 29.

ADULT MALE.—Iris brown, bill dark gray, feet brownish gray.

DISTRIBUTION OF THE SPECIES.—From Sierra Leone, the northern Congo, and northern Somaliland, southward in the west probably to Angola, and in the east to Natal and Knysna in Cape Province. Known from relatively few localities. We are scarcely justified in recognizing more than three races:

S. e. elegans (Smith), recorded from the southeast coast of Africa, Knysna to Natal, and Nyasaland, possibly extending north to the Uluguru Mountains and even to Mount Kenya.

S. e. reichenovi, occupying the forested Cameroon, Congo, Uganda, and the region south of Mount Elgon. It certainly extends southward to Stanley Pool and Lukolela on the Congo River, and may be expected to reach Angola. There is an adult male in the Congo Museum from Kilo; and in the Rothschild Collection a female from Ishangi on the south shore of Lake Kivu. It must certainly occur in the Gaboon, as it is reported from the Mayombe; and it is to be looked for in the Kasai district. Some form, probably *reichenovi*, occupies Upper Guinea, for at

¹ 1867, 'Birds S. Afr.' p. 339.

several places in Sierra Leone and southern French Guinea Bates¹ heard the unmistakable call of the species.

At best, *reichenovi* is scarcely distinguishable from the typical race. I cannot see any constant difference between males, and doubt whether the female of *reichenovi* is darker, more heavily barred on the underparts as has been claimed.

Measurements of six adult males of *reichenovi* from the Ituri district and one from southern Cameroon: wing, 83–89 mm.; tail, 32.5–36; exposed culmen, 13.5–14.5; metatarsus, 25–27; middle toe with claw, 26.5–28.5.

Four adult females from Lolodorf, Cameroon (Carnegie Museum): wing, 84–89 mm.; tail, 34–36; culmen, 12.5–14; metatarsus, 24–26; middle toe with claw, 26.5–27.5.

I have examined the type of *S. e. loringi* Mearns from Mt. Kenya, which I think identical with *S. e. elegans*; and I doubt the validity of *S. e. languens* Friedmann from Uluguru.

Sarothrura e. buryi O.-Grant, of which only the female type is known seems much more whitish below than any other I have examined. It is surprising that any representative of the species should occur in northern Somaliland.

In West and Central Africa *Sarothrura elegans* is a common inhabitant of second growth and the border regions of the forest. Unlike other members of the genus, it exhibits marked nocturnal activity. My acquaintance with it was gained only after long search for the author of a weird note, most often heard at night, which I began in April, 1910, in the Mabudu country near the Nepoko River.

During a large part of the year one may hear this unobtrusive call—low, prolonged, and, to our ear, mournful—issuing from the dense vegetation near the village clearings. It might be called a low wailing, with almost the clarity of a tuning fork, and offering no measure of distance. Starting faintly, it swells in volume without change of pitch, and then ceases abruptly after three or four seconds. Often it is repeated persistently, with intervals of silence lasting six or eight seconds, and in the stillness of night is audible at 300 yards. The sound becomes commonplace, and natives attribute it a variety of creatures, even chameleons or a large skink, though many of them do know it is made by a small bird. Native names for the bird are “Ne-i” (Medje), “Nebebu” (Mangbetu), “Njunju” (Mabudu).

Finally, at Badonde, in July, 1913, I had a party of natives surround one that was calling at daybreak in a neglected banana grove. It did

¹ 1931, *Ibis*, p. 672. See also Bannerman, 1935, B. B. O. C., I.V, p. 17.

not take wing, and was caught in the hand. Subsequent experience showed that this crane lives on high ground, away from water, seldom in virgin forest, and not in open grassy fields. Thickets on old cleared land are preferred. Near Avakubi, by the same method, we caught two more males; and at Lukolela my natives brought me two in 1930. One of these I kept alive for three days, but the only noise it made was a low growl, audible within a few yards.

Females are evidently silent, and in the northern Ituri males call most frequently from March to September. At Lukolela the dates are, of course, reversed: September 11 to March 13, so one may say the calling starts with the rains, and continues about six months. When heard during daytime, the sound seems weak, and it appears that the esophagus can be distended with air so as to increase the resonance, much as in the pectoral sandpiper, the prairie chicken, and a number of other birds.¹

Nesting may be delayed till the latter part of the season of calling. In late September, 1926, near Irumu (Ituri district), we discovered a nest on the ground in a patch of woods, with three white eggs. When shown to me by my black companion, the nest was not roofed over. A cautious approach at night with a flashlight enabled me to catch the incubating female. One of her eggs measures 26×20.2 mm. In southern Cameroon Bates² reported the finding of two nests in September and October, one with three eggs, the other with four, $26-28$ mm. $\times 20-21.5$.

In six stomachs of Reichenow's pigmy-crane I have found insects most commonly, including termites and a small roach. Small snails were noted in three stomachs, tiny pebbles also being swallowed, but seeds only once.

Sarothrura pulchra centralis Neumann

Sarothrura pulchra centralis NEUMANN, 1908, B. B. O. C., XXI, p. 45 (type locality: Mswa, W. shore Lake Albert). BANNERMAN, 1921, Ibis, p. 115; 1922, B. B. O. C., XLIII, pp. 6, 7 (Medje). CHAPIN, 1923, Am. Naturalist, LVII, p. 113; 1927, Bull. A. M. N. H., LIII, p. 476. SCHOUTEDEN, 1923, Rev. Z. A., XI, pp. 316, 388 (Tshikapa; Luebo; Kwamouth); 1924, idem, XII, p. 262 (Kidada); 1925, idem, XIII, p. 5 (Kunungu); 1936, Ann. Congo Mus., Zool., I, f. 2, p. 68 (Buta; Poko; Mauda). W. L. SCLATER, 1924, 'Syst. Av. Æth.', pt. 1, p. 105. PETERS, 1934, 'Check-List,' II, p. 195. STONE, 1936, Proc. Acad. Nat. Sci. Phila., LXXXVIII, p. 557 (Saidi).—*Corethrura cinnamomea* SHARPE, 1884, Journ. Linn. Soc. Lond., Zool., XVII, p. 441 (Ndoruma). HARTLAUB, 1891, Abhandl. Naturwiss. Verein Bremen, XII, p. 43.—*Corethrura pulchra* DE SOUSA, 1887, Jorn. Sci Lisboa, XII, p. 85 (Cahungula). SHARPE, 1890, in Jameson, 'Story of Rear Column,' p. 411 (Aruwimi

¹ See also the account by Astley Maberly, 1935, Ostrich, VI, pp. 39-42.

² 1927, Ibis, p. 12.

R.); 1894, 'Cat. Birds Brit. Mus.,' XXIII, p. 116 (Tingasi). HARTLAUB, 1891, Abhandl. Naturwiss. Verein Bremen, XII, p. 44. BERLIOZ, 1925, Bull. Mus. Hist. Nat. Paris, XXXI, p. 352 (Luluabourg).—*Corythura cinnamomea* SHELLY, 1888, P. Z. S. Lond., p. 49. FLOWER, 1894, idem, p. 604 (Ulike Urumbi).—*Corethrura pulchra* OUSTALET, 1893, Naturaliste, VII, p. 128.—*Sarothrura pulchra* REICHENOW, 1900, 'Vög. Afr.,' I, p. 286; 1911, 'Wiss. Ergeb. D. Z.-Afr. Exp.,' III, p. 248 (Beni). DUBOIS, 1905, Ann. Mus. Congo, Zool., I, f. 1, p. 24 (Banalia; Kisantu). LÖNNBERG, 1907 Arkiv f. Zool., III, No. 21, p. 3 (Mukimbungu). W. DEW. MILLER, 1924, Bull. A. M. N. H., L, pp. 308, 309.—*Sarothrura* CHAPIN, 1915, A. M. Journ., p. 284.—*Sarothrura pulchra* subsp. BANNERMAN, 1921, Ibis, p. 117.—*Sarothrura pulchra batesi* BANNERMAN, 1922, B. B. O. C., XLIII, p. 7 (S. Cameroon and N. Angola); 1931, 'Birds Trop. W. Afr.,' II, p. 24 (Landana). W. L. SCLATER, 1924, 'Syst. Av. Æth.,' pt. 1, p. 105.

SPECIMENS.—Bengamisa, ♂, Sept. 27. Avakubi, ♂, Jan. 21; ♀, Aug. 28. Babonde, ♀, July 20. Medje, 3 ♂, Mar. 29, Apr. 11, May 14; 4 ♀, Mar. 27, 30, May 15, 26. Niangara, ♂, Apr. 23. Dungu, ♂, Feb. 23. Faradje, 4 ♂, Mar. 5, May 7, Aug. 17, 29; 3 ♀, Jan. 2, Apr. 27, Aug. 17; ♂ juv., ♀ juv., May 9. Nzoro, ♂, Aug. 5.

ADULT MALE.—Iris medium brown, bill blackish, feet brownish-gray.

ADULT FEMALE.—Iris light brown or brownish-gray, bill and feet dark gray.

DISTRIBUTION OF THE SPECIES.—Western and central forest-region of equatorial Africa, from the Gambia to the Kavirondo district, and south to northern Angola. *S. p. pulchra* (Gray) ranges from the Gambia to southern Nigeria. *S. p. tibatiensis* Bannerman occupies the highlands of northern Cameroon, and may extend to the eastward. *S. p. zenkeri* Neumann is restricted to the coastlands of southern Cameroon and perhaps of the Gaboon, but a male from the Portuguese Congo in the Paris Museum is nearer *centralis* than *zenkeri*.

Sarothrura pulchra centralis ranges from the Lower Congo and Bitye in Cameroon, east to Doruma in the northern Uelle, Lake Albert, Nandi in Kenya Colony, Bukoba, the Lualaba River, the Kasai district, and Ndala Tando in northern Angola. There is a male from Lokandu on the Lualaba in the collection of Mr. J. H. Fleming of Toronto. From Luluabourg Father Callewaert has sent us eight males and two females.

In this subspecies the tail of the female usually shows distinct broad bars of black, as was the case in seven specimens out of nine from the Uelle and Ituri districts. This black tail-barring is wider in the same sex of *zenkeri*, and the back is more narrowly banded with ochraceous. Males of *zenkeri* have smaller white spots on the back than those of *centralis*.

S. p. pulchra has small spots on the back in the male, but is less deeply colored than *zenkeri*, the female with tail faintly barred, if at all.

S. p. tibatiensis is rather like typical *pulchra*, but larger, the wing of males attaining 91.5 mm. *S. p. batesi* Bannerman¹ has less title to recognition, being roughly intermediate between *zenkeri* and *centralis*, so that I prefer to unite it with the latter.

Measurements of *centralis* from the northeastern Congo—10 males: wing, 76–85 mm.; tail, 38.5–45.5; exposed culmen, 14–16.5; metatarsus, 31–34; middle toe with claw, 30.5–34.5. 8 females: wing, 79–85 mm.; tail, 36.5–44.5; exposed culmen, 14.5–16; metatarsus, 30.5–34.5; middle toe with claw, 31–34.

Sarothrura pulchra is probably the commonest species in collections because—I suspect—of its voice. It is one of the two spotted species characteristic of wooded places, even outside the main body of the equatorial forest. Found along the wooded banks of brooks and swamps, it betrays its presence during the day by a cheery call, not very loud, but repeated almost incessantly. The notes have something faintly bell-like, and a slight break comes after every three or four syllables. “Goong-goong-goong-goong, goong-goong-goong-goong,” Until I had seen the bird call, I could scarcely believe that a rail was the author.

The bird’s range extends out along wooded river-bottoms to the borders of the Sudan, and in the northeastern Uelle it is also to be heard in papyrus swamps. On the eastern Congo frontier it ascends to 5300 feet in the highlands, even a few miles east of Rutshuru. Though extending southward over the whole Kasai district, it does not reach the Upper Katanga.

If one sits quietly and patiently along a brook where the bird has been calling, it is fairly sure to reappear, walking along the bank or jumping from stone to stone. Besides the more pleasant call, which has given rise to the Mangbetu name of the bird, “Nung-gung-gu,” there is another shriller “kik-kik-kik. . . ,” emitted rapidly and more rail-like in quality. The species calls throughout the year.

Examination of seven stomachs showed that insects formed the greater part of their food, but small snails had been eaten in three cases, small frog-bones were found twice, and earthworms once. No seeds were noted.

It was my good fortune to find two nests of *S. p. centralis* near Faradje. On April 27, 1911, in a damp bit of gallery-forest, a small dark bird darted out from under my feet. Its nest was a small oval mound, not quite four inches high, nine inches long. Covered with dead leaves exactly like those around it, it could be entered only through a horizontal

¹ 1922, B. B. O. C., XLIII, p. 7 (Bitye, S. Cameroon).

slit kept closed by the weight of the roof until actually raised by the bird. Dry plant-stems as well as dry leaves formed its interior. Setting a snare, we were able to catch the female when she came back to her pure-white eggs, two in number. They measured 30.3×21.9 and 30.9×22.1 mm.

The second nest was found in like manner on May 7, 1911, near a pool of stagnant water in swampy woods, and was an almost exact counterpart of the first. This time the male was incubating two eggs just about to hatch, and he was caught with a butterfly net. The downy black young hatched soon afterward. From this evidence and that obtained by dissections, I conclude that the breeding season falls in the first half of the rainy season, though directly on the equator there is probably no complete regularity.

Himantornis hæmatopus hæmatopus Hartlaub

Himantornis hæmatopus HARTLAUB, 1855, J. f. O., p. 357 (type locality: Dabocrom, Gold Coast). BANNERMAN, 1922, Rev. Z. A., X, p. 193 (Uelle R.); 1931 'Birds Trop. W. Afr.,' II, p. 4, Fig. 1 (in part. Likandi R.; Bambili). W. L. SCLATER, 1924, 'Syst. Av. Æth.,' pt. 1, p. 100. SCHOUTEDEN, 1935, Bull. C. Z. C., XI, p. 69 (vicinity of Buta). CHAPIN, 1935, Bull. C. Z. C., XII, p. 71.—*Himantornis himantopus* SCHOUTEDEN, 1935, Bull. C. Z. C., XII, p. 43.

The genus *Himantornis* has no very close ally. While its feet resemble those of *Gymnocrex rosenbergi* of Celebes, and both these rails have but eight rectrices, *Himantornis* differs from *Gymnocrex* in having no aftershaft, no tuft on the oil-gland, and a eutaxic wing.¹ The natal down of *Himantornis* is unlike that of most rails, and not blackish.

DISTRIBUTION OF THE SPECIES.—West and central Africa, from Liberia to Cameroon, Mayombe forest in Lower Congo, and eastward to the Ituri and Manyema districts.

The few specimens I have seen from Upper Guinea do not differ perceptibly from those of the Cameroon, and similar plain-colored birds have been taken in the Lower Uelle district: at the Likandi River (British Museum), Koloka (Frankfort Museum), Buta, and Bambili (Congo Museum). *H. h. hæmatopus* may therefore be said to range from Liberia to the northern Belgian Congo. A few of our own specimens from the vicinity of Medje might be referred to this race, if *whitesidei* did not likewise occur there.

H. h. petiti, of the southern Gaboon, Portuguese Congo, and Mayombe, has the breast-feathers strongly margined with bluish gray, but usually lacks blackish spotting there.

¹ First noticed by Bates, 1911, Ibis, p. 483.

H. h. whitesidei, of the south-central and eastern Congo forests, is richly colored, with more warm brown above, and the breast-feathers often bear a median spot of black. There remains a question as to its distinctness from *petiti*, but I believe these differences hold good for the majority of specimens.

Himantornis hæmatopus petiti (Oustalet)

Psammocrex petiti OUSTALET, 1884, Naturaliste, II, p. 509 (type locality: Landana, Portuguese Congo).—*Himantornis hæmatopus* OUSTALET, 1898, Bull. Mus. Hist. Nat. Paris, IV, p. 357 (Eschira country). BANNERMAN, 1931, 'Birds Trop. W. Afr.,' II, p. 4 (in part. Mayombe).—*Himantornis hæmatopus whitesidei* SCHOUTEDEN, 1926, Rev. Z. A., XIII, p. 187 (Makaia Ntete).—*Himantornis hæmatopus petiti* PETERS, 1934, 'Check-List,' II, p. 180 (Loango coast).

The female type is preserved in the Paris Museum and shows some approach to *whitesidei*, especially in the color of the upperparts. The breast-feathers are conspicuously margined with gray, but lack dark centers until the lower breast and flanks are reached. The crown is dark brown, and forehead and supercilium darker than usual in *whitesidei*. Wing, 213 mm., metatarsus, 76.

DISTRIBUTION.—Forested districts from the southern Gaboon to the Lower Congo. A male taken by Aschemeier at Oguma in the Fernand Vaz district (U. S. National Museum) likewise has broad margins of the breast-feathers bluish gray. There was every reason to expect this wood-rail in the Mayombe forest. Dr. Schouteden obtained a specimen there, at Makaia Ntete, which was at first identified as *whitesidei*, but which I find inseparable from *petiti*.

Himantornis hæmatopus whitesidei Sharpe

Himantornis whitesidei SHARPE, 1909, B. B. O. C., XXV, p. 19 (type locality: Lolanga, Upper Congo¹). BANNERMAN, 1922, Rev. Z. A., X, p. 193 (Uelle R.). W. L. SCLATER, 1924, 'Syst. Av. Æth.,' pt. 1, p. 100. MILLER, 1924, Bull. A. M. N. H., L, pp. 308, 309, 318, 322. SCHOUTEDEN, 1936, Bull. C. Z., XIII, p. 18 (near Bolobo). STONE, 1936, Proc. Acad. Nat. Sci. Phila., LXXXVIII, p. 556 (Epiwi R. in Ituri).—*Himantornis hæmatopus* DUBOIS, 1905, Ann. Mus. Congo, Zool., I, f. 1 p. 24 (Banalia; Umangi). SCHOUTEDEN, 1918, Rev. Z. A., V, p. 221 (Djapanda, near Mawambi). BANNERMAN, 1931, 'Birds Trop. W. Afr.,' II, p. 4 (in part. Lulonga R.; Poko; Buta; Panga; Popoi; Medje; Lesse; Inkongo).—*Himantornis whitesidei* BANNERMAN, 1919, B. B. O. C., XXXIX, p. 97; 1921, Ibis, p. 112. CHAPIN, 1927, Bull. A. M. N. H., LIII, p. 538. PETERS, 1934, 'Check-List,' II, p. 180 (Ituri; Manyema). SCHOUTEDEN, 1936, Ann. Mus. Congo, Zool., I, f. 2, p. 67 (Bambili).—*Himantopus whitesidei* SCHOUTEDEN, 1928, Bull. C. Z. C., V, p. 40 (Itimbiri R.).

SPECIMENS.—Avakubi, ♂, July 10. Gamangui, 2 ♀, Feb. 13, 19. Medje, 3 ♂, Mar. 9, 26, May 7; 4 ♀, Mar. 9, 17, 27, Apr. 24; ♂ juv., May 7. Akenge, ♀, Oct. 1.

¹ A mission station north of Coquilhatville, at mouth of Lulonga R.

ADULT MALE.—Iris light reddish brown or reddish orange, eyelids and lores blackish; maxilla black, mandible light blue, with blackish tip; feet light crimson, claws gray.

ADULT FEMALE.—Iris dull red, brownish orange, or reddish orange; base of mandible sometimes grayish green; feet rose-red.

DISTRIBUTION.—From the vicinity of Lukolela eastward to the Semliki Valley and the Manyema district, and northward to the Bomokandi River at Poko. The southern limit is near the Sankuru River, along the southern margin of the equatorial forest.

Two adults, male and female, from Lukolela are black-spotted on the breast, like the type in the British Museum and several of our specimens from the Ituri, as well as others I have seen from Kitutu, Manyema district, and Inkongo on the Sankuru River. Some of the females from the Ituri lack this spotting. Measurements of our series from the Ituri, four adult males and six adult females: wing, ♂, 220–232 mm., ♀, 200–225; tail, ♂, 84–93, ♀, 80–91; exposed culmen, ♂, 38.5, ♀, 38–39.5; metatarsus, ♂, 78.5–84.5, ♀, 73–81.5; middle toe with claw, ♂, 49.5–55, ♀, 49–53.

This large wood-rail is widely distributed throughout the Congo forests, yet of our dozen specimens only a single one was shot with the gun. Most of the others were trapped, save for the one young bird captured in the hand. It seemed to be attracted with one of its parents by the glow of a lantern at night. The old bird flew up into the trees and escaped.

To trap these birds a little fence was built across tiny forest rivulets, leaving an opening in the middle, where a noose was arranged so as to catch the bird either by the leg or by the neck when the trap was sprung. A large rat (*Malacomys longipes centralis*), also fond of brooks, was frequently caught in the same traps. The short toes of *Himantornis* are adapted to walking on fairly hard ground; it is primarily a bird of deep forests. At Lukolela one was caught during the dry season in a deadfall set in forest seventy yards from the nearest spot where a small brook would flow during the rains.

To this species the natives of the Ituri and Bomokandi attribute, no doubt correctly, a curious sound often heard in the forest at twilight. This is a rather low, gruff call of several syllables, repeated over and over again, without a pause, sometimes for several minutes, and audible for several hundred yards.

According to the Medje people, the bird is saying “jú-urúkwandra, jú-urúkwandra. . . .,” meaning literally “go away from my place.” This advice is said to be addressed to the leopard, or to other birds, such as the guinea-fowl. The performance has a peculiar rhythm, which na-

tive imagination associates with dancing, so that they often wag their heads from side to side when imitating the sound.¹ This noise, said to be delivered from a perch, I have heard in the northern Ituri in the months of March, April, July, and September.

At Lukolela on the middle Congo I heard *Himantornis* call in the evening only during late December. There, the natives also put it into words: "Nakatele akulu, nakakwela na nsusu," which mean, "My feet became red, I married a chicken." The story went that the rail once came out of the forest and mated with a chicken of a village. The sun turned his feet red, and the hen cast him off. Back again in the forest, his feet remain red, hence his repeated complaint.

Though probably not an active bird through the day, it is said not to be strictly nocturnal either, but rather to feed in the morning and evening on the ground, roosting aloft at night. One of our specimens was shot from a perch, ten feet up.

Native names of such an interesting bird are worthy of mention; in the northeastern Congo, the Medje call it "Nekudzakula"; the Wabali, "Kodo-kodo"; and the Azande, "Bwagido." Along the middle Congo River, the Mpama know it as "Unsasi"; the Mobangi, "Monsasi"; and the Basengere, "Bunsansu."

The stomachs of nine adult birds were examined; in seven cases they contained varied insect-remains, including beetles; two had eaten only ants; one a small millipede; one had swallowed small snails of two kinds, as well as a small frog or toad. All but two had a few small stones in the gizzard, and three had some hard seeds as well.

A native near Medje, who brought me a specimen (March 17) killed with an arrow while on its nest, along with its three eggs, assured me that the nest had been placed in a tree. There is no doubt as to the identification of these eggs, so closely do they agree with one which I took from the oviduct of a female (February 13). Their color is creamy white with scattered spots of red-brown that vary from small specks to fair-sized blotches. The blotches are numerous toward the smaller end, and some are half concealed, showing as gray shell-markings. Dimensions, 49-50.5 × 38.1-38.9 mm.

The color of the natal down is most unusual. In our youngest specimen, with juvenal plumage just beginning to sprout, the down is brownish white below, rather dull light brown above, with a well-marked dark pattern, consisting of a blackish-brown patch covering the whole crown, a stripe of the same color from lores to ears, and a broad median stripe

¹ See also Bates, 1907, *Ibis*, p. 421.

of sepia on back and rump. This chick has small sharp claws on both pollex and index. Iris very dark brownish; maxilla blackish, mandible gray; feet dull pink.

Subfamily Gallinulinæ

KEY TO THE SPECIES OF *GALLINULA* IN AFRICA

Wing more than 148 mm. long, base of both mandible and maxilla red. *G. chloropus*.
 Wing less than 148 mm. long, red on bill—if any—restricted to base of culmen
 *G. angulata*.

Gallinula angulata Sundevall

Gallinula angulata SUNDEVALL, 1850, Öfv. K. S. Vet. Akad. Förh. Stockh., VII, p. 110 (type locality: "Lower Caffraria" = Natal). SHARPE, 1894, 'Cat. Birds Brit. Mus.,' XXIII, p. 181 (Ambriz, Angola). DUBOIS, 1905, Ann. Mus. Congo, Zool., I, f. 1, p. 24 (Katanga). SCHOUTEDEN, 1936, Ann. Mus. Congo, Zool., I, f. 2, p. 69 (Buta; Niangara; Abimva).

SPECIMEN.—Stanleyville, ♂ im. Aug. 16.

Iris brownish-red; bill dull yellow, dusky on base of culmen; feet grayish-green. In the adult male the frontal shield becomes bright red.

This example was not fully adult, for it retained a considerable amount of white on the middle of the underparts, and also whitish feathers on the throat. Its wing measured 128 mm. Adult males have wings 132–146 mm.

Gallinula pumila P. L. Sclater, considered by Reichenow to be the young of *G. angulata*, is as Bates¹ believed, the adult female of *angulata*. The distinct brownish plumage of the female is exceptional for this genus.

DISTRIBUTION.—From Senegal, Darfur, and Sennar south to the Cape Province, and on the island of São Tomé. In the Congo it seems to be nowhere a common bird. Our single specimen from Stanleyville was procured for us by the natives, and none was ever seen alive by us in the Ituri or Uelle districts.

The Congo Museum, however, now has specimens from Buta, Niangara, and Abimva in the Uelle district, as well as Barumbu on the upper Congo, Moba on Lake Tanganyika, Kabalo on the Lualaba, and Kando in the Upper Katanga. In 1937 I obtained one myself at Angumu in the heart of the eastern Congo forest. De Riemaecker has collected it at Elisabethville. The species may also be expected in the Lower Congo, for it was taken at Landana by Lucan and Petit.

The lesser moorhen breeds throughout its range, or at least in Darfur, Kenya Colony, and Damaraland. The nest is of rushes or water grass, hidden in the wettest part of a marsh, and usually contains four eggs, yellowish white or very pale brown, with gray shell-markings and spots

¹1911, Ibis, p. 483.

of rufous-brown, most numerous about the large end. Dimensions, 33.5×24 mm. The rainy season seems to be preferred for nesting, though van Someren found eggs near Nairobi, Kenya Colony, in June.

***Gallinula chloropus meridionalis* (Brehm)**

Stagnicola meridionalis C. L. BREHM, 1855, 'Vogelfang,' p. 331 (type locality: South Africa).—*Gallinula chloropus* DUBOIS, 1905, Ann. Mus. Congo, Zool., I, f. 1, p. 24 (Katanga). SCHOUTEDEN, 1918, Rev. Z. A., V, p. 221 (Baraka).—*Gallinula chloropus brachyptera* GYLDENSTOLPE, 1924, K. Svenska Vet. Akad. Handl., (3) I, No. 3, p. 303 (L. Edward; L. Albert). SCHOUTEDEN, 1930, Rev. Z. A., XVIII, p. 281 (Kafubu R.); 1936, Ann. Mus. Congo, Zool., I, f. 2, p. 69 (Mahagi Port).—*Gallinula chloropus meridionalis* PAGET-WILKES, 1926, S. Afr. Journ. Nat. Hist., VI, p. 69 (upper Kafue R. near Ndola).—*Gallinula ochropus brachyptera* SCHOUTEDEN, 1933, Rev. Z. A., XXII, p. 381 (Ruhengere).

DISTRIBUTION OF THE SPECIES.—From Europe, southern Asia, and North America to northern Argentine, Cape Province, Madagascar, the Seychelles, Celebes, Guam, and the Hawaiian Islands. The African race, *meridionalis*, ranges from South Africa north to Abyssinia and the southern border of the Sudan, as well as the islands of São Tomé and Anobon. But it is wanting in all the forest region of western Africa and the Congo.

There are specimens from the Katanga, Baraka on Lake Tanganyika, and Ruhengere in Ruanda. Count Gyldenstolpe took two on the lakes of British Ruanda, where they are abundant, and reported seeing others on Lakes Edward and Albert. They may be expected on Lake Kivu. Mr. G. Babault showed me an example which he had collected on the Mokoto Lakes; and on Lake Bunyoni (6700 feet) I found them to be among the commonest water-birds, swimming between the lily-pads near the shores. When excited they can step up on a patch of water-lilies and run off on top of them. At Kabare on the south shore of Lake Edward I too saw a few moorhens, but I noticed none on Lake Albert.

In nesting habits the African moorhen resembles the European race, and is said to lay from four to eight eggs. These are creamy white to pinkish buff, spotted with rusty red and lead-blue, $39.1-45$ mm. \times $27.9-32.5$.¹ Nests have been found in the region of Damaraland from February to April, in Natal in June, and in Nyasaland during August. The breeding season in the eastern Congo is not known.

***Porphyryula alleni* (Thomson)**

Porphyrio alleni THOMSON, 1842, Ann. Mag. Nat. Hist. Lond., X, p. 204 (type locality: Idda, Niger R.).—DUBOIS, 1886, Bull. Mus. Roy. Hist. Nat. Belg., IV, p.

¹ Chubb, 1914, Ann. Durban Mus., I, p. 36; Belcher, 1930, 'Birds of Nyasaland,' p. 69.

149 (L. Tanganyika). SCHOUTEDEN, 1918, Rev. Z. A., V, p. 221 (Beni). DE RIE-MAECKER, 1927, Rev. Z. A., XIV, p. 258 (Kafubu R.).—*Hydrornia alleni* JOHNSTON, 1884, 'The River Congo,' p. 369 (Isangila).—*Porphyriola alleni* DUBOIS, 1905, Ann. Mus. Congo, Zool., I, f. 1, p. 24 (Karema; Kisantu; L. Leopold II).—*Porphyryula alleni* SCHOUTEDEN, 1924, Rev. Z. A., XII, p. 409 (Eala); 1925, idem, XIII, p. 6 (Kunungu); 1926, idem, XIII, p. 187 (Boma); 1932, Bull. C. Z. C., VIII, p. 104 (Buta); 1936, Ann. Mus. Congo, Zool., I, f. 2, p. 69.

SPECIMENS.—Boma, ♂, Jan. 27. Avakubi, ♂, Nov. 28; ♂ im., Dec. 19. Nzoro, ♂ im., July 31.

ADULT MALE.—Iris scarlet; bill red, darker than eye, and browner above, frontal shield dark brown or dusky green; feet brownish red, becoming scarlet on front of tibiae.

DISTRIBUTION.—From the White Nile and Senegambia to Cape Province, also in Madagascar, Ascension, and other islands. Will be found locally, depending upon suitable river banks and swamps, throughout the Congo. Rodhain and Bequaert shot one near the village of Nkole, where the Luapula empties into Lake Moero. Raven secured specimens at Kabwe and Kongolo on the Lualaba River. Apparently absent, however, from the small highland lakes of the Kivu district.

At Nzoro and Avakubi these small porphyrios were found haunting the fringe of grass along the river banks. They were not numerous, and seen but rarely. On one occasion, at sundown, a pair was found perched high in the stout grasses, where they evidently meant to spend the night. At Boma they were somewhat more common, in a large papyrus swamp. Like moorhens they can swim well, and I have even seen a wounded specimen dive.

Nests found in southern Nyasaland by Paget-Wilkes¹ were placed among tangled water-weeds and leaves, which formed a matted growth on the more open stretches of water. Four or five eggs are laid, dirty white to light reddish brown, with ashy or purplish shell-markings and reddish-brown spots, measuring 31.1–39.5 mm. by 22.9–27.

Of three stomachs examined, all contained small grass-seeds, one also showed pieces of a large spider and of insects. In two cases the birds had swallowed bits of stone.

Porphyrio madagascariensis (Latham)

Gallinula madagascariensis LATHAM, 1801, 'Index Orn. Suppl.,' p. lxxviii (type locality: Madagascar).—*Porphyrio smaragnotus* DUBOIS, 1886, Bull. Mus. Roy. Hist. Nat. Belg., IV, p. 149 (L. Tanganyika).—*Porphyrio smaragdonotus* SCHALOW, 1886, J. f. O., p. 416 (Manda, Marungu); 1887, idem, p. 226 (Mpala). MATSCHIE,

¹ 1928, Ibis, p. 728; 1930, idem, p. 445. See also Reichenow, 1900, 'Vög. Afr.,' I, p. 293; Skinner, 1925, Ool. Rec., V, p. 67; Belcher, 1930, 'Birds of Nyasaland,' p. 68.

1887, J. f. O., p. 145.—*Porphyrio porphyrio* REICHENOW, 1900, 'Vög. Afr.,' I, p. 290 (Luitshe R.); 1911, 'Wiss. Ergeb. D. Z.-Afr. Exp.,' III, p. 249. SASSI, 1912, Ann. Naturh. Hofmus. Wien., XXVI, p. 354 (L. Edward). SCHOUTEDEN, 1918, Rev. Z. A., V, p. 221 (Kabare).—*Porphyrio madagascariensis* DUBOIS, 1905, Ann. Mus. Congo, Zool., I, f. 1, p. 24 (Pweto; Karema). GYLDESTOLPE, 1924, K. Svenska Vet. Akad. Handl., (3) I, No. 3, p. 303 (L. Edward). SCHOUTEDEN, 1930, Rev. Z. A., XVIII, p. 281 (near Elisabethville). BANNERMAN, 1931, 'Birds Trop. W. Afr.,' II, p. 28, Fig. 8.—*Porphyrio porphyrio* var.? LÖNNBERG, 1917, Arkiv f. Zool., X, No. 24, p. 7 (L. Edward).

DISTRIBUTION.—Madagascar and a large part of Africa, from Cape Province north to Egypt, Lake Chad, and Senegal, and accidental in southern Europe. Unknown in the forest regions of western Africa and the Congo, or even in the Anglo-Egyptian Sudan.

All the records from the Belgian Congo are from the Upper Katanga and the vicinity of Lakes Edward, Tanganyika, and Moero. Like the other gallinules, the king reed-hen leads a secretive existence in reedy marshes, and builds its nest amid reeds growing in shallow water. Sets of eggs number three to five. They are pale reddish brown or yellowish stone color, spotted with purplish and rufous-brown, averaging about 56×37 mm.¹

Subfamily Fulicinae

Fulica cristata Gmelin

Fulica cristata GMELIN, 1789, 'Syst. Nat.,' I, pt. 2, p. 704 (type locality: Madagascar). REICHENOW, 1911, 'Wiss. Ergeb. D. Z.-Afr. Exp.,' III, p. 249 (L. Bolero). LÖNNBERG, 1917, Arkiv f. Zool., X, No. 24, p. 7 (Rutshuru). SCHOUTEDEN, 1918, Rev. Z. A., V, p. 222 (Kibati; Mokoto Lakes); 1932, idem, XXII, p. 249 (L. Gando); 1933, idem, XXII, p. 381 (Kisenyi). GYLDESTOLPE, 1924, K. Svenska Vet. Akad. Handl., (3) I, No. 3, 303 (L. Edward). PAGET-WILKES, 1926, S. Afr. Journ. Nat. Hist., VI, p. 69 (upper Kafue R. near Ndola). BOWEN, 1933, Ecology, XIV, pp. 257, 260, Fig. 6B.—? *Fulica cristata* JOHNSTON, 1884, 'River Congo,' p. 369 ('Stanley Pool and many broad parts of Congo').

DISTRIBUTION.—Madagascar; Africa from Cape Province north to Pungu Andongo in Angola, and through eastern Africa to Abyssinia; also in Morocco and southern Spain. Sir Harry Johnston's reference to this coot from Stanley Pool and vicinity is undoubtedly erroneous. It is not known from western equatorial Africa, nor from any part of the Congo save the eastern border. Here I have seen it only at the southern end of Lake Edward. Count Gyldenstolpe recorded it from Lakes Bunyoni and Chahafi. Douce collected it at Kisenyi on Lake Kivu, and G. Babault showed me a specimen from the Mokoto Lakes. In life the pale

¹ See especially W. L. Slater, 1906, 'Birds S. Afr.,' IV, pp. 266-268; Paget-Wilkes, 1923, Ibis, pp. 727, 728; 1930, idem, p. 446.

gray bill, white frontal shield (bordered behind by two reddish knobs), and the lack of a white flank-stripe readily distinguish it from the moorhen.

The red-knobbed coot is fond of quite open water, and builds a floating nest amid rushes, containing three to seven eggs. These are cream-colored, freely speckled with small spots and blotches of very dark brown, measuring 49.7–59.7 mm. by 35.4–40.¹

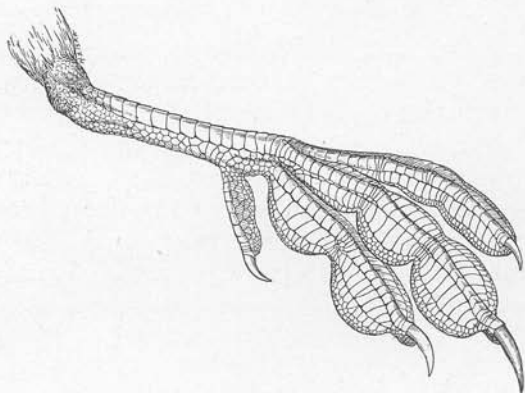


Fig. 1. Left foot of a coot, *Fulica cristata*. $\times 1/2$.

FAMILY Heliornithidæ. FINFEET

Podica senegalensis senegalensis (Vieillot)

Heliornis senegalensis VIEILLOT, 1817, 'Nouv. Dict. Hist. Nat.,' XIV, p. 277 (type locality: Senegal).—*Podica senegalensis* DUBOIS, 1905, Ann. Mus. Congo, Zool., I, f. 1, p. 24 (Panga). MILLER, 1924, Bull. A. M. N. H., L, p. 325.—*Podica* CHAPIN, 1915, A. M. Journ., pp. 284, 290.—*Podica senegalensis senegalensis* CHAPIN, 1921, A. M. Nov., No. 17, p. 14 (Avakubi; Niapu; Niangara); 1926, Bull. A. M. N. H., LIII, p. 5; 1927, idem, LIII, p. 538. W. L. SCLATER, 1924, 'Syst. Av. Æth.,' pt. 1, p. 116. STRESEMANN, 1924, J. f. O., p. 97. BANNERMAN, 1931, 'Birds Trop., W. Afr.,' II, pp. 37, 38 (Ituri R.). PETERS, 1934, 'Check-List,' II, p. 213. SCHOUTEDEN, 1936, Ann. Mus. Congo, Zool., I, f. 2, p. 70 (in part. Panga; Dramba). STONE, 1936, Proc. Acad. Nat. Sci. Phila., LXXXVIII, p. 557 (Ekibondo).—*Podica senegalensis petersi* M.-PRAED AND GRANT, 1935, Ibis, p. 669 (in part. Uelle and Ituri rivers).

SPECIMENS.—Avakubi, ♂, Apr. 28; 3 ♀, Mar. 29, May 22, July 22. Panga, ♀, Sept. 12; ♂ im., Sept. 12. Niapu, 1 juv., Dec. Niangara, ♀ im., Dec. 11.

ADULT MALE.—Iris rather dark brown; bill scarlet, duller and paler toward tip, culmen dusky brown; feet bright orange red, browner on back of metatarsi.

¹ See W. L. Sclater, 1906, 'Birds of S. Afr.,' IV, pp. 270–273; Chubb, 1914, Ann. Durban Mus., I, p. 36; Hartert, 1921, 'Vög. pal. Fauna,' III, p. 1853.

ADULT FEMALE.—Colors of soft parts similar, but not quite so bright; bill shading nearly to whitish below; iris rather dull buffy yellow.

DISTRIBUTION OF THE SPECIES.—From Senegal to Nigeria, Cameroon, northern Congo, and the Tana River system in Kenya Colony, south through western Africa to Angola, also through eastern Africa south to Natal and the Cape Province. There are three well-marked subspecies, and perhaps a fourth.

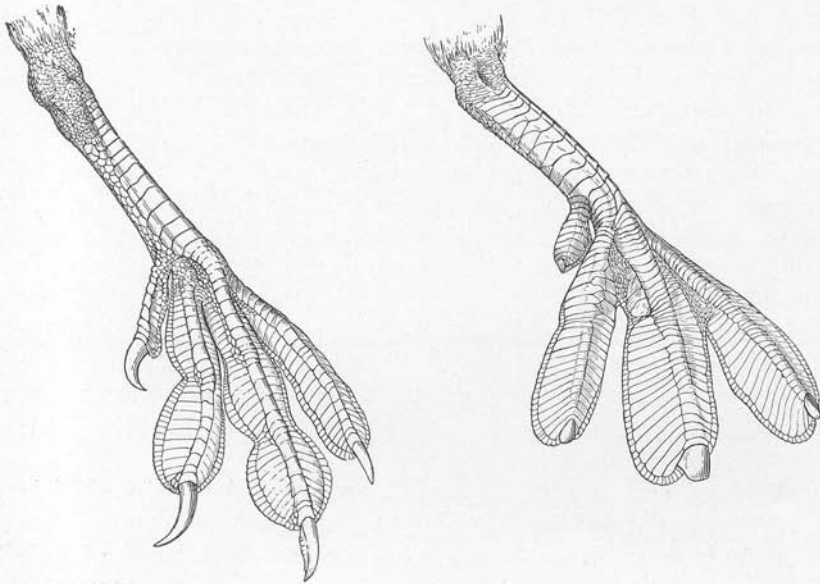


Fig. 2. Left feet of *Podica s. petersii* and of a grebe, *Podiceps cristatus* (at the right). $\times 1/2$.

P. s. senegalensis ranges through Upper Guinea to the Niger delta, and across the northeastern Belgian Congo to Uganda. It is a rather small bird, the wing in males 186–211 mm., in females 163–182 mm. Underparts always whitish in the middle, even in fully adult males which are distinguished by their gray throats.

P. s. camerunensis, of forested Cameroon, Gaboon, and the central Congo basin, is a darker race, averaging slightly smaller. Wings of males 177–212 mm., of females 152–179 mm. In fully adult males the underparts are mottled with blackish or almost wholly black.

P. s. albipectus, still doubtfully distinct from *senegalensis*, was de-

scribed from the mouth of the Shiloango River. Colored like *senegalensis*, it is supposedly larger, thus approaching *petersii*.

P. s. petersii, of eastern and southeastern Africa, the largest race, has the wing in males 220–252 mm., in females 184–215 mm. Underparts always whitish in the middle. Females of *petersii* are just about as large as males of typical *senegalensis*, and some confusion has naturally resulted.

After careful examination of material in London, Berlin, Tervueren, and in several other museums, I am convinced that the birds of the north-eastern Congo forest are not separable from typical *senegalensis*. Certainly they are not *petersii*, as stated by Mackworth-Praed and Grant. One of our adult females from Panga is faintly mottled with dark brown on the middle of lower breast and belly; and somewhere in that neighborhood one may expect intergradation with *camerunensis*. Our adult male from Avakubi is in full plumage, with dark gray throat, a distinct white line down the side of the neck, and whitish breast and belly. Its wing measures 207 mm.; that of the immature male from Panga, 186 mm.; and those of the adult females from Avakubi and Panga 168–172 mm. In the Congo Museum there is a sub-adult male from Dramba, Upper Uelle district, without gray on throat, wing 211 mm. Once assumed, the gray throat seems to be retained at all seasons. The Field Museum has an adult female with wing only 176 mm. taken at Entebbe, Uganda, by Sir Frederick J. Jackson.

Finfoot is certainly a better name than sun-grebe for *Podica*, which is so little like a grebe. It usually swims close to shore, and takes to the land when frightened. When feeding in smaller streams within the forest, it readily escapes notice. Only on rare occasions did we come upon these birds, generally while traveling by canoe along forested rivers. They “pattered” or flew a little way ahead, soon dropping back into the water, and swam to the bank. On land they can run rapidly, and are apt to be lost if not driven back toward the water. Then they may scuttle out over the water again. Never have I seen one dive. Sometimes they sit on boughs or tree-trunks overhanging the water.

Natives of this region know the finfoot as the author of a low reiterated booming sound,¹ said to be heard mostly when the water is rising in the streams; hence they picture the bird as calling for water and rejoicing in rains. The Mangbetu and Medje call it “Ne-dukenge,” the Wabali “Mukenge.” I doubt that *Podica* eats many fish. In the seven stomachs I examined there were invariably remains of insects, often beetles, but also a dragon-fly larva, a green grasshopper, and wings of a

¹ Compare Bates, 1930, ‘Handbook Birds W. Afr.’ p. 75.

dragon-fly. One of the birds had also eaten a small crab, another, two snails, some small shrimps, and a small millipede. There were usually small pieces of stone in the gizzard. Bates¹ recorded bits of prawns in the gizzard of *P. s. camerunensis*; and Chubb² found the stomach of a female of *P. s. petersii* to contain the remains of frogs.

In the Ituri, breeding seems to begin with the rains, for an adult male with enlarged gonads was taken on April 28, while on May 22 a female was shot that had a fully formed egg in the oviduct. This measured 50 mm. \times 38. Its ground-color was whitish, faintly tinged with buff, and the rufous spots, which marked it throughout, varied much in size—the smallest no larger than pin-points—but were largest and thickest on its larger end. Most of the markings were slightly prolonged longitudinally, giving a streaked effect, and many slightly clouded over. The ovary showed three empty follicles, and the remaining ova were not markedly enlarged. It seemed that this must be the last egg of a set of three.

Another female examined on July 22 showed five swollen ova in the ovary, so the number of eggs may sometimes be larger. That the breeding season coincides with rains and high water in the rivers is confirmed by our three young specimens secured in September and December.

The young bird from Niapu has the remiges less than half grown and retains the rufous-brown natal down on a large part of the crown. A downy chick of *senegalensis* in the British Museum, from Southern Nigeria (October 6), still retaining the egg-tooth, has most of the upper-parts chocolate-brown, forehead rufous, and a blacker line down the middle of the back, with other dark lines on the sides of the rump and upper surface of wings. A blackish stripe crosses the lores, cheeks and throat whitish washed with brown, chest cinnamon-drab, and remaining underparts white.

***Podica senegalensis camerunensis* Sjöstedt**

Podica camerunensis SJÖSTEDT 1893, O. Mb. p., 42 (type locality: Bongene near Mt. Cameroon). SCHOUTEDEN, 1930, Bull. C. Z. C., VI, p. 118 (near Stanleyville); 1933, idem, X, p. 32; 1935, idem, XII, p. 43 (Buta).—*Podica senegalensis* OUSTALET, 1893, Naturaliste, (2) VII, p. 128.—*Podica senegalensis* REICHENOW, 1900, 'Vög. Afr.', I, p. 298 (in part. "Ubangi" = lower Ogowé R.). SCHOUTEDEN, 1924, Rev. Z. A., XII, p. 409 (Bikoro; Eala); 1929, Bull. C. Z. C., VI, p. 48 (Buta); 1934, idem, XI, p. 44.—*Podica senegalensis camerunensis* PETERS, 1934, 'Check-List,' II p. 214. SCHOUTEDEN, 1936, Ann. Mus. Congo, Zool., I, f. 2. p. 69 (Buta).—? *Podica senegalensis camerunensis* M.-PRAED AND GRANT, 1935, Ibis, p. 669 (Luluabourg). *Podica sene-*

¹ 1909, Ibis, p. 8.

² 1908, Journ. S. Afr. Orn. Union, IV, p. 108.

galensis senegalensis SCHOUTEDEN, 1936, Ann. Mus. Congo, Zool., I, f. 2, p. 70 (in part. Buta).

DISTRIBUTION.—From the base of Mount Cameroon south to Sette Cama on the Gaboon coast, and eastward across the central Congo basin, in the forest belt, to Lukolela, Buta, and the vicinity of Stanley Falls.

The Congo Museum now has five males of *camerunensis* in full plumage: from Karawa in the Ubangi district, from Buta in the Lower Uelle, from between Titule and Api, from 31 km. east of Stanleyville, and from Inkongo on the Sankuru River. In the same museum there are an immature male and three adult females from Buta, two females from Eala, and another from Bikoro. An immature male and a female from Kunungu near Bolobo seem referable to *camerunensis*; and a female from Leopoldville, with wing 179 mm., belongs either with this race or the rather doubtful *albipectus*.

On August 16, 1930, a native boy at Lukolela brought me another adult male of *camerunensis*, which I kept alive for eight days. Mr. de Bellefroid saw it and assured me that he had shot several like it in the Lulonga district. Finally, on December 14, 1930, a young bird in natal down was brought to me at Lukolela, where natives had captured it in a large forest swamp about a mile from the banks of the Congo. It was similar in color to the chick of *P. s. senegalensis* already described. Here again, breeding seems to take place in the first half of the rainy season. Dr. Schouteden also noted a chick taken from a nest near Eala on January 19.

***Podica senegalensis albipectus* Stresemann**

Podica senegalensis albipectus STRESEMANN, 1924, J. f. O., p. 97 (type locality: Chinchoxo, Portuguese Congo. Also from Landana and Shiloango R.). BANNERMAN, 1931 'Birds Trop. W. Afr.,' II, p. 40. PETERS, 1934, 'Check-List,' II, p. 214 (Loango Coast). M.-PRAED AND GRANT, 1935, Ibis, p. 669 (near the Congo R. mouth).—*Podica senegalensis* BOCAGE, 1881, 'Orn. Angola,' p. 487 (Landana; Chinchoxo; Loemma R.). REICHENOW, 1900, 'Vög. Afr.,' I, p. 298 (in part. Shiloango; "Luemba" = Loemma).—*Podica petersi* BOCAGE, 1881, 'Orn. Angola,' p. 488 (Insonné).—*Podica* JOHNSTON, 1884, 'River Congo,' pp. 352, 353, 369 (Stanley Pool; Lower Congo; Shiloango R. and coast).

This race is light-breasted, like *senegalensis* and *petersii*, and supposedly intermediate between them in size. Two females had wings 171 and 178 mm., not longer therefore than birds of that sex from Upper Guinea. A third specimen, not sexed but resembling a female, had the wing 196 mm. I am inclined to think it really an immature male. The claim for the larger size of *albipectus* rests mainly on a statement by

Bocage¹ that Lucan and Petit collected a fully adult male at Insonné on the Shiloango River, with wing 220 mm., tail 170, bill 47, metatarsus 44.

If this proves to be correct, we may use the name *albipectus* for a white-breasted race that probably extends eastward from the Loango Coast and Portuguese Congo to the Kasai district, and possibly even to the Lualaba River. We have a female collected by Father Callewaert at Luluabourg, apparently adult, and too well spotted on the back for *camerunensis*. Its wing measures 181 mm., close to the maximum for *senegalensis*. The Field Museum has another female from Luluabourg, with wing 188 mm. long. Were it not for Bocage's measurements, *albipectus* would seem scarcely more distinct from typical *senegalensis* than are the birds of the Ituri district.

Podica senegalensis petersii Hartlaub

Podica petersii HARTLAUB, 1852, Abhandl. Naturwiss. Verein Hamburg, II, pt. 2, p. 62 (type locality: Mozambique).—*Podica* SCHALOW, 1886, J. f. O., p. 432 (Luvulombo R.).—*Podica petersi* MOURITZ, 1914, Ibis, p. 36 (headwaters Musoshi R.). PAGET-WILKES, 1926, S. Afr. Journ. Nat. Hist., VI, p. 67 (Upper Kafue R. near Ndola).—*Podica senegalensis* DE RIEMAECKER, 1927, Rev. Z. A., XIV, p. 258 (Lubumbashi R.).—*Podica senegalensis petersi* M.-PRAED AND GRANT, 1935, Ibis, p. 669 (in part. Kasenga on Luapula R.).

DISTRIBUTION.—From the mouth of the Tana River and the upper Thika River in Kenya Colony south through Mozambique, Nyasaland, Zululand, Transvaal, and Natal to eastern Cape Province. Also westward across the Katanga and Rhodesia and probably to southern Angola and Damaraland.

Specimens from East Africa south to Mozambique and Nyasaland average slightly smaller than those of South Africa, but the difference is scarcely important enough for the recognition of subspecies. The wing-length varies somewhat as follows: Eastern Africa south to Mozambique and Nyasaland, ♂ 220–242, ♀ 184–197 mm.; South Africa, ♂ 231–252, ♀ 186–215.

From the Katanga, the Congo Museum has a gray-throated male collected at Kapiri by de Baillet-Latour on November 19, 1913. It has the thick bill of *petersii*, with exposed culmen 54 mm. The wing measures but 215 mm. This may be evidence of intergradation between *petersii* and the smaller West African forms. Dr. J. Bequaert has also given me a careful description from his notebook of a gray-throated male of *Podica* killed at Bukama on April 23, 1911. He did not measure the length of the wing, but noted the length from tip of bill to tip of tail as

¹ 1881, 'Orn. Angola,' p. 488.

56 cm., spread of wings as 65 cm. These dimensions seem smaller than those of South African specimens of *petersii*.

The habits of *petersii* are similar in every respect to those of *senegalensis*. A nest of *petersii* described by Mr. E. C. Chubb,¹ was found on a river near Bulawayo, Southern Rhodesia, built of dry reeds and coarse grass, with a few leaves as lining, and placed on a mass of old reeds left in an overhanging bough by a former freshet, but now five feet above

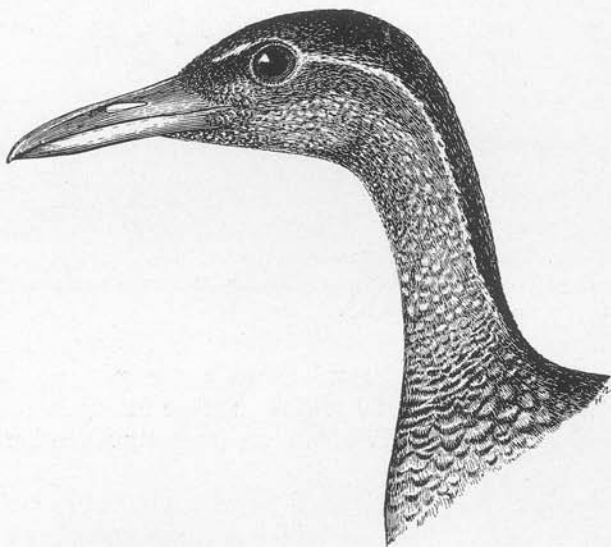


Fig. 3. Head of adult male of *Podica s. petersii*. $\times 1/2$.

the water. In it were two eggs, of a drab ground-color with splashings of reddish brown, these being much thicker at the large end. The date was January 19.

Another nest, found in October by W. Krienke in the Beatrice district of Southern Rhodesia, was likewise a platform of sticks on a fallen tree over a pool. Eggs two, rich cream-color, with blotches of light purplish-brown and reddish-orange spots.² Dimensions of eggs from South Africa: 52–57 mm. \times 41–42.

¹ 1908, Journ. S. Afr. Orn. Union, IV, pp. 107, 108, Pl. v.

² Priest, 1934, 'Birds of S. Rhodesia,' II, p. 66.

ORDER GRUIFORMES

FAMILY Gruidæ. CRANES

KEY TO THE GENERA OF GRUIDÆ REPRESENTED IN THE CONGO

- Feathering of crown gray and rather short, nape white; no bare skin behind the eye, a hanging wattle at each side of throat almost wholly covered with short white or gray feathers.....BUGERANUS, p. 41.
- Crown velvety black; a large tuft of straw-like feathers on occiput; a broad patch of bare skin on side of head behind the eye, loose drooping skin on upper fore-neck naked.....BALEARICA, p. 42.

Buggeranus carunculatus (Gmelin)

Ardea carunculata GMELIN, 1789, 'Syst. Nat.,' I, pt. 2, p. 643 (type locality: Cape of Good Hope).—?*Grus carunculata* JOHNSTON, 1884, 'River Congo,' p. 368 ("Stanley Pool and Upper River").—*Buggeranus carunculatus* NEAVE, 1910, *Ibis*, p.

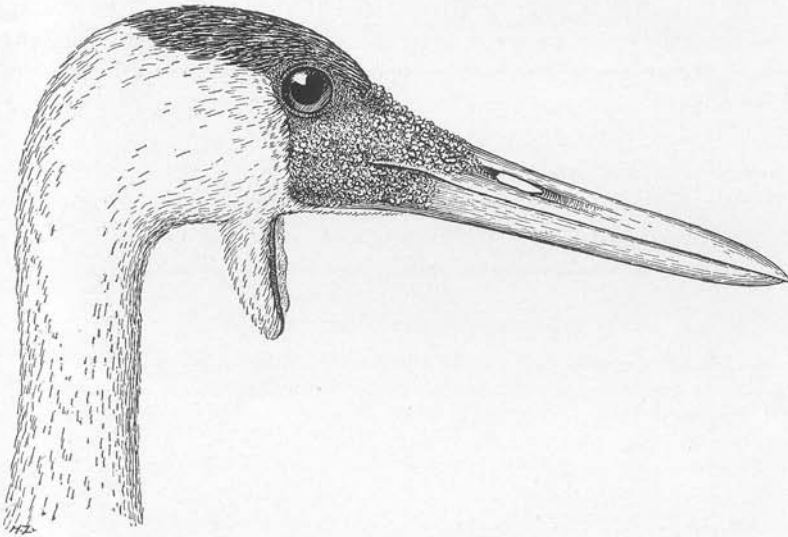


Fig. 4. Head of *Buggeranus carunculatus*. $\times 1/3$.

94 (L. Bangweolo district). SALVADORI, 1914, *Ann. Mus. Zool. Napoli*, IV, No. 10, p. 7 (L. Bangweolo). DE RIEMAECKER, 1927, *Rev. Z. A.*, XIV, p. 260 (Malambwe; Dembo des Hindous; Karavia R.). SCHOUTEDEN, 1930, *Rev. Z. A.*, XVIII, p. 281 (Kafubu R. near Elisabethville); 1932, *Bull. C. Z. C.*, VIII, p. 45 (Katanga). PRYMAN, 1935, *Ool. Rec.*, XV, pp. 49, 51 (Bangweolo swamps). LYNES, 1938, *Rev. Z. A.*, XXXI, p. 110 (Banda).

DISTRIBUTION.—From Cape Province north to Benguela, the Kasai district, Lualaba, and Tanganyika Territory; also in Somaliland

and the highlands of Abyssinia. Sir Harry Johnston's statement that the wattled crane occurred on Stanley Pool and the Congo River was surely erroneous. Such a conspicuous bird could never have been overlooked there by collectors. Yet Admiral Lynes has found it at Banda in the western Kasai, and R. Gildof at Kindu on the Lualaba.

The Congo Museum has a skin from Nieuwdorp in the Upper Katanga, and another from Kinda in the eastern Lulua district, so possibly this is the "*Grosser Kranich*?" noted by Böhm at Lake Upemba.¹ Neave collected two specimens in the Chambezi Valley, and remarked that they were not uncommon in the open country on the high plateau, especially in the Lake Bangweolo district. He found them in pairs, or sometimes as many as five together. Flocks of thirty-two, and even of sixty-five, have been reported in Southern Rhodesia.

Mr. J. De Riemaeker, who secured specimens near Elisabethville and at Malambwe, 65 km. to the northeast on the Mwati River, writes me that the wattled crane is fairly common in the marshy plains or along the borders of rivers when fringed with grassy spaces, but he does not find more than two together. They are extraordinarily wary, he adds, and since they keep to treeless places, they take wing at a distance of three or four hundred yards.

The wattled crane builds a large nest in shallow water or on a rock surrounded by water, laying two eggs, pale olive-brown faintly blotched or clouded with darker brown, 98–116.5 mm. \times 59–69.

***Balearica regulorum regulorum* (Bennett)**

Anthropoides regulorum BENNETT, 1833, P. Z. S. Lond., p. 118 (type locality: South Africa).—*Balearica pavonina* JOHNSTON, 1884, 'The River Congo,' pp. 355, 368 ("Stanley Pool"). REICHENOW, 1900, 'Vög. Afr.,' I, p. 264.—*Balearica regulorum* DUBOIS, 1886, Bull. Mus. Roy. Hist. Nat. Belg., IV, p. 149 (L. Tanganyika); 1905, Ann. Mus. Congo, Zool., I, f. 1, p. 25 (Katanga). SCHALOW, 1886, J. f. O., p. 435 (L. Upemba). MATSCHIE, 1887, J. f. O., p. 145 (Lufuku R.; Lufonzo Valley; Likulwe R.; L. Upemba). NEAVE, 1910, Ibis, p. 94 (Katanga). RODHAIN et al., 1913, 'Rapp. Miss. Sci. Katanga,' pp. 150, 151, 156, 157 (Bukama). MOURITZ, 1914, Ibis, p. 27 (Muniengashi). DERSCHIED, 1925, Bull. C. Z. C., II, p. 53 (Katanga; L. Kisale; L. Kabamba).—*Balearica* SCHALOW, 1886, J. f. O., pp. 422, 432, 434. JOHNSTON, 1908, 'George Grenfell and the Congo,' II, p. 927.

DISTRIBUTION OF THE SPECIES.—Eastern Cape Colony north to the Cunene River, Lake Kabamba on the Lualaba, the eastern Congo border to the vicinity of Mahagi, Uganda, and Kenya Colony. Two races are recognized, typical *regulorum* living in the southern part of the range.

Schalow, 1886, J. f. O., p. 434.

northward presumably to the southeastern Congo and the vicinity of Zanzibar. *B. r. gibbericeps* of the more northern parts of eastern Africa is closely similar, but the bare skin of the cheeks extends farther upward in a point toward the hind-crown.

The alleged occurrence of crowned cranes in the Lower Congo or near Stanley Pool is scarcely credible. In Angola the species does not seem to extend north of the Cunene Valley. There is, to be sure, an old mounted bird in the Congo Museum labeled "District du Bas Congo," but this locality was not even mentioned by Dubois (1905). Pechuël-Loesche¹ reported flocks of large crane-like birds resting on the sand-banks of the lower Congo and Kwilu rivers, but his description scarcely suggested *Balearica*.

Crowned cranes are not uncommon in the Katanga, where Neave and Mouritz noted them especially in the low-lying river valleys, in small parties. The birds of this region are believed to be *B. r. regulorum*, and a sketch from Dr. Bequaert's notebook of one killed at Bukama shows the posterior upper border of the bare cheeks as rounded, not running to a point. A party of six birds was noted by Bequaert on a sand-bank in the Lualaba near Bukama on October 12, but they generally sought their food on higher ground, in native farms and similar spots.

In South Africa nests of this crane, built of rushes or reeds, are located in wet, open marshes. From December to May seems to be the breeding season there, two eggs being laid, which are bluish or greenish white when not soiled with brown, and measure 82.5-89 mm. \times 51-63.5.

***Balearica regulorum gibbericeps* Reichenow**

Balearica gibbericeps REICHENOW, 1892, J. f. O., p. 126 (type locality: Lake Jipe, near Kilimanjaro); 1911, 'Wiss. Ergeb. D. Z.-Afr. Exp.,' III, p. 247 (N. E. Ruanda). LÖNNBERG, 1917, Arkiv f. Zool., X, No. 24, p. 7 (Rutshuru). DERSCHEID, 1925, Bull. C. Z. C., II, p. 52 (Bobandana; Kisenyi).—*Balearica pavonina* O.-GRANT, 1905, Ibis, p. 204 (L. Ruaketenge). SCHUBOTZ, 1921, 'Tageb. Emin Pascha,' VI, pp. 50, 52 (Tunguru on L. Albert).—*Balearica pavonina ceciliae* REICHENOW, 1911, 'Wiss. Ergeb. D. Z.-Afr. Exp.,' III, p. 247.—*Balearica regulorum* SALVADORI, 1914, Ann. Mus. Zool. Napoli, IV, No. 10, p. 7 (Ujiji; Kigali; Kagera Valley). PILETTE, 1914, 'A Travers l'Afrique Equatoriale,' p. 278, Fig. 74 (S. of L. Edward). SCHOUTEDEN, 1927, Bull. C. Z. C., IV, p. 39 (near Mahagi).—*Balearica regulorum gibbericeps* SCHOUTEDEN, 1918, Rev. Z. A., V, p. 220 (Kalegela; Kabare; Baraka); 1932, idem, XXII, p. 249 (between Kisenyi and Mutura R.; Kibati); 1933, idem, XXII, p. 381 (Kisenyi). GYLDENSTOLPE, 1924, K. Svenska Vet. Akad. Handl., (3) I, No. 3, p. 297 (Lulenga). W. L. SCLATER, 1924, 'Syst. Av. Æth.,' pt. 1, p. 110.

¹ 1888. 'Loango Exp.,' III, pt. 1, p. 252.

FRIEDMANN, 1930, 'Afr. Rep. Liberia Belg. Congo,' II, p. 751 (Kamaniola; S. W. foot Mt. Mikenno, 7250 ft.).—*Balearica pavonina gibbericeps* PETERS, 1934, 'Check-List,' II, p. 154 (eastern Belgian Congo).—*Balearica regulorum gibbericeps* SCHOUTEDEN, 1936, Ann. Mus. Congo, Zool., I, f. 2, p. 69 (near Djalasinda).

DISTRIBUTION.—Coastlands near Kilimanjaro, Kenya Colony, Uganda, and the eastern border of the Congo from the vicinity of Wadelai on the Bahr-el-Jebel and Mahagi near Lake Albert south at least to the northern end of Tanganyika. At Nyanza on the northeast shore of this lake, Raven secured an example (in U. S. National Museum) agreeing in the shape of the bare cheek-patch with others from Kenya Colony. The same is true of those in the Congo Museum from Uvira and the vicinity of Lake Edward.

Although the name *B. pavonina* (Linnæus) has sometimes been used for the crowned cranes of Lake Albert, that dark-necked Sudanese species does not reach the Belgian Congo. In the Ubangi-Shari territory, Blancou¹ noted it only once on the upper Kukur River, about 140 miles north of the Ubangi River. The eastern race, *B. pavonina ceciliæ* Mitchell, while common near the Bahr-el-Ghazal, does not seem to frequent the White Nile south of Lake No. Emin noted that in "*pavonina*" from Wadelai the long feathers of the neck were light ash-gray, and the bare cheeks pure white, bordered with red above. These colors are characteristic of *gibbericeps*.²

Emin reported crowned cranes as common about Lake Albert, usually in pairs or threes and fours, resting on the banks of rivers, and going out in the morning and afternoon to feed in native fields.

Around the eastern base of Ruwenzori, Lake Edward, and throughout the Kivu highlands, wherever the vegetation is open, crowned cranes are a common sight, fairly confiding, and seldom molested. I have seen them about Lake Bunyoni, at 6700 feet, and in a small marsh on the western slope of Mt. Mikenno, at 7200 feet. Dr. Bequaert told me that natives had found a nest in the latter spot on March 22, with two downy young. Another young bird, somewhat more than half-grown, was brought to the post of Rutshuru on May 29.

Flocks of twelve to sixteen birds are not rare; and on the south of Lake Edward, in May, I saw some of a party give their well-known dance, two birds facing each other, with wings upraised, stepping high.³ The native name in the vicinity of Rutshuru is "Malu" or "Maru," and imi-

¹ 1933, Ois. R. F. O., (N. S.) III, p. 41.

² See Mitchell, 1904, P. Z. S. Lond., II, pp. 200-205, Figs. 37-40. I cannot agree with Grote (1928, O. Mb., p. 179), that all the African crowned cranes are races of a single species.

³ See Bland-Sutton, 1911, Man and Beast in E. Ethiopia, pp. 362-365.

tates well their doleful call, heard at sundown or dusk and carrying afar. It is often accompanied by a loud grunting note, slowly repeated, doubtless by another bird. At sunset they go to roost on large trees, usually near water. At Luvungi in the Ruzizi Valley, I watched a flock of no less than fifty-five flying over.

Dr. van Someren¹ has reported nests in Kenya Colony in June and July, built amongst reeds in a swamp. Paget-Wilkes² found a nest near Kitale, Kenya Colony, on September 17 in an open marsh amid sword-grass. The eggs are described as pale bluish with an outer deposit of white, rubbed off in places, thicker in others. Dimensions: 79.6-86 × 56.5-58 mm. Two eggs usually compose a set, and they are said to become dirty brownish as incubation advances.

FAMILY Otididæ. BUSTARDS

KEY TO THE SPECIES OF BUSTARDS TO BE EXPECTED IN THE CONGO

- 1.—Wing less than 300 mm. long; male with a black patch on throat; ground-color of upperparts with considerable rufous, especially on outer wing-coverts. *Eupodotis senegalensis*.
Wing more than 300 mm. long, coloration not as above. 2.
- 2.—Wing less than 400 mm. long; neck exceptionally slender; underparts of adult male black, those of female buffy whitish with concealed blackish feather-bases, and with dark vermiculation on upper chest. *Lissotis melanogaster*.
Wing more than 400 mm. long; neck relatively stout; underparts never black. 3.
- 3.—A pointed black crest on occiput; neck narrowly barred with blackish and whitish all around, no rufous on hind-neck; wing-length 720-800 mm. in males, 530-650 mm. in females. *Choriotis kori*.
Feathers of occiput not lengthened to form a crest; neck largely gray or finely barred with blackish, but always light rufous on hind-neck; wing-length 540-635 mm. in males, 460-515 mm. in females. *Neotis cafra*.

Lissotis melanogaster melanogaster (Rüppell)

Otis melanogaster RÜPPELL, 1835, 'Neue Wirbelthiere Fauna Abyss.,' p. 16, Pl. VII (type locality: Lake Tsana, Abyssinia). SCHALOW, 1886, J. f. O., pp. 432, 435 (Likulwe R.; L. Upemba). DUBOIS, 1886, Bull. Mus. Roy. Hist. Nat. Belg., IV, p. 149 (L. Tanganyika); 1905, Ann. Mus. Congo, Zool., I, f. 1, p. 25 (Katanga). MATSCHIE, 1887, J. f. O., p. 145 (Lufuku R.). REICHENOW, 1900, 'Vög. Afr.,' I, p. 256 (S. W. of L. Edward); 1911, 'Wiss. Ergeb. D. Zentr.-Afr. Exp.,' III, p. 247 (W. of L. Albert; Mpororo; Rutshuru Plain). RODHAIN et al., 1913, 'Rapp. Miss. Sci. Katanga,' pp. 150, 151 (Nyangwe). SCHOUTEDEN, 1914, Rev. Z. A., III, p. 261 (Kilo); 1918, idem, V, p. 220 (Ruzizi; Kivu; Uganda-Congo frontier; L. Edward; old Mission St. Gustave; Molekera; Kayera). LÖNNBERG, 1917, Arkiv f. Zool., X,

¹ 1916, Ibis, p. 202. See also Paget-Wilkes, 1938, Ibis, p. 121.

² 1928, Bateleur, I, pp. 9-11. For breeding habits of this crane in captivity, see Cerva, 1931, Zoologische Garten, Leipzig, (N. S.) IV, pp. 9-13, Figs. 1-5.

No. 24, p. 7 (Rutshuru). SCHUBOTZ, 1921, 'Tageb. Emin Pascha,' VI, p. 49 (Mak-raka). DE RIEMAECKER, 1927, Rev. Z. A., XIV, p. 259 (Lubumbashi R.; Mulando; Kasepa R.).—*Otis melanogastra* SCHALOW, 1886, J. f. O., p. 431 (Lufira R.).—*Lissotis melanogaster* SCHOUTEDEN, 1923, Rev. Z. A., XI, p. 316 (Luebo; Kabambaie; Dumbi; Tshikapa; Macaco); 1925, idem, XIII, p. 6 (Kunungu); 1932, idem, XXII, p. 249 (W. of Ngoma); 1933, idem, XXII, p. 380 (Kisenyi); 1936, Ann. Mus. Congo, Zool., I, f. 2, p. 69 (Niagara). STONE, 1936, Proc. Acad. Nat. Sci. Phila., LXXXVIII, p. 557 (Kasenyi).—*Lissotis melanogaster melanogaster* GYLDENSTOLPE, 1924, K. Svenska Vet. Akad. Handl., (3) I, No. 3, p. 298 (Ngoma; Rutshuru Plain). BANNER-man, 1931, 'Birds Trop. W. Afr.,' II, p. 64, Pl. VI. BOWEN, 1933, Ecology, XIV, p. 248, Fig. 1 C. *Otis tetrax* PETIT, 1926, 'Dix Années de Chasses,' p. 121 (Boma).—*Lissotis melanogastes* SCHOUTEDEN, 1932, Bull. C. Z. C., VIII, p. 80 (Katanga).

SPECIMENS.—Zambi, ♂ im., June 22. Niangara, ♂, Apr. 13; ♀, May 6. Faradje, 3 ♂, Jan. 31, July 30, Aug. 21; ♀, Mar. 22; ♂ im., Jan. 28.

ADULT MALE.—Iris light brown, pale yellowish buff on outer edge; rim of eye-lids dull lemon-yellow; culmen blackish, rest of bill light yellowish gray, corners of mouth yellower; feet very light yellow.

ADULT FEMALE.—Iris whitish brown, rim of eyelids, corners of mouth, and small naked areas at sides of head pinkish gray; culmen brownish black, rest of bill pale gray; feet light grayish yellow.

DISTRIBUTION OF THE SPECIES.—Over the greater part of the African continent, though rare near the Cape, extending northwest to the Gambia, as well as to Darfur and Abyssinia. Within our area, however, it is wholly lacking in the forests, and thus unknown in much of the central Congo. On the north, east, and south of our territory, it is undoubtedly the commonest species of bustard, and it occurs even in the Fernand Vaz region of the Gaboon.

Specimens from north of the Zambesi River have wings measuring 303–355 mm. (both sexes included), whereas those from South Africa are larger, as Count Gyldenstolpe pointed out, with wings 337–380. For the southern race Bannerman¹ proposed the name *Lissotis melanogaster major*, but the earlier *L. m. notophila* Oberholser² will have to be used.

The black-bellied bustard is found in the Upper Uelle district throughout the year and is not averse to alighting directly in the grass, even when it is a yard high. Four or five was the maximum number ever seen there in one day. Of course it was more fond of open spots amid the grass and bush, and in any event rather shy, usually taking wing a long gunshot away. Especially attractive to it are old fields and pastures, the latter furnishing what seem to be perhaps its favorite

¹ 1930, Ibis, p. 435.

² 1905, Proc. U. S. Nat. Mus., XXVIII, p. 836 (Durban, Natal).

food, dung-beetles. The flight is strong, with rapid flaps of the wings, the head stretched straight out forward. The long slender neck, supporting a much fuller, rounded head, lends striking character to the bird in any posture.

All the black-bellied bustards I saw and shot were silent, but an Azande hunter, who knew them well, imitated their voice as a whistle followed after a short pause by a loud "pop!"¹ We secured no specimens in the Uelle with gonads enlarged, nor any very young birds; and I suspect that they breed when the grass is high.

Nowhere have I noticed *Lissotis melanogaster* in greater abundance than on the western shore of Lake Albert near Kasenyi. There we saw eight or nine in a day, during early September, but four examples collected were all non-breeding. In the Kasai district the species must be common. Father Callewaert has sent us specimens from Lake Munkamba and Luluabourg.

Admiral Lynes² found that in Darfur this small bustard arrived in mid-June and stayed until August, apparently without breeding. Yet there is reason to believe that the rainy season is their usual period of reproduction, for eggs have been taken in Northern Nigeria in July and August, in Abyssinia in September and in Nyasaland in December. In western Kenya Colony they have been found on February 20 and April 18.

While sets of two eggs have often been recorded,³ a single egg seems sometimes to be laid. No attempt is made at nest-building, the eggs being deposited on bare ground amid tall grass, sometimes near the base of a tree. A single egg sent us by Father Callewaert from the vicinity of Luluabourg, Kasai district, is dull olive greenish, diffusely spotted with rather dark brown, and measures 58.9×49.5 mm. This is the normal color, but dimensions have been given by others as $50-65$ mm. \times $43-54$.

The stomach-contents of eight individuals were noted, and showed that *Lissotis melanogaster* is almost wholly insectivorous, though two birds killed in January had eaten numbers of soft yellow flowers and flower-buds, and two other birds had swallowed some small seeds. Among the insects eaten, beetles predominated; and numbers of them were found in seven stomachs; grasshoppers in four, hemiptera in three, caterpillars in three, crickets in two, termites in two, and mantises in

¹ Very similar descriptions of it have been given by Carpenter, 1920, 'Naturalist on L. Victoria,' p. 153; Belcher, 1930, 'Birds of Nyasaland,' p. 73; and Krienke, 1931, Ostrich, II, p. 44.

² 1916, Ibis, p. 202. See also Paget-Wilkes, 1935, Ibis, p. 121.

³ Paget-Wilkes, 1923, Ibis, p. 529; Jourdain, 1929, Ool. Rec., IX, p. 73.

two. One bird had eaten more than twenty mantises. Single centipedes were found twice; a cicada, an adult ant-lion, a wasp, and an ant, each once.

[*Eupodotis senegalensis barrowii* (Gray)]

Otis barrowii J. E. GRAY, 1829, in Griffith, 'Animal Kingdom,' Aves, III, p. 304 (type locality: Cape of Good Hope).—*Eupodotis barrowii* LYNES AND SCLATER, 1934, Ibis, p. 37 (Mocussueze in N. E. Angola).

Barrow's bustard ranges from central Cape Province north through the Transvaal and Bechuanaland to Angola. The American Museum has a male and a female from Huambo, Angola, collected by Rudyerd Boulton. Recently Admiral Lynes obtained a female at Mocussueze, close to the southern Congo border in the vicinity of Lake Dilolo. Its occurrence in the southern Lulua District is therefore fairly probable.

Eupodotis s. senegalensis (Vieillot), though reported by L. Blancou¹ from Grimari, 50 miles north of the Ubangi River, is scarcely to be expected along the northern Congo border. I doubt the accuracy of Blancou's identification.

***Neotis cafra jacksoni* Bannerman**

Neotis cafra jacksoni BANNERMAN, 1930, B. B. O. C., L, p. 60 (type locality: Amala R., Kenya Colony). PETERS, 1934, 'Check-List,' II, p. 218 (L. Bangweolo).—*Otis denhami* NEAVE, 1910, Ibis, p. 94 (Luena R., E. of L. Bangweolo; Kalungwisi distr.).—*Otis cafra* REICHENOW, 1911, 'Wiss. Ergeb. D. Z.-Afr. Exp.,' III, p. 247 (Plain W. of Kagera R.). SASSI, 1912, Ann. Naturh. Hofmus. Wien, XXVI, p. 358 (Kisaka).—*Neotis cafra cafra* HARTERT, 1915, Nov. Zool., XXII, p. 247 (Kyiowa in Karagwe; 120 km. W. of L. Tanganyika). SCHOUTEDEN, 1930, Bull. C. Z. C., VII, p. 43, Fig. on p. 44 (near Leopoldville).—*Neotis cafra cafra* JACKSON, 1926, 'Notes on Game Birds of Kenya and Uganda,' pp. 194, 195 (Burumbi in S. Uganda; "Lake Albert").—*Otis kori* SCHOUTEDEN, 1932, Bull. C. Z. C., VIII, p. 45 (Katanga).—*Neotis cafra* SCHOUTEDEN, 1932, Bull. C. Z. C., VIII, p. 80 (foot-note).

DISTRIBUTION OF THE SPECIES.—From Cape Province to the southern Congo, East Africa, Western Abyssinia, and across the Sudan to the Gambia. Three races are now admitted. *N. c. cafra* (Lichtenstein) is restricted to the region south of the Zambesi. *N. c. jacksoni*, generally darker in color but less rufous on hind-neck, ranges from Angola through Northern Rhodesia and the southern Congo to northern Kenya Colony and Uganda. *N. c. denhami*, of slightly larger size and with much paler rufous hind-neck, is the Sudanese form.

Neotis c. jacksoni, though still unknown from the Kasai district, has been collected near Stanley Pool on the Congo River, in the savannas of

¹ 1933, Ois. R. F. O., (N. S.) III, p. 32.

the Manyema, and in the Katanga. The Congo Museum has two specimens, apparently females, from Kasenga on the Luapula River (Dr. Barthélemy) and from Kassabo near Kinda in the Lulua district (Charliers). The Field Museum has specimens from Katobwe on the Lualaba River, and Katapena, south of Lake Upemba (Conover and Zimmer). The records from the Kisaka and Kagera districts are probably not quite within our limits, yet there is good reason to suppose that this bustard does reach Ruanda or Urundi. On the other hand, there are no reliable records from the vicinity of Ruwenzori or Lake Albert.

While van Someren¹ mentions its occurrence northeast of Lake Albert, the only specimen I have seen from the Bahr-el-Jebel was *denhami*. The young bustard mentioned by Emin² from Wadelai was probably also *denhami*.

The breeding season of *jacksoni* in Kenya Colony is from February to June, perhaps also in November. Jackson and van Someren have watched the males displaying, strutting like turkeys, and puffing the neck so that its feathering fans out in front like a great ball. The voice is compared to the "booming" of a bittern.

The nest of the typical South African race is said to be a depression scratched in the ground, with a wisp of grass at most for a lining, and the eggs two in number. These are light reddish brown or brownish olive, with diffuse markings of darker brown and purplish gray; dimensions 73.6–78 mm. × 53–55.

***Neotis cafra denhami* (Children)**

Otis denhami CHILDREN, 1826, in Denham and Clapperton, 'Travels and Discoveries in N. and Centr. Afr.,' II, p. 199 (type locality: interior of N. W. Africa). CHAPIN, 1916, A. M. Journ., p. 543 (Uelle).—*Otus cafra* DYBOWSKI, 1893, 'La Route du Tchad,' p. 276 (Ngapou country, near Ubangi-Shari divide).—*Otis cafra* (= *ruficollis*) OUSTALET, 1893, Naturaliste, VII, p. 128.—*Otis cafra* REICHENOW, 1900, 'Vög. Afr.,' I, p. 244 (in part. Ubangi).—*Neotis cafra cafra* W. L. SCLATER, 1924, 'Syst. Av. Æth.,' pt. 1, p. 113 (in part. "perhaps the Ubangi district").—*Neotis cafra denhami* SCHOUTEDEN, 1930, Bull. C. Z. C., VII, p. 44 (Uelle; Ubangi?).—*Neotis cafra denhami* BANNERMAN, 1931, 'Birds Trop. W. Afr.,' II, p. 53, Pl. I, fig. 15. BLANCOU, 1933, Ois. R. F. O., (N. S.) III, p. 37 (Ouaka distr. of S. Ubangi-Shari). PETERS, 1934, 'Check-List,' II, p. 218 (Uelle distr.). SCHOUTEDEN, 1936, Ann. Mus. Congo, Zool., I, f. 2, p. 70 (Bambili-Niangara; Niangara; Mauda; Faradje).

SPECIMENS.—Niangara, ♂, Mar. 26; 3 ♀, May 6, 16, Dec. 18; ♂ im., May 6; ♂ juv., Apr. 13. Dungu, ♂ juv., Jan. 6. Faradje, ♂, Jan. 31; ♀, Dec. 19; ♂ juv., Feb. 23. Aba, ♀, Dec. 18.

¹ 1933, Journ. E. Afr. Ug. N. H. Soc., No. 47–48, p. 107.

² See Schubotz, 1921, 'Tageb. Emin Pascha,' VI, pt. 2, p. 49.

ADULTS OF BOTH SEXES.—Iris yellowish white; bill black above, light gray below, naked portions of skin on head dusky; feet light grayish-yellow.

The differences between *N. c. denhami* and *jacksoni* seem to be very constant. All our specimens agree in the upward extension of the rufous coloration to the nape, and in lacking the white lateral stripe separating it from the fore-neck. The gray of the fore-neck, in adult males of *denhami*, is somewhat lighter than in *jacksoni*, but in females is heavily vermiculated. On the whole, the coloration of the neck is paler and duller in *denhami*, but even adult males have a well-marked light median stripe on the back of the crown.

In size *denhami* exceeds *jacksoni*, and the measurements of our adults of the former are as follows: two males, wing, 595, 631 mm.; tail, 300, 317; bill, 87, 93; metatarsus, 173, 181. Four females: wing, 479–515 mm. (average 500); tail, 254–290 (274.7); bill, 69–76 (72.6); metatarsus, 130–145 (139.7).

The down of the nestling is buff, lightest on belly, but with a complex pattern of black lines about the head and neck, and heavily mottled with black on the crown and all over the back and wings. Its iris was light brownish; bill gray, with whitish tip and greenish base; feet light greenish-gray.

The juvenal plumage in pattern resembles that of the adult female, but all the light markings above are more orange-buff, with a large spot of this color at the tip of each feather of the back.

DISTRIBUTION.—From the western border of Abyssinia and the White Nile just north of Lake Albert westward to Lake Chad, Sierra Leone, and the Gambia Colony. The southern limit is in the savannas just north of the equatorial forest, as in the Uelle district, Nigeria, and the Ivory Coast. The southward extension of the range to the northern Congo does not hold for the entire year; this is another example of a Sudanese migrant, occupying the savannas of the Uelle during the dry season.

During the seasons of 1910, 1911, and 1912, we noted that this fine bustard, the greatest game-bird of the region, put in appearance about Niangara and Faradje toward the latter part of November. We saw many more of them than we shot, because of their wariness; still two or three individuals were all one would ever note in a day. They arrived before the grass had been burned, and had to content themselves at first with cultivated fields or a few naturally barren spots. Then patches of burned country became available, and finally the great grass-fires of the dry season opened up the whole country to them.

The natives know their habits well; and near Aba we found them building light fences in favorable spots, with nooses hung in occasional openings, the effectiveness of which were proved by the feathers of their victims. This is not the "winter range" of Denham's bustard; instead it comes in here to breed; and by January 8 a large brown egg, doubtless correctly identified by its finder as belonging to this bustard, was brought

to us. Its ground-color was light brown (wood-brown of Ridgway), and the rather numerous but indistinct markings were of a darker brown, tinged with rufous and olive. Size: 84.5×54.8 mm.

At about the same date a young chick was secured and other young birds were taken in February, April, and May. Dissections of the old birds likewise placed the season of reproduction in December, and perhaps the two months following. We never saw more than one young bird with the parents: by May they are well grown, and not later than the end of this month all the birds quit the district, and are not seen again for at least five months.

Admiral Lynes's observations in Darfur¹ now show where this bustard spends the off-season, for there is a marked northward migration there from June to August. One only was noted during the southward migration, on October 27; and only a single specimen was obtained in January.

The first adult male we shot weighed ten pounds, this being three pounds heavier than an adult female; but Mr. N. Macris, a merchant at Faradje, assured me that he had killed one of fourteen pounds. Later we found this to be the actual weight of the male from Niangara.

In the air these bustards looked very heavy, but traveled with strong direct flight, the neck extended, and seldom gave one a second chance to stalk them. Except for a loud hoarse cry from a wounded bird, I never heard the voice. Two expert native hunters of the region described it as an abrupt raucous note, resembling the bark of the bushbuck, whence the Azande have named it "Ba-zere-bodi" meaning literally big-bird-bushbuck, while the Mangbetu name "Nagba" is similarly an imitation of its call, "gba!" appended to the article "na." This sound has been heard from a captive bird in the London Zoo² and it is accompanied by a swelling of the œsophagus with air. There is no gular pouch like that of *Otis tarda*.

The tail is carried slightly raised, and somewhat folded. In one case it had been so frayed from rubbing against the grass that of the two middle rectrices and their greater coverts little remained at the end of the breeding season but the bare shafts.

The food is largely made up of insects, which were found among the stomach-contents of all ten specimens. Beetles were present in every case, including one elater and one cerambycid, but dung-beetles much more frequently. Grasshoppers figured in seven instances, hemiptera

¹ 1925, *Ibis*, p. 555. See also Lipscomb, 1937, *Ibis*, p. 674.

² Forbes, 1880, *P. Z. S. Lond.*, p. 478.

in three, mantises in two, ants twice, a moth only once, and caterpillars (hairless) twice. A single millipede completed the list of animal food; but vegetable substances were present in seven stomachs, and included seeds, some red berries, tender stalks bearing flower-buds, and pieces of sweet-potato.

[*Choriotis kori struthiunculus* (Neumann)]

Otis kori struthiunculus NEUMANN, 1907, J. f. O., p. 306 (type locality: Lake Zwai, Abyssinia).—*Otis kori* NEAVE, 1910, Ibis, p. 94 (upper Lufupa R.).

The species ranges from Abyssinia to Tanganyika Territory (*C. k. struthiunculus*), as well as on the high veldt south of the Zambesi to Cape Province (*C. k. kori*). Neave reported seeing one in the Katanga which he could not shoot, but subsequent search has furnished no confirmation. A supposed specimen collected by de Witte later proved to be *Neotis cafra jacksoni*.¹

It seems more probable that the East African race, *struthiunculus*, may occur in Ruanda or Urundi. Jackson² believed that Dr. Dobell may have seen it once at Rusasa in the adjacent province of Ankole. I have had a similar report from Mr. R. S. Hill for eastern Ruanda, but the weight of the largest bustard he could remember was only 16 pounds. An adult male of *struthiunculus* would weigh around 30 pounds.

FAMILY **Burhinidæ**. STONE-CURLEWS OR THICK-KNEES

KEY TO THE AFRICAN SPECIES OF BURHINIDÆ

- 1.—Feathers of back, scapulars, and tail barred and spotted with black or blackish brown on a more or less buffy ground; metatarsus more than 80 mm. long. *Edicnemus capensis*.
 Back and scapulars, for the most part, streaked with black or blackish brown, and ground-color more grayish brown, sometimes with dusky vermiculation as well; middle tail-feathers not distinctly barred; metatarsus usually not more than 80 mm. long. 2.
- 2.—Back, scapulars, and middle tail-feathers diffusely vermiculated with dusky gray; a faint white band across lesser wing-coverts, bordered with blackish above. *Edicnemus vermiculatus*.
 No dusky vermiculation on back or adjacent parts. 3.
- 3.—Lesser wing-coverts crossed by a more or less regular blackish or dark brown band, but no white band directly below it, though the greater coverts are whitish subterminally. *Edicnemus senegalensis*.
 Lesser wing-coverts crossed by a distinct whitish band, which is bordered above and below by more or less regular bands of black or dark brown. *Edicnemus edicnemus*.

¹ Schouteden, 1932, Bull. C. Z. C., VIII, pp. 45, 80.

² 1926, 'Notes on Game Birds of Kenya and Uganda,' pp. 208, 209.

***Oedicnemus senegalensis* Swainson**

Oedicnemus senegalensis SWAINSON, 1837, 'Birds of W. Afr.,' II, p. 228 (type locality: Senegal). SHARPE, 1896, 'Cat. Birds Brit. Mus.,' XXIV, p. 10 (Lado). CHAPIN, 1916, A. M. Journ., p. 543 (Uelle). SCHUBOTZ, 1921, 'Tageb. Emin Pascha,' VI, p. 47 (Nyamsansi; Nsabe; Uére).—*Oedicnemus crepitans* DYBOWSKI, 1893, 'La Route du Tchad,' p. 319 (Ubangi R.).—*Oedicnemus* CHAPIN, 1915, A. M. Journ., p. 291 (Uelle distr.).—*Burhinus senegalensis* HARTERT, 1920, 'Vög. pal. Fauna,' II, p. 1521 (Gaboon; Loango). SCHOUTEDEN, 1936, Ann. Mus. Congo, Zool., I, f. 2, p. 75 (Buta; Mauda).—*Burhinus senegalensis senegalensis* MRS. A. MEINERTZHAGEN, 1924, Ibis, p. 340. PETERS, 1934, 'Check-List,' II, p. 295 (Senegal to Loango Coast and Shari R.).—*Burhinus senegalensis assimilis* MRS. A. MEINERTZHAGEN, 1924, Ibis, p. 340 (Lado).—*Oedicnemus senegalensis senegalensis* BANNERMAN, 1931, 'Birds Trop. W. Afr.,' II, p. 68, Fig. 18.

SPECIMENS.—Avakubi, ♀, Dec. 2. Gamangui, ♀, Feb. 10. Faradje, 6 ♂, Jan. 1, Feb. 17, Apr. 1, 17, Nov. 26, Dec. 3; 4 ♀, Feb. 15, Mar. 15, Nov. 22, Dec. 2.

ADULTS.—Iris and rim of eyelids yellow, bare skin behind eye green; bill black with yellow at base of maxilla, green at base of mandible; feet pale grayish green, claws black.

DISTRIBUTION.—From Senegambia and the Sudan to Egypt, Abyssinia, and Lake Rudolf, south to the Loango Coast and the Ituri River. The southern part of the range seems to be occupied for only about seven months at most; this is definitely established at least for the Uelle and Ituri districts.

Specimens from Egypt, Abyssinia, and the eastern Sudan are grayer, less edged above with cinnamon, than those of western Africa, and are often recognized as a valid race, *assimilis* Bâdeker, or more correctly *inornatus* Salvadori.¹ The difference is slight, evident mainly while the plumage is fresh, and specimens from the northern Congo are in general intermediate between the two races.

In the Ituri forest the Senegal thick-knee is little more than accidental. We saw it only twice, first on the Nepoko River, later on the Ituri; both times during the northern dry season. Yet it is common during the dry season just beyond the northern border of the forest.

Along the rivers in the Uelle district it arrives each year in early November, before the rains have ceased, and while the streams are still in full flood. During the day the birds stand placidly along the shady river-banks, but at dusk become very active, flying along to more open spots, and out to cultivated fields or even village squares. Here they walk about and feed, largely upon insects. In the eight stomachs examined we invariably found insects, usually beetles; but grasshoppers, a large earwig, and a cricket were also noted, and one toad.

¹ 1865, Atti. Soc. Ital. Sci. Nat. Milano, VIII, p. 381 (Ethiopia).

From the time of their arrival they make their presence known at night by a series of a dozen to twenty shrill piping notes, at first swelling in volume, then dying away toward the close. This calling is especially frequent under a bright moon. A shorter complaining note is sometimes given in flight, both by night and by day.

For the first two months of their stay they show no disposition to nest. It was only on February 17 that we found our first nest, in a hollow in the sand on a wooded islet near Faradje. The two eggs were dull buff, thickly spotted and blotched with dark brown, measuring 45.6×35.9 mm. and 46.2×35.8 . The male bird was incubating. Another nest was found on an island in the Uelle River below Dungu on March 2. In northern Uganda Pitman¹ found nests in these same months, and gave measurements of eggs as $49.1-52.2 \times 32.4-33.2$ mm.

At Faradje these thick-knees were still heard calling in April, but a month later they had practically disappeared. Cheesman found a nest in Abyssinia, April 22, while in Egypt they appear to be resident, and are known to nest in May.

***Oedicnemus vermiculatus vermiculatus* Cabanis**

Oedicnemus vermiculatus CABANIS, 1868, J. f. O., p. 413 (type locality: East Africa—Lake Jipe, in von der Decken, 1869, 'Reisen in Ost-Africa,' III, p. 46, Pl. xvi). SCHALOW, 1887, J. f. O., p. 226 (W. shore of Tanganyika). REICHENOW, 1900, 'Vög. Afr.,' I, p. 200; 1911, 'Wiss. Ergeb. D. Z.-Afr. Exp.,' III, p. 245 (Kisenyi; Usumbura; L. Edward). DUBOIS, 1905, Ann. Mus. Congo, Zool., I, f. 1, p. 25 (Mpala). O.-GRANT, 1910, Tr. Z. S. Lond., XIX, p. 444 (Mokia in W. Uganda). SASSI, 1912, Ann. Naturh. Hofmus. Wien, XXVI, p. 357. SALVADORI, 1914, Ann. Mus. Zool. Napoli, IV, No. 10, p. 6 (L. Kivu). LÖNNBERG, 1917, Arkiv f. Zool., X, No. 24, p. 6 (Kasindi). MENEGAUX, 1918, Rev. Fr. O., V, p. 253 (Zambi). SCHOUTEDEN, 1918, Rev. Z. A., V, p. 219 (Beni; Kayera; Kikorongo; Kwidjwi).—*Oedicnemus senegalensis* DUBOIS, 1886, Bull. Mus. Roy. Hist. Nat. Belg., IV, p. 149 (L. Tanganyika).—*Burhinus vermiculatus* HARTERT, 1920, 'Vög. pal. Fauna,' II, p. 1521 (Loango; Congo). SCHOUTEDEN, 1923, Rev. Z. A., XI, p. 318 (Basongo); 1926, idem, XIII, p. 188 (Banc d'Anvers near Boma). GYLDENSTOLPE, 1924, K. Svenska Vet. Akad. Handl., (3) I, No. 3, p. 298 (near L. Edward).—*Burhinus vermiculatus vermiculatus* SCHOUTEDEN, 1923, Rev. Z. A., XI, p. 390 (Kwamouth); 1925, idem, XIII, p. 6 (Bolobo; Kunungu). Mrs. A. MEINERTZHAGEN, 1924, Ibis, p. 341 (L. Moero; L. Kivu; L. Tanganyika; L. Albert; Upoto). PETERS, 1934, 'Check-List,' II, p. 295 (from Ogowe R. and Kenya Colony south to Cape Province).—*Oedicnemus vermiculatus vermiculatus* BANNERMAN, 1931, 'Birds Trop. W. Afr.,' II, pp. 74, 76. SCHOUTEDEN, 1932, Rev. Z. A., XXII, p. 246 (Ngoma).—*Oedicnemus vermiculatus buttkoferi* FRIEDMANN, 1930, Bull. 153, U. S. Nat. Mus., p. 186 (Gaboon to eastern Congo).—*Burhinus vermiculatus buttkoferi* VAN SOMEREN, 1933, Journ. E. Afr. Ug. N. H. Soc., No. 47-48, pp. 124, 125 (L. George).

¹ 1931, Ool. Rec., XI, pp. 62-64, 2 Figs

SPECIMENS.—Zambi, 2 ♀, June 28, 30. Kwamouth, ♂, July 14.

ADULTS.—Iris yellow; bill black, greenish around nostrils; feet light grayish-green.

DISTRIBUTION OF THE SPECIES.—From Cape Province north to Lamu, the Athi River in Kenya Colony, Lake Albert, Upoto on the Congo River, Gaboon, and Liberia. In Liberia and Nigeria there is a large-billed race, *Æ. v. büttikoferi* Reichenow, with culmen 50–54 mm. In the remainder of the range the culmen usually measures 41–43.5 mm., but specimens from the Gaboon are intermediate in this respect, with measurements of 45–48 mm. Seven specimens from the Congo River have the culmen (to base) 42.5–47 mm. Since I can find no appreciable difference in color between these skins and others from southeastern Africa, I regard them as belonging to *Æ. v. vermiculatus*, in spite of the very different conclusion of Dr. Friedmann (1930).

This stone-curlew is seldom found within the Congo forest except along rivers, but is common along the southern and eastern borders of this area. Our specimens were secured along the bank of the Kwa (= Kasai) where it joins the Congo, and on some small islands near Zambi.

More recently I have studied the behavior of the vermiculated thick-knee at Lukolela on the middle Congo River, where they are not migratory, and were noted occasionally from August, 1930, to February, 1931. During the day they were noted only on islands in the river, singly or in pairs; but late at night they would be found walking on the roads through the cacao-groves, even a couple of miles back from the river. An electric flashlight directed on them would sometimes draw a faint yellow glow from their eyes. Although the voice has been described as similar to that of *Æ. senegalensis*, I never heard any such whistles near Lukolela or in the Lower Congo.

The breeding habits¹ are known to be similar to those of *Æ. senegalensis*; the two eggs of the same coloration, measuring 45–52 mm. by 33–39 mm. On the middle Congo they must nest on the sandy shores of islands in the river, presumably during the periods of low water. The female taken at Zambi on the lower Congo, June 30, was in breeding condition.

[*Ædicnemus ædicnemus ædicnemus* (Linnæus)]

Charadrius oedicnemus LINNÆUS, 1758, 'Syst. Nat.', 10th Ed., p. 151 (type locality: England).

¹ See especially R. and V. van Someren, 1911, 'Studies of Birdlife in Uganda,' p. 8. Pls. vi, vii; and Pitman, 1928, Ool. Rec., VIII, pp. 102–103, Figs. a, b (photos of nests).

The stone-curlew of Europe and western Asia migrates south in winter to the Red Sea and the eastern Sudan, and also reaches Kyambu and Naivasha in Kenya Colony. We have a specimen taken in the Uasin Gishu district by Jenness Richardson. There is a remote possibility that it may sometimes reach the Congo border in the vicinity of Mahagi.

***Oedicnemus capensis capensis* (Lichtenstein)**

Oedicnemus capensis H. LICHTENSTEIN, 1823, 'Verzeichniss Doubl. Zool. Mus., Berlin, p. 69 (type locality: Cape of Good Hope). DUBOIS, 1905, Ann. Mus. Congo, Zool., I, f. 1, p. 25 (Lower Congo). SCHOUTEDEN, 1918, Rev. Z. A., V, p. 219 (Baraka). MENEGAUX, 1918, Rev. Fr. O., V, p. 253 (Bube in Lower Congo). DE RIEMAECKER, 1927, Rev. Z. A., XIV, p. 259 (R. Kalule Sud).—*Burhinus capensis capensis* FRIEDMANN, 1930, 'Afr. Rep. Liberia Belg. Congo,' II, p. 752 (Kamaniola). PETERS, 1934, 'Check-List,' II, p. 296 (eastern Belgian Congo).—*Burhinops capensis* SCHOUTEDEN, 1930, Rev. Z. A., XVIII, p. 281 (near Elisabethville).

SPECIMEN.—Zambi, ♂, June 30.

ADULT MALE.—Iris yellow, edge of eyelids dirty yellowish; feet yellow, but dusky on front; bill blackish with yellow base.

Although its sexual organs were enlarged, this specimen has the wing measuring only 210 mm.

DISTRIBUTION OF THE SPECIES.—From Cape Province north to the Lower Congo, Lake Tanganyika, southern Arabia, Eritrea, and Darfur. Across the Sudan it again extends westward to Asben, Togoland, and Senegal. Of the six subspecies now recognized, *O. c. capensis* extends from Cape Province northward through eastern Africa to Kenya Colony, also to Angola and the southern and eastern Congo. Southwest Africa has a paler, grayer race, *damarensis*. *O. c. maculosus* of the Western and Central Sudan is more pinkish buff on the upperparts, with smaller black spots on the back than typical *capensis*, and *O. c. affinis* Rüppell of the Eastern Sudan is doubtfully distinct from *maculosus*. Two other races, *ehrenbergi* and *dodsoni*, are restricted to Dahlak Island in the Red Sea and to Arabia and North Somaliland.

The Cape thick-knee is unknown in the forest area of the Congo, as it is in the Kasai district, but has been found in the Lower Congo, the Katanga, and the Ruzizi Valley. Our single specimen was secured by Lang on an island in the Congo River near Zambi. In South Africa, this species is often found in open country on stony flats or along the slopes of low hills, often in small flocks. It has a loud plaintive note, and is somewhat nocturnal in habits. Two eggs are laid on the ground

or on sand; they are stone-gray or light buff, with blotches of dark brown, and measure 48–56 mm. by 36–43.

[*Oedicnemus capensis maculosus* Temminck]

Oedicnemus maculosus TEMMINCK, 1824, 'Planches Coloriées,' livr. 49, Pl. CCXCII (type locality: Senegal).—*Burhinus capensis maculosus* MRS. A. MEINERTZ-HAGEN, 1924, Ibis, p. 345 (Lado).—*Burhinus senegalensis senegalensis* BLANCOU, 1933, Ois. R. F. O., (N. S.) III, p. 36 (Waka distr. in southern Ubangi-Shari).—*Oedicnemus capensis maculosus* BLANCOU, 1933, Ois. R. F. O., (N. S.) III, p. 336 (Waka distr.).

This race extends from Senegal east to Northern Nigeria and the Ubangi-Shari district, while a very similar form, *O. c. affinis*, occupies the countries from Kordofan and Eritrea south to northern Uganda and possibly Lado. Although we have as yet no record of a specimen from the northern Congo, one or both may be expected occasionally.

In French Equatorial Africa, Blancou found *maculosus* about 100 miles north of the Ubangi River. Once near Dungu in the Upper Uelle I saw a thick-knee in June, well away from water, but did not collect it. I have wondered if possibly it was not a bird of the present species.

FAMILY **Jacani**dæ. LILY-TROTTERS OR JACANAS

KEY TO THE AFRICAN SPECIES OF JACANIDÆ

- Wing more than 130 mm. long, metatarsus more than 59 mm.; forehead with a bare "shield"; lower breast and abdomen deep maroon in adult, though underparts are almost entirely white in young *Actophilornis africanus*.
Wing less than 100 mm. long, metatarsus less than 40 mm.; forehead feathered; underparts almost entirely white in both adult and young. *Microparra capensis*.

Actophilornis africanus (Gmelin)

Parra africana GMELIN, 1789, 'Syst. Nat.,' I, pt. 2, p. 709 (Africa; restricted type locality: Abyssinia). LEACH, 1818, in Tuckey, 'Narr. Exp. R. Zaire,' p. 408, (Lower Congo). HARTLAUB, 1857, 'Syst. Orn. Westafr.,' opp. p. lix. JOHNSTON, 1884, 'River Congo,' pp. 202, 368. DUBOIS, 1886, Bull. Mus. Roy. Hist. Nat. Belg., IV, p. 149 (L. Tanganyika). MATSCHIE, 1887, J. f. O., p. 145 (Luvule R.; Lufira R.; L. Upemba). REICHENOW, 1887, J. f. O., p. 299 (Manyanga). OUSTALET, 1893, Naturaliste, VII, p. 128. SALVADORI, 1914, Ann. Mus. Zool. Napoli, IV, No. 10, p. 8 (L. Bangweolo; Kagera R.).—*Actophilus africanus* REICHENOW, 1900, 'Vög. Afr.,' I, p. 267; 1911, 'Wiss. Ergeb. D. Z.-Afr. Exp.,' III, p. 248 (L. Luhondo; L. Edward). DUBOIS, 1905, Ann. Mus. Congo, Zool., I, f. 1, p. 24 (Umangi; Kisantu). SALVADORI, 1907, 'Boll. Mus. Zool. Anat. Torino,' XXII, No. 570, p. 9 (near Lukonzolwa). NEAVE, 1910, Ibis, p. 91 (L. Bangweolo); 1910, Geogr. Journ., XXXV, p. 141. SASSI, 1912, Ann. Naturh. Hofmus. Wien, XXVI, p. 356. LÖNNBERG, 1917, Arkiv f. Zool., X, No. 24, p. 7 (Kabare). SCHOUTEDEN, 1918, Rev. Z. A., V, p. 220

(Beni; Baudouinville); 1920, idem, VII, p. 189 (Temvo in Mayombe); 1923, idem, XI, pp. 318, 390 (Kasai R.; Lulua R.; Tshikapa R.; Luebo R.; between Macaco and Dumbi; Kwamouth); 1924, idem, XII, pp. 263, 410 (Kidada; Stanley Pool; near Eala; Bamania); 1925, idem, XIII, p. 7 (Bolobo region); 1926, idem, XIII, p. 188 (Vista; Boma; Kalamu R.); 1932, Bull. C. Z. C., VIII, p. 80 (? Katanga); 1933, Rev. Z. A., XXII, p. 380 (Kisenyi); 1936, Ann. Mus. Congo, Zool., I, f. 2, p. 76 (Djamba; Buta; Mauda; Mahagi Port). SCHUBOTZ, 1921, 'Tageb. Emin Pascha,' VI, p. 52 (Tunguru; S. end of L. Albert). GYLDENSTOLPE, 1924, K. Svenska Vet. Akad. Handl., (3) I, No. 3, p. 299. DE RIEMAECKER, 1927, Rev. Z. A., XIV, p. 258 (in part. Lubumbashi R.). CHAPIN, 1927, Bull. A. M. N. H., LIII, p. 539.—*Phyllopezus africanus* MENEGAUX, 1918, Rev. Fr. O., V, p. 253 (Zambi).—*Astophilornis africanus* SCHOUTEDEN, 1930, Rev. Z. A., XVIII, p. 281 (Kafubu R. near Elisabethville).—*Actophilornis africanus* BANNERMAN, 1931, 'Birds Trop. W. Afr.,' II, p. 77, Fig. 20.

SPECIMENS.—Stanleyville, ♀, Aug. 11. Avakubi, ♂ im., Dec. 27. Niangara, ♂, May 3. Dungu, ♀, Mar. 1. Faradje, ♂ im., Mar. 10.

ADULTS.—Iris dark brown; bill bluish gray, frontal shield light blue; feet dirty greenish brown. In the young, naked skin of forehead green.

Males as a rule are markedly smaller than females, having wings about 143–155 mm., whereas those of females measure 156–173 mm. Any overlapping in these dimensions will probably be attributable to the shorter wings of immature females.

DISTRIBUTION.—Nearly the whole Ethiopian Region, north to latitude 12° in the eastern, and to the Senegal River on the western side of Africa. In the Congo uniformly but sparingly distributed, save along the larger rivers and lakes, where it is more abundant. Thus the "lily-trotter" is to be seen commonly from the Congo River steamers; and about the large papyrus swamp just to the east of Boma it was a frequent sight, and even more often heard, as it repeated its petulant note, over and over, without changing the tone: "ka-ka-ka-ka. . ."

Along heavily forested rivers, like the Ituri, it is generally seen only where there is a growth of rank grass along the shores, and this is often a sign of clearing by man at some time in the past. In flight, the legs and long toes are held out behind, and the wings beat rather rapidly. In this forest region I have never come upon more than two birds together, nor did I see them at any great distance from the shore on floating plants. Along the Uelle River, I have watched them walking on wet, mossy rocks. About Lake Edward, lily-trotters are abundant, a half-dozen often feeding together. Even on Lake Bunyoni, at an altitude of 6700 feet, they are not uncommon, and may be seen standing and walking on the large lily-pads, a foot or more in diameter. Both the stomachs examined contained small seeds, rather hard, and little stones, while one held also a small snail with conical shell.

The female taken at Stanleyville in August, when the river was very low, was in breeding condition. Friedmann¹ claimed that breeding was timed with the beginning of the long rains, except around large lakes. But Belcher² found that this jacana nested in Nyasaland from June to August, during the dry season; and Emin (in Schubotz, 1921) reported numbers of nests on the Bahr-el-Jebel near Gaba Shambe at the end of April. We did not find a nest, but it is known to be built of floating plant-material and to contain usually four eggs. These are pale ochreous-brown, generously scrawled with very dark brown or blackish, mingled at times with lighter markings. Dimensions, 30-35 mm. X 20-23. According to Emin, a chick taken from the egg was wholly velvet-black, its bill flesh-red with whitish tip, and the large feet reddish gray with dark claws. His mention of the size of the feet would seem to obviate any error.

Microparra capensis (Smith)

Parra capensis A. SMITH, 1839, 'Ill. Zool. S. Afr.,' Birds, Pl. xxxii (type locality: Algoa Bay).—*Microparra capensis* NEAVE, 1910, Ibis, p. 91 (Chambezi Valley, near L. Bangweolo). GYLDENSTOLPE, 1924, K. Svenska Vet. Akad. Handl., (3) I, No. 3, p. 299 (L. Chahafi in Kigezi distr.).—*Actophilus africanus* DE RIEMAECKER, 1927, Rev. Z. A., XIV, p. 258 (in part. Kafubu R.).

DISTRIBUTION.—The smaller African lily-trotter ranges from Cape Province and Natal to Damaraland, and north through eastern Africa to Lake Naivasha and the upper Nile near Fashoda, thence westward to Fort Lamy near Lake Chad³ and Hago, Northern Nigeria.⁴ A specimen was obtained by Count Gyldenstolpe at Lake Chahafi, almost within the border of Belgian Ruanda, so it may certainly be looked for about the swampy margins of many of the lakes in the Kivu highlands. Neave found it near Lake Bangweolo and Raven collected a specimen on the Kafue River in Northern Rhodesia, so it was to be expected in the Upper Katanga. In examining the collection of J. De Riemaecker at Ghent, I found that he had collected a specimen along the Kafubu River near Elisabethville which he mistook for a chick of *Actophilornis*.

Both in its haunts and its nesting this species is said to resemble the commoner large lily-trotter. Its color-pattern is remarkably similar to that of the juvenal plumage of the larger *Actophilornis*, and the feathering of its forehead retains a downy appearance throughout life.

¹ 1930, Bull. 153, U. S. Nat. Mus., p. 153.

² 1930, 'Birds of Nyasaland,' p. 70.

³ Berlioz, 1934, Bull. Mus. Hist. Nat. Paris, VI, p. 492.

⁴ Buxton, 1935, Ibis, p. 107.

ORDER CHARADRIIFORMES

FAMILY Rostratulidæ. PAINTED SNIPES

Rostratula benghalensis benghalensis (Linnæus)

Rallus benghalensis LINNÆUS, 1758, 'Syst. Nat.,' 10th Ed., p. 153 (type locality: Asia).—*Rhynchea capensis* DUBOIS, 1905, Ann. Mus. Congo, Zool., I, f. 1, p. 24 (Pozo Valley). EMIN, 1922, in Stuhlmann, 'Tageb. Emin Pascha,' III, p. 426 (Tunguru on L. Albert).—*Rostratula capensis* NEAVE, 1907, Mem. Proc. Manchester Lit. Phil. Soc., LI, No. 10, p. 15 (Alala Plateau; L. Bangweolo); 1910, Ibis, p. 91 (E. of L. Bangweolo). MENEGAUX, 1918, Rev. Fr. O., V, p. 253 (Zambi).—*Rostratulus capensis* NEAVE, 1910, Geogr. Journ., XXXV, p. 141.—*Rhynchea capensis* DE RIE-MAECKER, 1927, Rev. Z. A., XIV, p. 258 (Elisabethville).—*Rostratula benghalensis benghalensis* BANNERMAN, 1931, 'Birds Trop. W. Afr.,' II, p. 85 (Loango Coast).—*Rostratula benghalensis* SCHOUTEDEN, 1932, Bull. C. Z. C., VIII, p. 80 (Tenke in Upper Katanga); 1936, Ann. Mus. Congo, Zool., I, f. 2, p. 73 (Niagara).

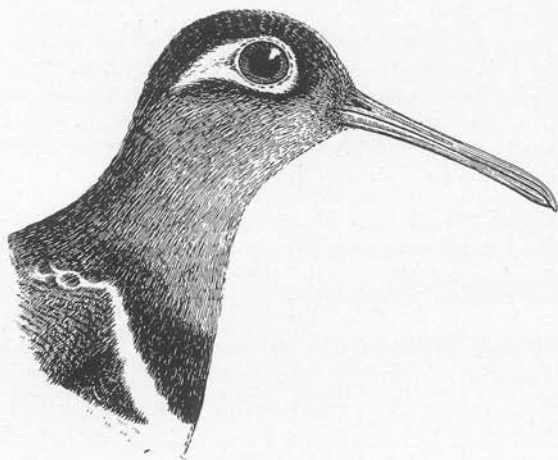


Fig. 5. Head of *Rostratula b. benghalensis*, female. $\times 2/3$

DISTRIBUTION.—Southern Asia from Asia Minor and southern Arabia to China, Japan, the Philippines, Ceylon, and Borneo; also Madagascar, and Africa from the Cape Province north to Senegal, Egypt, and Abyssinia. This vast region is occupied by the typical race, while *R. b. australis* (Gould) inhabits Australia and Tasmania. In Africa the painted snipe avoids the forests of Upper and Lower Guinea. The only Congo records are from the Uelle, the Lower Congo, Lakes Albert and Edward, the Lualaba River, and the Katanga.

Lang and I never saw one in the Uelle; but at Kabare on Lake Edward, toward the middle of May, I came across several, at different times. They were hiding amid low rushes on the shore, but did not conceal themselves so effectively as true snipe. A nervous, up-and-down jerk of the head at short intervals seemed a point of resemblance to plover and other shore-birds. When going but a short distance, to drop again into the herbage, the flight might be termed rail-like; but it is fairly rapid and rather plover-like when the bird is traveling longer distances. Of course, they never rise with the speed of true snipe. A female collected on May 13 was in condition to breed.

The painted snipe is almost always described as more like a rail in habits than a snipe. Nevertheless, it is clearly a Limicoline bird, and Dr. P. R. Lowe¹ regards *Rostratula* as a very generalized member of the shore-bird group, worthy of separation in a distinct family, and with only superficial resemblances to the true snipe. The adult female is larger and more richly colored than the male; and her voice is said to be deeper or more guttural than that of the male, as a result of a slight twisting and other modification of the trachea not exhibited by that of the male.²

According to Dr. van Someren, the painted snipe breeds in East Africa, and it is probably not migratory in those parts of the Congo where it is found. Neave noted it as abundant on the partially flooded plains to the east of Lake Bangweolo in June and July, and several examples have since been secured in the Upper Katanga. Conover collected specimens at Katobwe and Katapena, near Lake Upemba.

The nest is a depression in the ground sometimes lined with leaves or herbage, and the usual set is of four eggs. These are of a dull buff or stone-gray color, with a few purplish shell-markings and more numerous, though sharply circumscribed, blackish spots. Oval rather than pyriform, they measure 31.5-39 mm. by 22.5-27.4.

FAMILY **Charadriidæ**. PLOVERS, LAPWINGS, SANDPIPERS, SNIPES, AND ALLIES

KEY TO THE GENERA OF CHARADRIIDÆ AS REPRESENTED IN AND NEAR THE CONGO

- 1.—Without hind-toe.....2.
- Hind-toe present, though often very small.....11.
- 2.—Bill relatively long, exceeding length of remainder of head, or else of typical slender sandpiper form.....3.
- Bill as short as, or shorter than remainder of head, and of plover-like form....5.

¹ 1931, *Ibis*, pp. 491-534, 721.

² Wood-Mason, 1878, *P. Z. S. Lond.*, p. 745, Pl. XLVII.

- 3.—Bill and feet exceedingly long, metatarsus exceeding 100 mm. and the slender, nearly straight bill at least 57 mm. HIMANTOPUS, p. 91.
Metatarsus less than 60 mm. long. 4.
- 4.—Bill exceeding 60 mm. in length, and compressed laterally, especially toward tip; plumage largely blackish, or black or dark brown above and white on breast and abdomen. HÆMATOPUS, p. 89.
Bill less than 30 mm. long, not compressed but of usual sandpiper shape; in winter plumage gray above and white below, breeding plumage variegated with rufous and with blackish on chest and upperparts. . . CROCETHIA, p. 96.
- 5.—With a sharp spur on bend of wing. 6.
No spur, but often a blunt knob on bend of wing. 7.
- 6.—A naked lappet hanging from in front of each eye; upper wing-coverts largely black, head gray with a broad white stripe from forehead through middle of crown. XIPHIDOPTERUS, p. 84.
No lappet or wattle in loreal region; head with considerable black, and wing-coverts mostly light gray or gray-brown. HOPIOPTERUS, p. 79.
- 7.—With a wattle or lappet in loreal region. 8.
No wattle or lappet in loreal region. 9.
- 8.—Scutes on front of metatarsus not divided in middle; black color of lower throat extending in a stripe down middle of chest. . . SARCIOPHORUS, p. 76.
Scales on front of metatarsus mostly divided near mid-line; a crescentic band of maroon crosses the upper breast, no black on throat. ANOMALOPHRYS, p. 77.
- 9.—Distance from the tips of shortest secondaries to the ends of longest primaries (when wing is folded) less than one-half of length of wing; wing more than 160 mm. long. STEPHANIBYX, p. 74.
Shortest secondaries fall short of longest primaries by more than one-half of wing-length. 10.
- 10.—Wing-length exceeding 160 mm.; back and rump spotted, edged, or mottled with yellowish. PLUVIALIS, p. 73.
Wing-length less than 150 mm.; no yellow spotting or variegation on back or rump. CHARADRIUS, p. 64.
- 11.—Three forward toes connected by a broad web which extends out for more than half their length; bill more than 75 mm. long, somewhat flattened but tapering to a very fine point, and strikingly up-curved; wing-length at least 215 mm. RECURVIROSTRA, p. 92.
Toes not webbed, or with only slight webbing at base; bill not so thin at tip, nor so remarkably up-curved. 12.
- 12.—Bill only as long as, or shorter than remainder of head, and usually plover-like in form. 13.
Bill much longer than remainder of head, or else of typical sandpiper or snipe form. 16.
- 13.—Metatarsus a little shorter than middle toe with claw; bill with rather pointed tip, and its distal half bent slightly upward; wing not more than 160 mm. long. ARENARIA, p. 89.
Metatarsus longer than middle toe with claw; bill more blunt and plover-like; wing more than 180 mm. long. 14.

- 14.—With wattle or lappet on loreal region, and a sharp spur on bend of wing; upperparts largely dull brown; adults with a black patch on throat and blackish streaking on cheeks and sides of neck. *AFRIBYX*, p. 81.
Without loreal wattle; spur on wing wanting or very small. 15.
- 15.—Outermost primary the longest; upperparts mottled or spotted with blackish and white or pale buff, throat and breast black in breeding plumage only. *SQUATAROLA*, p. 73.
Outermost primary not longer than the next one; back uniform gray-brown, remainder of plumage largely black and white, a broad black band across chest; a small spur often present on bend of wing. *HEMIPARRA*, p. 87.
- 16.—A well-marked basal web between third and fourth toes. 17.
No web between third and fourth toes. 24.
- 17.—Bill considerably longer than metatarsus. 18.
Bill little if at all longer than metatarsus. 20
- 18.—Bill with a strong downward curve; wing at least 225 mm. long. *NUMENIUS*, p. 104.
Bill slightly or distinctly up-curved. 19.
- 19.—Wing more than 190 mm. long; bill exceeding 70 mm. *LIMOSA*, p. 104.
Wing less than 140 mm.; bill less than 55 mm. *TEREKIA*, p. 98.
- 20.—Tail very much rounded, only four middle rectrices of equal length, the outermost more than 10 mm. shorter than the median. *ACTITIS*, p. 96.
Tail square or only slightly rounded. 21.
- 21.—The brownish color of the back extends down the middle of the rump, though sides of rump and longest upper tail-coverts may be white; wing more than 150 mm. long, but bill does not exceed 38 mm.; male in breeding season with feathering about neck and chest lengthened and of remarkably variable color. *PHILOMACHUS*, p. 95.
The region of the rump or upper base of the tail always crossed by a patch of white, sometimes pure white, sometimes spotted or otherwise marked with blackish. 22.
- 22.—Bill at least 40 mm., usually considerably longer; metatarsus 50 mm. or longer. *TOTANUS*, p. 100.
Bill not more than 39 mm.; metatarsus not more than 42 mm. 23.
- 23.—Wing more than 135 mm. long, shaft of outermost primary brown above; under wing-coverts and axillaries blackish gray, only narrowly barred with white; metasternum 2-notched. *TRINGA*, p. 103.
Wing less than 135 mm. long, shaft of outermost primary whitish above; under wing-coverts and axillaries white, with spots or narrow bars of blackish gray; metasternum 4-notched. *RHYACOPHILUS*, p. 102.
- 24.—Distance from tips of shortest secondaries to ends of longest primaries (in folded wing) greater than one-half of wing-length. 25.
Above measurement less than one-half of wing-length. 27.
- 25.—Wing more than 140 mm. long. *CALIDRIS*, p. 95.
Wing less than 140 mm. long. 26.
- 26.—Wing more than 105 mm. long; bill more than 25 mm. and often slightly decurved. *EROLIA*, p. 94.

- Wing less than 105 mm. long; bill less than 23 mm. and not decurved. PISOBIA, p. 93.
- 27.—Tail only slightly rounded and not more than one-third as long as wing; outer webs of primaries with five or six conspicuous spots of yellowish buff; tip of bill curved downward. . . (see *ROSTRATULA*, in preceding family), p. 60.
- Tail rounded or even pointed, half as long as wing, or more than half; outer webs of primaries not spotted with buff; bill straight. 28.
- 28.—Bill less than 45 mm. long; inner webs of many feathers of back and scapulars with green or lilac metallic gloss. LYMNOCRYPTES, p. 106.
- Bill more than 55 mm. long; no metallic gloss on back or scapulars. CAPELLA, p. 107.

Subfamily Charadriinæ

KEY TO THE SPECIES OF *CHARADRIUS* OCCURRING IN THE CONGO

- 1.—Two blackish bands across chest, separated by a white one. 2.
Chest with a single band of blackish, rufous, or brown, or none at all. 3.
- 2.—Forehead white, wing usually less than 120 mm. long. *C. tricoloris*.
Forehead brownish, wing usually exceeding 120 mm. *C. forbesi*.
- 3.—Wing less than 120 mm. long. 4.
Wing more than 120 mm. long. 7.
- 4.—One black or brown band across chest. *C. dubius*.
No dark band entirely across chest, which is plain white in mid-line, or washed with buff or pale rufous. 5.
- 5.—A black or dull brown patch at each side of chest, the middle of which is white; metatarsus 26–30 mm. long. *C. alexandrinus*.
No dark patch at sides of chest. 6.
- 6.—Legs longer, metatarsus 29–33 mm.; in adults the white temporal stripe is continued entirely around the nape, being bordered with black below; lesser wing-coverts always more blackish than the middle and greater. *C. pecuarius*.
Legs shorter, metatarsus 23–26 mm.; pale superciliary stripe does not extend to nape, though there may be a light collar lower down on hind-neck; lesser wing-coverts not especially dark. *C. marginatus*.
- 7.—White of throat continued in a white collar entirely around hind-neck; in full plumage a single black chest-band. *C. hiaticula*.
No whitish collar around hind-neck; in full plumage a broad rufous chest-band. 8.
- 8.—Wing more than 140 mm. long, metatarsus at least 40 mm.; in full plumage a rufous chest-band with dusky posterior border. *C. asiaticus*.
Wing less than 140 mm. long, metatarsus less than 37 mm.; in full plumage the rufous chest-band has no dusky posterior border. *C. mongolus*.

Charadrius pecuarius Temminck

Charadrius pecuarius TEMMINCK, 1823, 'Planches Coloriées,' livr. XXXI, Pl. CLXXXIII (type locality: Cape of Good Hope). OUSTALET, 1893, Naturaliste, VII, p. 128. VAN SOMEREN, 1916, Ibis, p. 198 (L. Edward). SCHOUTEDEN, 1926, Rev. Z. A., XIII, p. 187 (Banc d'Anvers, near Boma).—*Egalitis pecuarius* SHARPE and BOUVIER, 1876, Bull. Soc. Zool. France, I, p. 313 (Shiloango R.). SCHWEINFURTH and RATZEL, 1888, 'Emin-Pascha,' German Ed., p. 182 (Kibiro). EMIN, 1888, 'Emin

Pasha Centr. Afr.,' p. 184.—*Aegialitis pecuaria* SHARPE, 1896, 'Cat. Birds Brit. Mus.,' XXIV, p. 297. *Charadrius varius* REICHENOW, 1900, 'Vög. Afr.,' I, p. 171 ('Ubangi R.' = Brazzaville; Tanganyika); 1911, 'Wiss. Ergeb. D. Z.-Afr. Exp.' III, p. 242 (Usumbura). SASSI, 1912, Ann. Nat. Hofmus. Wien, XXVI, p. 356 (L. Edward). MENEGAUX, 1918, Rev. Fr. O., V, p. 252 (Zambi). SCHOUTEDEN, 1918, Rev. Z. A., V, p. 217 (Kikorongo; Kabare).—*Charadrius (Ægialitis) varius* LÖNNBERG, 1917, Arkiv f. Zool., X, No. 24, p. 5 (L. Edward).—*Charadrius pecuarius pecuarius* SCHOUTEDEN, 1923, Rev. Z. A., XI, pp. 317, 389 (Basongo; Boma; Kwamouth).—*Leucopoliis pecuarius pecuarius* BANNERMAN, 1931, 'Birds Trop. W. Afr., II, p. 94, Fig. 23 (Landana).

DISTRIBUTION OF THE SPECIES.—Cape Province north to Senegal and the southern edge of the Sahara, also to Lower Egypt and Madagascar. Absent, however, from the equatorial forests of Cameroon and Congo, and apparently also from the Abyssinian plateau.

C. p. allenbyi Nicoll of Lower Egypt, with wings 100–110 mm., is not larger than specimens from Cape Province, and seems not to be valid. Birds of tropical Africa have wings 98–105 mm. *C. sanctæ-helenæ* (Harting) of Saint Helena is best regarded as a distinct species.

In the Congo this plain-colored plover is fairly common to the east of the forest, living along the borders of lakes, but it has not been noticed in the highlands of the Kivu or Upper Katanga. On the shores of Lake Edward I found it usually in parties of four to ten, on the muddy margins of shallow pools back of the reed-beds fringing the lake. On the middle Congo near Lukolela I did not see it, and Dybowski collected it at Brazzaville, not on the Ubangi. It is known from the Kasai and lower Congo River, but there is no record from the Uelle.

The breeding of this plover has been studied in southern and eastern Africa, especially by Harris and by van Someren.¹ The eggs are not easy to find because the sitting bird shuffles sand or earth over them as she leaves. Two eggs form a set, creamy buff slightly tinged with greenish, thickly covered with irregular streaks and scrolls of very dark brown, and with underlying greenish-brown markings. Dimensions: 28–33 mm. × 21–23.

Charadrius alexandrinus alexandrinus Linnæus

Charadrius alexandrinus LINNÆUS, 1758, 'Syst. Nat.,' 10th Ed., p. 150 (type locality: Egypt). REICHENOW, 1900, 'Vög. Afr.,' I, p. 169 (L. Tanganyika).—*Charadrius alexandrinus alexandrinus* GROTE, 1930, Mitt. Zool. Mus. Berlin, XVI, p. 85 (L. Tanganyika).

SPECIMEN.—Avakubi, ♀, Oct. 21.

¹ 1934, Journ. E. Afr. Ug. N. H. Soc., Nos. 40–53, pp. 185–137, 1 Pl.

DISTRIBUTION OF THE SPECIES.—Breeding from Rio de Oro, Cape Verde Islands, Azores, and western Europe east to Korea, Japan, and Indo-China. Some authorities now regard *C. nivosus* (Cassin), *C. ruficapillus* Temminck, and *C. marginatus* Vieillot as conspecific, thus extending the range to North and South America, Tasmania, and South Africa.¹

C. a. alexandrinus ranges in summer from North Africa, the Azores, and Europe eastward to Korea. It migrates south to Borneo, India, and in Africa to Lake Tanganyika and Liberia. Records from Damaraland and Knysna are erroneous. Many Kentish plovers winter in the Anglo-Egyptian Sudan, but in the northern Congo they must be rare. The example collected was the only one I ever observed there, and was in company with a ringed plover (*C. hiaticula tundræ*).

***Charadrius marginatus mechowii* (Cabanis)**

Aegialitis mechowii CABANIS, 1884, J. f. O., p. 437; 1885, idem, Pl. vi, fig. 2a (Angola; type from Kwango R.).—*Aegialites marginatus* DUBOIS, 1886, Bull. Mus. Roy. Hist. Nat. Belg., IV, p. 149 (L. Tanganyika region).—*Charadrius marginatus tenellus* REICHENOW, 1900, 'Vög. Afr.,' I, p. 171 (Kwango R.). SASSI, 1912, Ann. Naturh. Hofmus. Wien, XXVI, p. 356 (Usumbura).—*Aegialitis marginata* var. *tenella* DUBOIS, 1905, Ann. Mus. Congo, Zool., I, f. 1, p. 24 (Tanganyika; Lower Congo).—*Charadrius marginatus pallidus* SCHOUTEDEN, 1923, Rev. Z. A., XI, pp. 317, 389 (Basongo; Kwamouth); 1924, idem, XII, p. 409 (Eala); 1926, Rev. Z. A., XIII, p. 187 (Banc d'Anvers, near Boma); 1936, Ann. Mus. Congo, Zool., I, f. 2, p. 71 (Mahagi Port).—*Charadrius alexandrinus pallidus* NEUMANN, 1929, Nov. Zool., XXXV, p. 214.—*Charadrius alexandrinus tenellus* NEUMANN, 1929, Nov. Zool., XXXV, p. 214 (in part. Kisenyi).—*Leucopoliis marginatus pallidus* BANNERMAN, 1931, 'Birds Trop. W. Afr.,' II, p. 90, Fig. 21 (Chinchoxo; Congo R.).—*Charadrius marginatus hesperius* BATES, 1932, B. B. O. C., LIII, p. 11.—*Charadrius alexandrinus mechowii* NEUMANN, 1933, B. B. O. C., LIII, p. 96 (Kwango R.; Stanley Pool).—*Charadrius marginatus* BATES, 1933, B. B. O. C., LIII, p. 212 (Ubangi R.).

SPECIMENS.—Near Coquilhatville, 2 ♂, Dec. 16; ♀, Dec. 15. Nouvelle Anvers ♀, Dec. 14. Congo River, near Lié, 2 ♂, Dec. 13. Faradje, ♀, Oct. 30.

ADULTS.—Iris very dark brown; bill black, with a little greenish-gray at base of mandible; feet light gray or greenish gray, slightly buffy on metatarsi.

DISTRIBUTION OF THE SPECIES.—Tropical and southern Africa, also Madagascar. *Charadrius m. marginatus* Vieillot is restricted to South Africa, from Cape Province to Natal and Damaraland. Specimens from farther north have shorter wings (less than 105 mm.) and are more washed with rufous. Those of Madagascar and perhaps the eastern coast of Africa are *C. m. tenellus* Hartlaub. *C. m. mechowii* of central

¹ See Peters, 1934, 'Check-List,' pp. 248-253.

and western Africa ranges from Angola north to the White Nile and Liberia. It never has so broad a black band on the fore-crown as *tenellus*.

C. m. nigirius Bates¹ is supposedly a very rusty race restricted to the upper Niger River, and *C. m. pons* Neumann² a very pale one from the coast of Italian Somaliland. Professor Neumann regards all forms of *C. marginatus* as races of *C. alexandrinus*.

In breeding plumage *mechowi* is readily distinguished from *marginatus* and *tenellus* by the narrower black area on its fore-crown. This mark is usually smaller in females of *mechowi* than in males, and may be almost absent. Two females from Moba on Lake Tanganyika do not differ from Congo River specimens, so I do not believe *tenellus* occurs in the eastern Congo. A male of *mechowi* was collected by Dr. J. C. Phillips on Lake Edward, and a female by Father Moonz at Lusambo, Sankuru district.

Though widely distributed in the Congo, this small plover is mainly restricted to the islands and banks of the larger rivers and the lake-shores. In the Uelle district we observed but two single birds, one at Faradje, the other on a bar in the Uelle River between Dungu and Niangara. Never noticed in the Ituri forest, it was found rather commonly along the Congo River in the Bangala and Equator districts, at high water in December when they were not breeding, and also in March when the river was low. In December they were in small parties, seldom exceeding six, and seemed to feed most actively at dusk. Four stomachs were examined, and found to contain only insects, including one small grasshopper and the heads of many termites.

Nesting takes place no doubt at low water, as Alexander³ found with *tenellus* on the Zambesi. Sets of three eggs were laid in the sand, and throughout the middle of the day were completely covered over, as if the heat of the sun were relied on for incubation during that time. The eggs were pale buffy-brown, minutely spotted and streaked with reddish-brown, and with purplish shell-markings. Average dimensions 25.8×22.3 mm.

***Charadrius hiaticula hiaticula* Linnaeus**

Charadrius hiaticula LINNÆUS, 1758, 'Syst. Nat.,' 10th Ed., p. 150 (Europe and North America; restricted type locality: Sweden). GROTE, 1928, J. f. O., p. 750 (Fort de Pessel on Ubangi R.); 1930, Mitt. Zool. Mus. Berlin, XVI, p. 84 (Congo R.).—*Ægialitis hiaticula* DUBOIS, 1905, Ann. Mus. Congo, Zool., I, f. 1, p. 24 (in part. Lower Congo).—*Charadrius hiaticula hiaticula* FRIEDMANN, 1930, Bull. 153,

¹ 1932, B. B. O. C., LIII, p. 76 (Kulikoro, French Sudan).

² 1929, Nov. Zool., XXXV, p. 212 (Kismayu).

³ 1900, Ibis, pp. 452-454.

U. S. Nat. Mus., p. 154 (L. Edward). BANNERMAN, 1931, 'Birds Trop. W. Afr.,' II, p. 98, Fig. 25 (Congo mouth). SCHOUTEDEN, 1936, Ann. Mus. Congo, Zool., I, f. 2, p. 71 (Buta).

SPECIMEN.—Penge, ♂, Apr. 27.

DISTRIBUTION OF THE SPECIES.—Breeds from Cumberland Sound, Greenland, and the British Isles east to northeastern Siberia and Japan. Four races are admitted by Peters,¹ but one of these is *C. semipalmatus* Bonaparte of North America. *C. h. hiaticula* nests in the Baltic countries, and migrates south into Africa, especially the western half, as far as the Cape. The wing of this race measures 127–139 mm., whereas *C. h. tundræ* has wings of 122–132 mm., usually under 129 mm.

Only a single specimen in our Congo collection can be referred to the typical race. It is an adult male taken on the northward migration, and its wing measures 134 mm. The four other specimens from the Congo are all autumn birds in dull plumage which must be assigned to the Siberian race. Friedmann has examined one specimen of typical *hiaticula* from Lake Edward, but most of the Congo references to *C. hiaticula* are here placed in the synonymy of *tundræ*, since that seems by far the commoner race in the Upper Congo. The main migration route of the typical race is probably in West Africa.

Charadrius hiaticula tundræ (Lowe)

Ægialitis hiaticola tundræ P. R. LOWE, 1915, B. B. O. C., XXXVI, p. 7 (type locality: valley of the Yenesei, Siberia).—*Charadrius hiaticula* EMIN, 1892, Zool. Jahrb., VI, p. 149 (L. Albert). REICHENOW, 1900, 'Vög. Afr.,' I, p. 174. SASSI, 1912, Ann. Naturh. Hofmus. Wien, XXVI, p. 356 (Beni-Mawambi). SCHOUTEDEN, 1918, Rev. Z. A., V, p. 217 (Kabare). CHAPIN, 1927, Bull. A. M. N. H., LIII, p. 538 (Faradje).—*Ægialitis hiaticula* DUBOIS, 1905, Ann. Mus. Congo, Zool., I, f. 1, p. 24 (in part. Prov. Orientale; Umangi).—*Charadrius (Ægialitis) hiaticula* LÖNNBERG, 1917, Arkiv f. Zool., X, No. 24, p. 5 (Kabare).

SPECIMENS.—Avakubi, ♂, Oct. 21; 2 ♀, Nov. 19. Faradje, ♀, Oct. 23.

The wing-lengths are, respectively, 127, 129, 123, 123.5 mm.

DISTRIBUTION.—Breeds in Siberia and northern Scandinavia, and after its southward migration is apparently much more common in eastern and central Africa than typical *hiaticula*, likewise reaching South Africa.

Ringed plovers, in the Upper Congo, do not travel in large flocks, but are more often seen in twos or fours, sometimes singly, and just as often in dry open spaces like village squares and pastures as along the

¹ 1934. 'Check-List,' II, p. 247.

shores of watercourses. In the Ituri and Uelle the present species arrived about the middle of October; and probably the majority of the birds passed on to the southward, returning in small numbers at the time of the northern spring. Their note was occasionally heard, and closely resembled that of *Charadrius semipalmatus*. Their diet is evidently varied, for in the stomach of the Faradje specimen were found many freshly-hatched flies, a small beetle, several tiny clam-like bivalves, a very small snail, and a small millipede.

Charadrius dubius curonicus Gmelin

Charadrius curonicus GMELIN, 1789, 'Syst. Nat.,' I, pt. 2, p. 692 (type locality: Courland).—*Ægialites philippinus* DUBOIS, 1886, Bull. Mus. Roy. Hist. Nat. Belg., IV, p. 149 (L. Tanganyika region).—*Ægialitis minor* SHELLEY, 1890 Ibis, p. 169 (Yambuya). SHARPE, 1890, in Jameson, 'Story of Rear Column,' p. 412.—*Charadrius minor* EMIN, 1892, Zool. Jahrb., VI, p. 149 (L. Albert).—*Aegialitis dubia* SHARPE, 1896, 'Cat. Birds Brit. Mus.,' XXIV, p. 263 (Lado).—*Charadrius dubius* REICHENOW, 1900, 'Vög. Afr.,' I, p. 175. SCHUBOTZ, 1921, 'Tageb. Emin Pascha,' VI, p. 287 (L. Albert). BERLIOZ, 1922, Bull. Mus. Paris, p. 396 (Kibali R.).—*Charadrius dubius curonicus* HARTERT, 1920, 'Vög. pal. Fauna,' II, p. 1535. W. L. SCLATER, 1924, 'Syst. Av. Æth.,' pt. 1, p. 118 (Congo R.). GROTE, 1930, Mitt. Zool. Mus. Berlin, XVI, p. 85. BANNERMAN, 1931, 'Birds Trop. W. Afr.,' II, p. 100. VAN SOMEREN, 1934, Journ. E. Afr. Ug. N. H. Soc., Nos. 49-50, p. 181. SCHOUTEDEN, 1936, Ann. Mus. Congo, Zool., I, f. 2, p. 71 (Buta).

SPECIMENS.—Faradje, ♂, Mar. 18; 3 ♀, Jan. 9, Feb. 7, Dec. 7.

ADULT MALE.—Iris brown, rim of eyelids bright yellow; bill black with a little buff at base of mandible; feet greenish buff, claws black.

DISTRIBUTION OF THE SPECIES.—From Europe and northwest Africa to eastern Siberia, Japan, Hainan, Formosa, and the Philippines, as well as in India. *Charadrius d. dubius* Scopoli is probably resident from southern Japan and southern China to the Philippines. *C. d. jerdoni* (Legge) breeds in the Deccan and winters south to Borneo and New Guinea. *C. d. curonicus* nests in the greater part of Europe, in northwest Africa, on Madeira, and through Asia to East Siberia and northern Japan. It winters in India, on the Sunda Islands, and in Africa, where it usually does not cross the equator, except on the coast of Tanganyika Territory.

In the northeastern Uelle district it was seen frequently during the dry season (northern winter), especially in open places about villages, or about cow-sheds and pastures. At Katwe, on Lake Edward, I have found it once, but it is not known to reach the Kivu district, and the one supposed record from Lake Tanganyika is probably erroneous.

Charadrius tricollaris tricollaris Vieillot

Charadrius tricollaris VIEILLOT, 1818, 'Nouv. Dict. Hist. Nat.,' XXVII, p. 147 (Africa, restricted type locality: Capetown). REICHENOW, 1887, J. f. O., p. 299 (Manyanga); 1900, 'Vög. Afr.,' I, p. 176 (Tanganyika); 1911, 'Wiss. Ergeb. D. Z.-Afr. Exp.,' III, p. 243 (Kasindi). SCHOUTEDEN, 1918, Rev. Z. A., V, p. 218 (Luvungi; Bigoisagua). SCHUBOTZ, 1921, 'Tageb. Emin Pascha,' VI, p. 287 (L. Albert).—*Aegialites tricollaris* JOHNSTON, 1884, 'River Congo,' p. 368 ("Stanley Pool to Bolobo"). DUBOIS, 1886, Bull. Mus. Roy. Hist. Nat. Belg., IV, p. 149 (L. Tanganyika). MOURITZ, 1914, Ibis, p. 31 (Inkosakapenda, S. E. Katanga).—*Oxyechus tricollaris* DUBOIS, 1905, Ann. Mus. Congo, Zool., I, f. 1, p. 24 (Mpala). MENEGAUX, 1918, Rev. Fr. O., V, p. 252 (Zambi).—*Charadrius tricollaris tricollaris* SCHOUTEDEN, 1924, Rev. Z. A., XII, p. 262 (Kisantu); 1936, Ann. Mus. Congo, Zool., I, f. 2, p. 71 (in part. Mahagi Port). W. L. SCLATER, 1924, 'Syst. Av. Æth.,' pt. 1, p. 120. PETERS, 1934, 'Check-List,' II, p. 253.—*Afroxyechus tricollaris tricollaris* FRIEDMANN, 1930, Bull. 153, U. S. Nat. Mus., p. 159. BANNERMAN, 1931, 'Birds Trop. W. Afr.,' II, p. 102.

DISTRIBUTION OF THE SPECIES.—In Africa from Cape Province north to the Red Sea, the eastern Sudan, and Marua in northern Cameroon; also on Madagascar. *C. t. tricollaris* is the continental race; *C. t. bifrontatus* Cabanis of Madagascar differs in having the anterior forehead gray. *C. forbesi* (Shelley) of western Africa is much more different, and will be treated here as a distinct species.

The three-banded plover is more common about rivers and lakes than on the seacoast, and is not a sociable bird. It avoids the heavy forest area of the Congo, and thus has been found only along the eastern border and near the Lower Congo. I have seen it on the lower Rutshuru River, but never in the Uelle district.

Its eggs are said to be laid in a slight hollow not far from water, and number two or occasionally three: yellowish or grayish white, thickly covered with zigzag lines of brown and blackish. Sometimes there is a dark zone around the larger end. Dimensions: 28–35.5 mm. × 21–24.

Charadrius forbesi (Shelley)

Aegialites forbesi SHELLEY, 1883, Ibis, p. 560, Pl. XIV (type locality: Shonga, Niger R.).—*Aegialites forbesi* JOHNSTON, 1884, 'River Congo,' p. 368 (Stanley Pool to Bolobo).—*Charadrius tricollaris forbesi* SCHOUTEDEN, 1924, Rev. Z. A., XII, pp. 262, 410 (Kisantu; Eala). PETERS, 1934, 'Check-List,' II, p. 253 (Portuguese Guinea to Cameroon and S. Belgian Congo).—*Afroxyechus forbesi* FRIEDMANN, 1930, 'Afr. Rep. Liberia and Belg. Congo,' II, p. 751 (Bumba); 1930, Bull. 153, U. S. Nat. Mus., p. 160. BANNERMAN, 1931, 'Birds Trop. W. Afr.,' II, p. 103, Fig. 26 (Kasama in N. E. Rhodesia).—*Charadrius tricollaris tricollaris* SCHOUTEDEN, 1936, Ann. Mus. Congo, Zool., I, f. 2, p. 71 (in part. Buta; Titule).—*Charadrius forbesi* PAKENHAM 1937, B. B. O. C., LVII, p. 87 (Kigoma).

This plover is larger than *C. t. tricoloris*, its wing measuring 121–134 mm. The forehead of *forbesi* is brownish gray with no white band across it, the two dark breastbands are broader, and the outermost rectrices show three or four blackish bars instead of a single bar restricted to the inner web. It is often regarded as a race of *tricoloris*, but both species have been recorded from the Cameroon, the south-western Congo, and Angola, so their ranges appear to overlap.

DISTRIBUTION.—Forbes's three-banded plover ranges from Portuguese Guinea eastward to the Cameroon, Bozum in French Equatorial Africa, the Lower Uelle district, Lake Albert, Lake Tanganyika, the Kasai district, Mombolo in the highlands of Benguela, and Kasama in Northeastern Rhodesia.

Nowhere does it seem very common, and none has yet been taken in the Upper Uelle or Ituri. There is however one example in the Nairobi Museum collected by W. J. Eggeling at Butiaba on Lake Albert. I failed to find it at Lukolela on the middle Congo River, though Johnston mentioned it as common above Stanley Pool, and Schouteden has reported it from Eala near Coquilhatville. The Congo Museum now has a specimen from Buta. Father Callewaert has sent us three males and a female from Luluabourg in the Kasai, all taken in January. They are quite typical, with wings 125–134 mm.

Rudyard Boulton collected a female at Mombolo, Angola, August 9; and Dr. F. O. Stoehr obtained a specimen for the British Museum in Northeast Rhodesia in January. Pakenham observed several near Kigoma in October. Thus it seems certain that the species will be found in the Katanga Province.

In West Africa it is said to frequent areas of short grass or bare ground, often near habitations, rather than muddy or sandy shores. Its call has been described as a short series of whistles, more or less high-pitched, like "peeee" or "peeee ooh." The nest remains to be discovered. Fairbairn¹ believes that breeding takes place between April and June in Southern Nigeria.

***Charadrius mongolus atrifrons* Wagler**

Charadrius atrifrons WAGLER, 1829, Isis, col. 650 (type locality: Bengal).—*Charadrius mongolus atrifrons* HARTERT, 1920, 'Vög. pal. Fauna,' II, p. 1543 (Usumbura). GROTE, 1930, Mitt. Zool. Mus. Berlin, XVI, p. 86.

DISTRIBUTION OF THE SPECIES.—Breeds from the Commander Islands and Kamchatka to Mongolia, Kirghiz steppes, and Tibet. *C. m. mongolus*, found in summer in Mongolia, migrates as far as the Caroline and Marianne Islands and Australia. *C. m. litoralis* Stegmann,²

¹ 1936, Nigerian Field, V, pp. 74–76.

² 1937, O. Mb., p. 25 (Bering Island).

more deeply colored, breeds on the Commander Islands and Kamchatka, migrating at least to Japan. *C. m. atrifrons*, breeding from the Kirghiz steppes to Tibet, travels southward to the Greater Sunda Islands, Ceylon, the Seychelles, Madagascar, and eastern Africa. There is a single winter record from Southwest Africa.

The only specimen known from our territory was taken by Grauer at Usumbura near the northern end of Lake Tanganyika on April 22, 1908. Dr. van Someren¹ has also found it on Lake Victoria, but most of the migrants keep to the east coast.

Charadrius asiaticus Pallas

Charadrius asiaticus PALLAS, 1773, 'Reise Russ. Reichs,' II, p. 715 (type locality: South Tartar Steppes). SCHOUTEDEN, 1932, Rev. Z. A., XXII, p. 249 (Ngoma); 1936, Ann. Mus. Congo, Zool., I, f. 2, p. 71 (Buta; Medje).—*Ochthodromus asiaticus* SHARPE, 1896, 'Cat. Birds Brit. Mus.,' XXIV, p. 230 (Lado). LÖNNBERG, 1917, Arkiv f. Zool., X, No. 24, p. 6 (L. Edward). GYLDENSTOLPE, 1924, K. Svenska Vet. Akad. Handl., (3) I, No. 3, p. 300 (Mt. Sabinyo, 2600 m.).—*Aegialitis asiatica* SALVADORI, 1907, Boll. Mus. Zool. Anat. Torino, XXII, No. 570, p. 9 (near L. Moero).—*Charadrius asiaticus asiaticus* GROTE, 1930, Mitt. Zool. Mus. Berlin, XVI, p. 86 (L. Tanganyika).—*Eupoda asiatica* PETERS, 1934, 'Check-List,' II, p. 255.

SPECIMENS.—Avakubi, ♀, Feb. 16. Faradje, 3 ♂, Jan. 1, 8, Mar. 16; 3 ♀, Jan. 18, Feb. 20, Mar. 16.

ADULTS.—Iris dark brown, bill black, feet brownish green or light grayish green.

DISTRIBUTION.—Breeds from the Kirghiz Steppes and eastern Persia to the Altai, and migrates to western India and Africa. By many authors *Charadrius veredus* Gould is regarded as a race of the same species, breeding in Mongolia and northern China, and migrating to the East Indies and Australia.

In Africa *C. asiaticus* winters abundantly in the Anglo-Egyptian Sudan, visits the grasslands of eastern Africa, and even reaches Cape Province and Benguella. It is not known from West Africa north of Angola, and must be wanting in the western Congo basin.

Near Faradje, in the Upper Uelle, the Caspian plover appeared every year, but usually much later than other migrant shore-birds, for we would see it in January, February, and March, not so much near river-banks as about well-worn pastures and even the vicinity of the cow-sheds. These plovers were most active toward sundown, feeding exclusively on insects—as shown by examination of seven stomachs.

At Avakubi, in the Ituri forest, only a single individual was observed; it was walking on the bare surface of the parade ground in com-

¹ 1922, Nov. Zool., XXIX, p. 13.

pany with one of the smaller plovers, on February 16, 1914. In the grasslands along the eastern Congo border it may be a little less common than in the Upper Uelle, though I saw a party of twelve near the old post of Kasindi, just north of Lake Edward, on January 30, 1927. Conover and Zimmer collected this plover for the Field Museum at Katobwe on the Lualaba River, but there are no records from the Kasai district.

[*Pluvialis apricaria apricaria* (Linnæus)]

Charadrius apricarius LINNÆUS, 1758, 'Syst. Nat.,' 10th Ed., p. 150 (Oeland and Canada; restricted type locality: Lapland).

The European golden plover was reported from the Gaboon by Du Chaillu, but there seem to be no reliable records either from the west coast of Africa south of the Canary Islands, or from the Anglo-Egyptian Sudan. The eastern golden plover, *P. dominica fulva* (Gmelin), does occasionally reach the northeastern Sudan and Somaliland; but neither species is to be expected near the Congo.

***Squatarola squatarola* (Linnæus)**

Tringa squatarola LINNÆUS, 1758, 'Syst. Nat.,' 10th Ed., p. 149 (Europe; restricted type locality: Sweden).—*Squatarola squatarola* SCHOUTEDEN, 1929, Bull. C. Z. C., VI, p. 48 (Buta; Panga).—*Squatarola squatarola squatarola* BANNERMAN, 1931, 'Birds Trop. W. Afr.,' II, p. 96, Fig. 24 (Loango Coast). SCHOUTEDEN, 1936, Ann. Mus. Congo, Zool., I, f. 2, p. 71.

DISTRIBUTION OF THE SPECIES.—The gray plover or black-bellied plover breeds in northern Europe, Asia, and North America, and migrates southward to Brazil, Peru, Australia, and the Cape of Good Hope. A large subspecies, *S. s. hypomelæna* (Pallas), breeding in East Siberia, is commonly recognized, which migrates mainly toward Australia, but may sometimes reach Somaliland.¹ The validity of a North American race has not been established.

The typical European form migrates south in autumn along both coasts of Africa and occasionally wanders inland, so that it has occurred on the west side of Lake Victoria, and the Congo Museum has specimens from Buta in the Lower Uelle and Panga on the Aruwimi River. Mr. H. B. Conover tells me that he has secured it on the Lualaba River at Katobwe, near 9° S. latitude. As it travels along the west coast, and has been collected near Landana by Falkenstein, it is sure to occur at the mouth of the Congo. Near Lukolela, March 29, 1931, on a sand-

¹ See, however, Peters, 1934, Condor, XXXVI, pp. 27-29, and Low, 1938, Ibis, pp. 154-158.

bar in the middle Congo River, I myself saw a party of about twenty black-bellied plover.

Subfamily Vanellinæ

KEY TO THE SPECIES OF *STEPHANIBYX*

- 1.—Forehead black, middle of crown black or brown, completely encircled by white.
feet light red in life. *S. coronatus*;
Forehead white, but hind-crown plain dark gray; feet blackish or black tinged
with red. 2.
- 2.—Wing less than 190 mm. long; greater upper wing-coverts very narrowly margin-
ed if at all with whitish; under wing-coverts only partly white, those be-
neath the primaries being brownish gray. *S. lugubris*.
Wing more than 195 mm. long; greater upper wing-coverts conspicuously tipped
with white; under wing-coverts entirely white. *S. melanopterus*.

Stephanibyx lugubris (Lesson)

Charadrius lugubris LESSON, 1826, 'Dict. Sci. Nat.,' 6d. Levrault, XLII, p. 36 (no locality: Senegal proposed by C. Grant, 1915, Ibis, p. 56).—*Chettusia inornata* SHARPE AND BOUVIER, 1878, Bull. Soc. Zool. France, III, p. 79 (San Antonio).—*Stephanibyx inornatus* REICHENOW, 1900, 'Vög. Afr.,' I, p. 179; 1911, 'Wiss. Ergeb. D. Z.-Afr. Exp.,' III, p. 243 (plain of Ruzizi R.). DUBOIS, 1905, Ann. Mus. Congo, Zool., I, f. 1, p. 24 (Lower Congo; Kisantu; Prov. Orientale). LÖNNBERG, 1907, Arkiv f. Zool., III, No. 21, p. 3 (Mukimbungu); 1917, idem, X, No. 24, p. 6 (L. Edward). SCHOUTEDEN, 1918, Rev. Z. A., V, p. 218 (Beni; Mission Saint-Gustave; Karemi).—*Stephanibyx inornatus* MENEGAUX, 1918, Rev. Fr. O., V, p. 252 (Zambi).—*Stephanibyx lugubris* SCHOUTEDEN 1923, Rev. Z. A., XI, pp. 317, 389 (Macaco; Kwamouth); 1924, idem, XII, p. 262 (Kisantu); 1925, idem, XIII, p. 6 (Kunungu). GYLDENSTOLPE, 1924, K. Svenska Vet. Akad. Handl., (3) I, No. 3, p. 301 (L. Edward). BANNERMAN, 1931, 'Birds Trop. W. Afr.,' II, p. 107, Fig. 27 (Landana).

SPECIMENS.—Leopoldville, ♀, ♂ im., Dec. 22.

ADULT FEMALE.—Iris chrome-yellow with greenish gray inner rim; bill and feet blackish. These colors are similar in the young male.

DISTRIBUTION.—From Natal northward to Kenya Colony, Uganda, the Semliki Valley, Kasai district, middle Congo River, and from the Lower Congo along the west coast to Sierra Leone, if not to the Gambia. Not known from the forests of the Cameroon and Congo, nor from southwestern Africa. Near Leopoldville I found it in the savanna country in late December, walking about in pairs and parties of four or five, on cultivated ground and in pastures. When flushed they gave a short complaining call, which Böhm wrote as "Tlü-ih." The stomachs of both our specimens disclosed insects, especially beetles.

At Lukolela I never saw it, though Dr. Schouteden has reported the species from Kwamouth and the country just south of Bolobo. Father

Callewaert procured several specimens at Luluabourg in the Kasai district between September and January. On January 26, 1927, I noted about seven in the dry acacia woods at the south end of Ruwenzori, near Kasindi, feeding in patches where the grass had been burned. It seems not to be migratory.

Records from the highlands of Marungu and the Upper Katanga are wanting, but H. B. Conover tells me that he found this plain-colored lapwing at Katapena, south of Lake Upemba. Léon Lippens collected one at Gabiro, Ruanda.

Nests have been found in Natal (October), Southern Rhodesia (November), Tanganyika Territory (October), and the Cherangani district of Kenya Colony (April 15). Four eggs found in ploughed land by Paget-Wilkes,¹ were dull olivaceous brown, spotted with black and a little umber. Reichenow and Nehrkorn gave the dimensions of eggs as 35.5×26.5 mm. and 38×26 mm.

[*Stephanibyx melanopterus minor* Zedlitz]

Stephanibyx melanopterus minor ZEDLITZ, 1908, O. Mb., p. 180 (type locality: South Africa).²

The black-winged plover ranges from Arabia and Abyssinia through East Africa to Cape Province. The species was first described by Cretschmar from Djedda, Arabia; and as specimens from Kenya Colony southward have slightly shorter wings (usually less than 218 mm. long) and less extensive white foreheads, they have been separated under the name *minor*.

This plover was said to have been taken by Ansorge in Uganda, just northeast of Lake Edward, but examination of the specimen shows it to be *S. lugubris*. So *S. melanopterus* is not likely to occur within our limits.

***Stephanibyx coronatus coronatus* (Boddært)**

Charadrius coronatus BODDAERT, 1783, 'Tabl. Planches Enluminées,' p. 49 (type locality: Cape of Good Hope).—*Chettusia coronata* SCHALOW, 1886, J. f. O., p. 420 ('Lualaba' [= Luvua R.]). MATSCHIE, 1887, J. f. O., p. 145 (Luvule R.).—*Stephanibyx coronatus* DUBOIS, 1886, Bull. Mus. Roy. Hist. Nat. Belg., IV, p. 149 (L. Tanganyika); 1905, Ann. Mus. Congo, Zool., I, f. 1, p. 24. REICHENOW, 1900, 'Vög. Afr.,' I, p. 180; 1911, 'Wiss. Ergeb. D. Z.-Afr. Exp.,' III, p. 243 (Mpororo). SHELLEY, 1901, Ibis, p. 167 (E. shore L. Moero). MOURITZ, 1914, Ibis, p. 32 (Luapula R.). GYLDENSTOLPE, 1924, K. Svenska Vet. Akad. Handl., (3) I, No. 3, p. 300 (Kabare). SCHOUTEDEN, 1935, Rev. Z. A., XXVII, p. 401 (Ruindi camp).—*Steph-*

¹ 1929, Ool. Rec., IX, p. 12.

² Hartert, 1900, Nov. Zool., VII, p. 27.

anibyz coronata SALVADORI, 1914, Ann. Mus. Zool. Napoli, IV, No. 10, p. 6 (L. Mohasi; Kagera Valley).

DISTRIBUTION OF THE SPECIES.—From Abyssinia and Somaliland south to Natal, Cape Province, and west to Mossamedes. South African specimens have wings 194–209 mm., those from eastern Africa usually 182–205 mm. These may all be assigned to the typical subspecies; but Abyssinian birds, and perhaps those from the Mau Escarpment, may be slightly larger, with wings 200–215 mm. For the large birds of the north-eastern highlands Friedmann has proposed the name *suspicax*.¹ On the other hand, British Somaliland seems to have a rather small race, *demissus*,² with wings only 191–197 mm. and the back of more sandy-rufous color when the plumage is fresh. This race may also extend to Italian Somaliland.

In the eastern Congo *S. c. coronatus* lives on dry plains to the south of Lake Edward, in the lower Ruzizi Valley, and in the Katanga province. It is found in pairs or small flocks, often far from water, and is a strong runner. The crowned lapwing is particularly fond of freshly burned grasslands, and has a loud, reiterated grating call. Active and noisy at dusk, the birds even fly about and call on moonlit nights. In South Africa the breeding season is stated to be from August to November, or even to February, and the nest a mere depression in the ground. The three eggs are yellowish brown, blotched with blackish-brown and often with gray shell-markings, the blotches heaviest at the obtuse end. Dimensions, 36–42 mm. \times 27–30.

[*Sarciophorus tectus tectus* (Boddaert)]

Charadrius tectus BODDAERT, 1783, 'Tabl. Planches Enluminées,' p. 51 (type locality: Senegal).—*Hoplopterus tectus* PELZELN, 1881, Verh. Zool. Bot. Ges. Wien, p. 616 (Redjaf).—*Sarciophorus tectus* SCHWEINFURTH AND RATZEL, 1888, 'Emin Pascha,' German Ed., p. 300 (Lado).

The blackhead plover ranges from Senegambia across the Sudan to Somaliland and Kenya Colony. The typical race occupies the whole of this area save for Southern Somaliland and the adjacent regions of Kenya Colony, where it is replaced by *S. t. latifrons* Reichenow. There is no record of *S. t. tectus* from the Congo, but since its range extends across the Sudan, bending southward to Redjaf, it may be expected in the northern savannas or near Lake Albert, at least accidentally. A supposed record by Blancou (1933) from the southern Ubangi-Shari district has proved to apply to *Anomalophrys superciliosus*.

¹ 1923, Proc. N. Eng. Zool. Cl., X, p. 95 (Sadi Malka, Abyssinia); 1930, Bull. 153, U. S. Nat. Mus., pp. 161–166.

² Friedmann, 1928, Proc. N. Eng. Zool. Cl., X, p. 97 (Suk-Soda, Somaliland).

Anomalophrys superciliosus (Reichenow)

Lobivanellus superciliosus REICHENOW, 1886, J. f. O., p. 116, Pl. III (type locality: "Aua Mpara," i. e., Mpala on L. Tanganyika). MATSCHIE, 1887, J. f. O., p. 144 (Marungu). SCHALOW, 1887, J. f. O., p. 226. SHELLEY, 1890, Ibis, p. 169 (Aruwimi R.; Yambuya). SHARPE, 1890, in Jameson, 'Story of Rear Column,' pp. 405, 409. OUSTALET, 1893, Naturaliste, VII, p. 128.—*Lobivanellus* MATSCHIE, 1887, J. f. O., p. 145.—*Anomalophrys superciliosus* SHARPE, 1896, 'Cat. Birds Brit. Mus.,' XXIV, p. 156 ("Stanley Pool"). W. L. SCLATER, 1924, 'Syst. Av. Æth.,' pt. 1, p. 124. BANNERMAN, 1931, 'Birds Trop. W. Afr.,' II, p. 121, Fig. 32 (Uelle R.; Aruwimi R.; L. Tanganyika). BLANCOU, 1933, Ois. R. F. O., (N. S.) III, p. 336. PETERS, 1934, 'Check-List,' II, p. 242. SCHOUTEDEN, 1936, Ann. Mus. Congo, Zool., I, f. 2, p. 72 (Buta; Titule; Niangara; Mauda).—*Sarciophorus superciliosus* REICHENOW, 1900, 'Vög. Afr.,' I, p. 190; 1911, 'Wiss. Ergeb. D. Z.-Afr. Exp.,' III, p. 244. DUBOIS, 1905, Ann. Mus. Congo, Zool., I, f. 1, p. 24 (Banalia). SASSI, 1912, Ann. Naturh. Hofmus. Wien, XXVI, p. 355 (Ukaika). VAN SOMEREN, 1916, Ibis, p. 200 (Kikorongo in Katwe distr., Uganda). SCHOUTEDEN, 1918, Rev. Z. A., V, p. 218 (Beni).—*Sarciophorus tectus tectus* BLANCOU, 1933, Ois. R. F. O., (N. S.) III, p. 35 (S. Ubangi-Shari).—*Stephanibyx lugubris* SCHOUTEDEN, 1933, Am. Mus. Congo, Zool., I, f. 2, p. 71 (Buta).

SPECIMENS.—Avakubi, 3 ♂, 5 ♀, Nov. 26, 29. Medje, ♂ im., July 27. Niangara, ♀, Jan. 3.

ADULTS.—Iris grayish yellow to yellow; bill greenish black, eyelids and loreal wattle yellow; feet dark brownish gray.

IMMATURE MALE.—Iris light brown; loreal wattle light brown, that around eye yellowish.

DISTRIBUTION.—From Togoland, Northern Nigeria, Bozum in French Equatorial Africa, and the Uelle district, east to the Kavirondo country and south to Mpala on Lake Tanganyika and Luluabourg in the Kasai district. Despite its occurrence at several localities within the limits of the Congo forest, it seems to be only a transient there. In the Ituri district, for example, it is seen even in favorable places only a few times each year, and undoubtedly is passing on migration. Coming in flocks of as many as twenty-five, they announce themselves with a loud triple grating call, and alight on cleared ground, sometimes near riverbanks.

At Avakubi a flock of about twenty adults, and perhaps one or two smaller groups, appeared on November 26, 1909, remaining but a day, and none were seen during the next eight months. On July 27 of the following year, two were flying about the post of Medje, one of them immature. A single adult female, with ovary somewhat enlarged, was captured by natives near Niangara on January 3, 1911.

In November, 1913, at Avakubi—just four years, to a day, from my first observation there—a flock of twenty-five came flying over a cleared

field, and three days later there was another flock of ten. A single individual was noted on December 29, and no more until August 8, 1914, when one was heard calling.

Records of other collectors with dates from the same forested area of the eastern Congo are: Beni, November 20 (Bonnievie); Ukaika, December (Grauer); lower Aruwimi River, July 30 and December 9 (Jameson).¹ So there are two seasons of occurrence, July–August and November–December. At the latter season the birds are all non-breeding adults, evidently moving toward their breeding area, while the July–August ex-

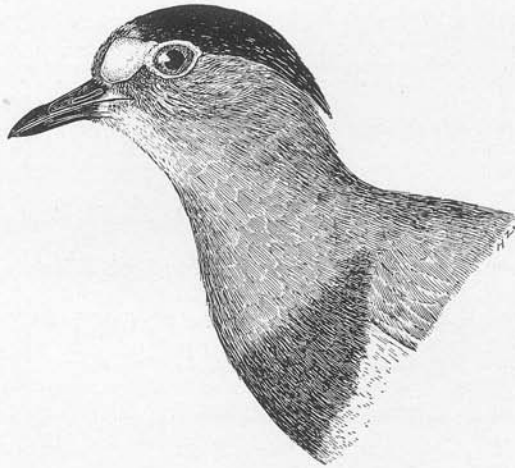


Fig. 6. *Anomalophrys superciliosus*. $\times 2/3$.

amples include rather young birds, hatched probably toward February. Dr. van Someren² likewise obtained an immature specimen in the Kavirondo district, August 22; but it is not young enough to indicate breeding there. Instead, it is several months old, and has already molted most of its juvenal primaries.

The only records I can find for the months when eggs should be laid are to the north of the forest belt: Togoland, January 3 and 26; Zaria, Northern Nigeria, April 14; Buta in the Lower Uelle, April; Niangara, January 3; and Mauda, Upper Uelle, March 20. In that region it would seem they must nest.

¹ The record by Sharpe (1896) from "Stanley Pool" refers to a specimen from the Aruwimi River.

² 1922, Nov. Zool., XXIX, p. 16.

South of the Congo forest, where the birds may be expected to spend their off-season, there are only a few known occurrences, in July and August: Luluabourg, August 9; Komi in the Sankuru district, July; and Mpala, August. From the Lower and Middle Congo there are no records. Further investigation is needed, but I am convinced that this lapwing nests north of the forest belt,¹ and migrates to the southeastern Congo.

KEY TO THE AFRICAN SPECIES OF *HOPLOPTERUS*

- Forehead and crown entirely black, cheeks white; back dull gray-brown.....*H. spinosus*.
 Forehead and anterior crown white, occiput and cheeks black; middle of back black, anterior half of scapular tract ashy gray like upper wing-coverts....*H. armatus*.

Hoplopterus spinosus (Linnæus)

Charadrius spinosus LINNÆUS, 1758, 'Syst. Nat.,' 10th Ed., p. 151 (type locality: Egypt).—*Vanellus* LEACH, 1818, in Tuckey, 'Narr. Exp. R. Zaire,' p. 408 ('Lower Congo').—*Hoplopterus spinosus* HARTLAUB, 1850, 'Beitr. Orn. Westafr.,' p. 39; 1857, 'Syst. Orn. Westafr.,' p. 214 ('Congo'). SHARPE, 1896, 'Cat. Birds Brit. Mus.,' XXIV, p. 734 (L. Edward). REICHENOW, 1911, 'Wiss. Ergeb. D. Z.-Afr. Exp.,' III, p. 244 (Usumbura). SASSI, 1912, Ann. Naturh. Hofmus. Wien, XXVI, p. 355. LÖNNBERG, 1917, Arkiv f. Zool., X, No. 24, p. 6 (Kabare; Kasindi). SCHOUTEDEN, 1918, Rev. Z. A., V, p. 218 (Beni; Karemi; Kaniki); 1936, Ann. Mus. Congo, Zool., I, f. 2, p. 71 (Faradje; Mahagi Port). GYLDENSTOLPE, 1924, K. Svenska Vet. Akad. Handl., (3) I, No. 3, p. 301 (S. shores of L. Edward). FRIEDMANN, 1930, Bull. 153, U. S. Nat. Mus., p. 169. PETERS, 1934, 'Check-List,' II, p. 241 (savanna belt of central Africa: L. Edward).—*Hoplopterus spinosus spinosus* VAN SOMEREN, 1934, Journ. E. Afr. Ug. N. H. Soc., XII, Nos. 1-2, p. 13 (Lakes Albert and Edward).

SPECIMENS.—Faradje, ♂ im., Aug. 11; ♀, Nov. 30; ♀ im., Aug. 11.

DISTRIBUTION.—From Cyprus and Palestine to Egypt, Arabia, eastern and central Africa, and west to Senegal. In East Africa the spur-winged plover ranges south to the latitude of Zanzibar and Mwanza; and along the eastern Congo border it is common as far south as the southern shore of Lake Edward, while one specimen has been recorded from the northern end of Lake Tanganyika. It is more partial to the vicinity of water than some of the other lapwings, and I have noted it at Kasenyi on Lake Albert, at Kasindi Landing, Katwe, and Kabare on Lake Edward, as well as along the lower Rutshuru River.

There are no records from the Ubangi district, and the species is by no

¹ This prediction has already been fulfilled by J. D. Clarke (1936, Nigerian Field, V, pp. 72, 73). He watched the birds courting in southeast Ilorin Province, Nigeria, in early January and caught a young chick on February 27. See also Heslop, 1937, Ibis, pp. 174, 175.

means common in the Uelle. The equatorial forest seems to be the barrier limiting its range in the Congo, and even in the grasslands of the northeastern Uelle the three specimens collected were all we ever saw there. They came in August and in November, alighting on bare patches of ground near the bank of the Dungu River at Faradje. The stomachs of two of them showed that they had been feeding on insects, including a single insect-larva.

I have little doubt that there was a bird of this species in the collection made by Cranch during the Tuckey Expedition, but it was doubtless secured somewhere in the western part of Upper Guinea, not in the Lower Congo.

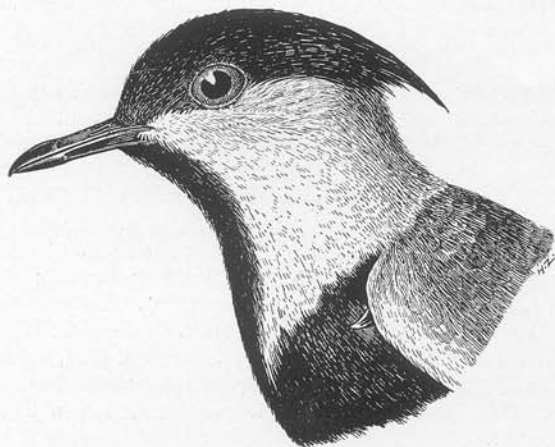


Fig. 7. *Hoplopterus spinosus*. $\times 2/3$.

The spur-winged plover is well known as a restless bird of river-banks and sand-bars, whose loud calls have won for it the Arab name of "Zic-zac." Though it has often been seen in the immediate vicinity of basking crocodiles, and said to enter the mouths of the great saurians, Heuglin thought that the real crocodile-bird—if it did have such an adventurous habit—was *Pluvianus ægyptius*.

The nest of *Hoplopterus spinosus* is a slight hollow in the sand or earth containing three or four eggs. The latter are pyriform or pointed oval, dull buff, frequently with a greenish tinge, and boldly marked with black or blackish-brown blotches and spots, thickest at the larger end. There are also underlying markings of pale purplish. Dimensions, 37–43 mm. \times 27–30.5.

Hoplopterus armatus (Burchell)

Charadrius armatus BURCHELL, 1822, 'Travels in S. Afr.,' I, p. 501 (type locality: Klaarwater, in the Hay distr., Cape Province).—*Pluvianus armatus* CAPELLO AND IVENS, 1886, 'De Angola a Contra-Costa,' II, p. 16 (Cabaco R.).—*Hoplopterus speciosus* DUBOIS, 1886, Bull. Mus. Roy. Hist. Nat. Belg., IV, p. 149 (L. Tanganyika); 1905, Ann. Mus. Congo, Zool., I, f. 1, p. 24 (Katanga; Karema). REICHENOW, 1900, 'Vög. Afr.,' I, p. 188.

DISTRIBUTION.—From Natal and the Orange River north to southern Angola, the Upper Katanga, Lake Tanganyika, and Lake Nakuru in Kenya Colony. Apparently rare in the southeastern Congo, but De Riemacker has collected three examples near the Luombwa and Kafubu rivers.

The blacksmith plover, so named because of its metallic twin-syllabled call, lives in pairs or small flocks in the vicinity of lakes and rivers. Its nest is a slight excavation in the bare ground not far from water, and is said sometimes to be lined with grass-roots. The eggs number two to four, and are sandy buff or olive, generously sprinkled with small spots and larger blotches or scrawls of black or blackish brown. Dimensions 38-41 mm. \times 28-30.

Afribyx senegallus senegallus (Linnæus)

Parra senegalla LINNÆUS, 1766, 'Syst. Nat.,' 12th Ed., p. 259 (type locality: Senegal).—*Lobivanellus senegalensis* HARTLAUB, 1881, Abhandl. Naturwiss. Verein Bremen, VII, p. 85 (Magungo). EMIN, in Stuhlmann, 1922, 'Tageb. Emin Pascha,' III, p. 389 (N. W. shore of L. Albert).—*Lobivanellus senegallus* CHAPIN, 1916, A. M. Journ., p. 543 (Uelle).—*Lobivanellus senegalus* SCHUBOTZ, 1921, 'Tageb. Emin Pascha,' VI, p. 46 (S. end of L. Albert).—*Afribyx senegallus* SCLATER AND M.-PRAED, 1920, Ibis, p. 816 (Yei).—*Afribyx senegallus senegallus* SCHOUTEDEN, 1936, Ann. Mus. Congo, Zool., I, f. 2, p. 72 (Buta; Niangara).

SPECIMENS.—Dungu, ♀, June 7. Nzoro, ♂, Apr. 12. Faradje, 6 ♂, Apr. 8, 29, Oct. 19, 20, Nov. 10, Dec. 2; ♀, Nov. 3; ♀ juv., Apr. 29. Garamba, ♂ juv., June 17.

ADULTS.—Iris dirty cream-color, grayish around pupil, rim of eyelids yellow, loreal wattle yellow, with upper portion rather dark red; bill yellow, tip black above; spur on wing blackish; feet lemon-yellow, nails black.

DISTRIBUTION OF THE SPECIES.—Senegal, Darfur, and Eritrea south to Natal, but wanting throughout the rain forests of West Africa and the Congo. The typical race extends from Senegal across the grasslands north of the forest belt to Lake Albert, intergrading near the White Nile with *A. s. major* Neumann¹ of Eritrea, Abyssinia, and northern Kenya Colony.

¹ 1914, O. Mb., p. 8 (Mareb R., N. Abyssinia).

West African specimens of *senegallus* have wings about 210–232 mm., as compared with 231–258 in *major*. Our specimens from the Uelle are intermediate, wings 226–242 mm.

South and east of the Congo forest lives *A. s. lateralis*, distinguished by the blackish coloring of its flanks.

The savannas of the northern Congo, in the Uelle and doubtless the Ubangi district, are occupied by *Afribyx s. senegallus* during part of the year. In addition to the three localities where we collected specimens, it was seen also a number of times at Niangara. These wattled lapwings are not particularly attached to water, but prefer cultivated fields or open barren spaces, often in remote parts of the bush-country. Here they

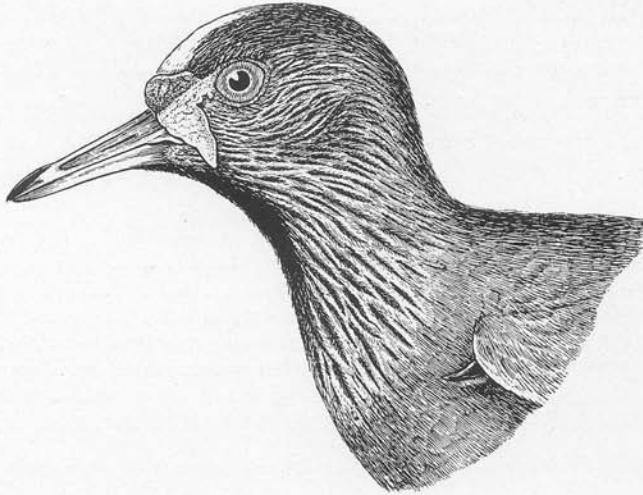


Fig. 8. *Afribyx s. senegallus*. $\times 2/3$.

are found singly, in pairs, or families, usually four at most, taking wing at some distance with loud complaining calls, like a reiterated "kip," and usually circling round with strong, measured wing-beats, at a safe distance. Another note not infrequently heard is imitated in the Mangbetu name of "Ma-gilf-gilf." They are rather active in the daytime, but especially so at sunset, while even at night—mostly when there is a bright moon—they are heard calling as they fly over. The pairs undoubtedly nest about dry upland fields, but we did not find any eggs, though the appearance of rather young birds in April seemed sufficient to fix the period of nesting as February and March.

During the middle of the rainy season the birds disappear completely. They must migrate to the northward, since they are unknown in the forest, and southward are replaced by *A. s. lateralis*. The earliest date of arrival we noted at Faradje was October 10, 1912, the latest date before departure June 20, 1912. All the dates of occurrence in the Anglo-Egyptian Sudan given by Selater and Mackworth-Praed fall within this same period; but in Darfur Admiral Lynes¹ observed that this lapwing only spent the "summer," and did not breed.

In western Africa the nest has not been found, but two eggs of *A. s. major* from Abyssinia, March 24, are described by Bannerman² as brownish buff, thickly spotted with black and chocolate-brown, these colors forming confluent blotches around the blunt end. Dimensions, 47.5×32 mm. and 48.5×31.5 mm.

To determine the food we examined eight stomachs, which were found to contain nothing but remains of insects and occasionally their larvæ. Beetles with hard shells were most commonly eaten, and occasionally crickets.

***Afribyx senegallus lateralis* (Smith)**

Vanellus lateralis A. SMITH, 1839, 'Illustr. Zool. S. Afr.,' Aves, Pl. XXIII and text (type locality: Tugela R., Natal).—? *Charadrius caruncula* CAPELLO AND IVENS, 1886, 'De Angola a Contra-Costa,' II, p. 16 (Cabaco R.).—*Lobivanellus senegallus* OUSTALET, 1893, Naturaliste, VII, p. 128. DUBOIS, 1905, Ann. Mus. Congo, Zool., I, f. 1, p. 24 (Tanganyika).—*Lobivanellus lateralis* SHARPE, 1896, 'Cat. Birds Brit. Mus.,' XXIV, p. 733 (L. Edward). REICHENOW, 1900, 'Vög. Afr.,' I, p. 194 (Kwango R.); 1911, 'Wiss. Ergeb. D. Z.-Afr. Exp.,' III, p. 244 (N. Ruanda). SASSI, 1912, Ann. Naturh. Hofmus. Wien, XXVI, p. 355 (Urundi; Ishangi). MOURITZ, 1914, Ibis, p. 31 (Inkosakapenda). SALVADORI, 1914, Ann. Mus. Zool. Napoli, IV, No. 10, p. 6 (near Usumbura). SCHOUTEDEN, 1918, Rev. Z. A., V, p. 218 (Ruzizi; Luvungi). BERLIOZ, 1921, Rev. Fr. O., VII, p. 6 (L. Ruisamba). DE RIEMAECKER, 1927, Rev. Z. A., XIV, p. 259 (near Elisabethville).—*Lobivanellus senegallus* REICHENOW, 1900, 'Vög. Afr.,' I, p. 193 (in part. "Ubangi River" = Brazzaville). LÖNNBERG, 1917, Arkiv f. Zool., X, No. 24, p. 6 (Rutshuru). SCHOUTEDEN, 1918, Rev. Z. A., V, p. 218 (Beni; L. Edward; Lisasa; Luvungi).—*Lobivanellus senegallus lateralis* GYLDENSTOLPE, 1924, K. Svenska Vet. Akad. Handl., (3) I, No. 3, p. 301 (plains S. of L. Edward).—*Afribyx senegallus lateralis* SCHOUTEDEN, 1930, Rev. Z. A., XVIII, p. 281; 1932, idem, XXII, p. 248 (Usumbura; Ngoma). FRIEDMANN, 1930, Bull. 153, U. S. Nat. Mus., p. 172. PETERS, 1934, 'Check-List,' II, p. 240.—*Afribyx seuegallis lateralis* SCHOUTEDEN, 1933, Rev. Z. A., XXII, p. 380 (Kayumbo in Kivu distr.).

DISTRIBUTION.—From Natal, Transvaal, and Damaraland north to Tanganyika Territory, Mt. Elgon, Masindi in Uganda, Lake Edward,

¹ 1925, Ibis, p. 568.

² 1931, 'Birds Trop. W. Afr.,' II, p. 118.

Lualaba River, Kwango River, and Stanley Pool. It apparently does not reach the central Kasai district, and certainly not the Ubangi. A specimen of *lateralis*, listed by Oustalet (1893) and Reichenow (1900) as *senegallus*, was actually collected by Dybowski at Brazzaville, July 9, 1891.

The wings in this race measure 220–241 mm. Some specimens from the eastern Congo have the patches on the flanks a little less blackish than in those of southern Africa. These patches are usually connected by a dusky band across the upper abdomen.

In its conspicuous and noisy ways of life, this race agrees with typical *senegallus*. Near Katwe and Kasindi on the north side of Lake Edward, and on the lower Rutshuru River, I saw about eight individuals, readily identified as *lateralis* with the field-glass. A few miles southwest of Luvungi in the Ruzizi Valley, July 14, a pair was found in open grassland. The female was collected and proved to have an egg in the oviduct. In August the species was noted along the Lualaba River below Bukama. In South Africa it has been said to occur only as a migrant, from October to March, yet in Southern Rhodesia and Beira Province of Mozambique it breeds between August and November. Dr. van Someren¹ gives the breeding season in Uganda as August and September. There may be two, three, or occasionally four eggs, laid in a simple depression in the ground. These are of a pale olive-brown, spotted and blotched with black and brown, 43–50 mm. \times 29.5–35.

Xiphidiopterus albiceps (Gould)

Vanellus albiceps GOULD, 1834, P. Z. S. Lond., p. 45 (type locality: Quorra R., i.e., Niger R.; or perhaps Fernando Po).—*Lobivanellus albiceps* JOHNSTON, 1884, 'River Congo,' pp. 263, 264, 344, 345, 358, 368, 372 (Congo R.).—*Hoplopterus albiceps* REICHENOW, 1885, J. f. O., p. 217 (Stanley Pool). OUSTALET, 1893, Naturaliste, VII, p. 128.—*Xiphidiopterus albiceps* REICHENOW, 1900, 'Vög. Afr.,' I, p. 192 ('Ubangi R. '); 1911, 'Wiss. Ergeb. D. Z.-Afr. Exp.,' III, p. 244 (L. Kivu). MENEGAUX, 1918, Rev. Fr. O., V, p. 252 (near Zambi). BANNERMAN, 1922, Rev. Z. A., X, p. 189 (Upper Congo); 1931, 'Birds Trop. W. Afr.,' II, p. 109, Fig. 28 (Bamingui R.; Upper Congo; Loango Coast). SCHOUTEDEN, 1923, Rev. Z. A., XI, pp. 317, 389 (Kasai R. and affluents; Kwamouth); 1924, idem, XII, pp. 262, 410 (Kitobola; between Eala and Bamanian); 1925, idem, XIII, p. 6 (Mongende; Kunungu); 1932, idem, XXII, p. 248 (Kisenyi). PETERS, 1934, 'Check-List,' II, p. 238.—*Sarciophorus albiceps* DUBOIS, 1905, Ann. Mus. Congo, Zool., I, f. 1, p. 24 (Umani; Prov. Orientale; Lower Congo). DE RIEMAECKER, 1927, Rev. Z. A., XIV, p. 259 (Kongolo).—*Cursorius chalcopterus* PETIT, 1926, 'Dix Années de Chasses,' p. 118 (near Boma).

ADULT MALE.—Iris yellowish cream-color, edge of eyelids pale green, wattle chrome-yellow, tinged with green on upper third and dull green just in front of eye;

¹ 1935, Journ. E. Afr. U. N. H. Soc., XII, p. 20.

tip of bill black, base chrome-yellow, greenish below; feet pale creamy green, claws black. In a female these colors were the same, except that the iris was grayish white with a tinge of green, and darker gray on the outer rim.

DISTRIBUTION.—From Liberia, Northern Nigeria, and the Bahr-el-Ghazal, south to northern Angola and the Zambesi Valley. Eastward it reaches Lake Kivu, the Rufidji River¹ in Tanganyika Territory, and the Beira district in Portuguese East Africa. Occurs also on Fernando Po. There is one doubtful record from the Transvaal.

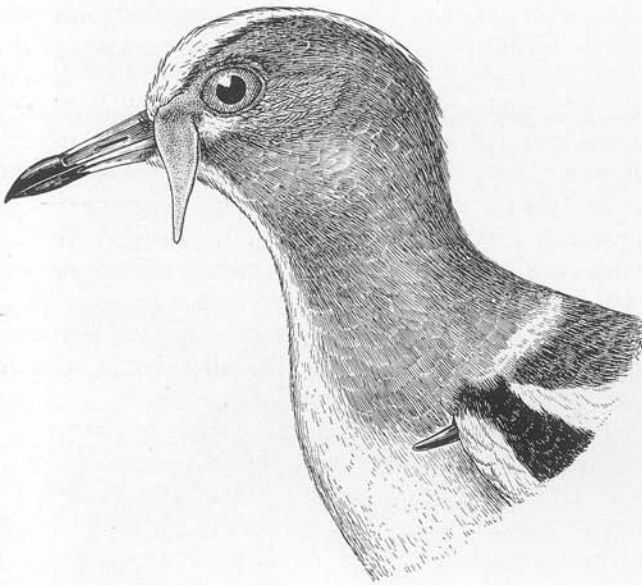


Fig. 9. *Xiphidiopus albiceps*. $\times 2/3$.

Along the main stream of the Congo, from Stanley Pool up to Stanley Falls, we often noticed the white-crowned lapwing, singly or in pairs, seldom in small parties, along the muddy river-bank or flying out ahead of the steamer with loud, shrill cries, and here and there on the broad sand-bars exposed at low water. It must be equally common along the lower Congo, the lower Ubangi, and on the larger rivers of the Kasai district. Father Callewaert has sent us two specimens from Luluabourg. Although it has been taken occasionally in the Sudan, we never noticed it

¹ Schuster, 1911, O. Mb., pp. 95-98.

in the Upper Uelle district, nor along the Ituri and Aruwimi rivers as far down as Banalia. Neither is it known from Uganda. It differs radically from *Afribyx senegallus* in its fondness for the banks of broad watercourses, and especially those in the forest region.

A spirited picture of the habits of the white-crowned lapwing, at a spot just above Stanley Pool, was given by Sir Harry Johnston (1884) in his 'River Congo.' He described the sprawling crocodiles and the birds that stood about them, very dissimilar creatures living in a strange intimacy. The lapwings were the first to give the alarm, and then flapped on black-and-white wings to another point along the shore, where they folded their attractive pinions under modest gray coverts, and strutted about the beach.

The call of *Xiphiodipterus albiceps* is a sharp "keep!" or "peep!" which may be repeated many times. It sometimes resembles the voice of the skimmer, *Rynchops flavirostris*; and since both in flight look black-and-white, it is not unnatural that the Mobangi people near Lukolela use the same name, "Ndawle," for both birds. Although resident through the whole year on the Congo River, this lapwing evidently nests only during the periods of low water. On August 9 near Lukolela I collected a pair in non-breeding condition and molting remiges and rectrices. Their wing-spurs were likewise about to shed the outer sheath, which could be lifted off, leaving a perfect new horny point beneath.

The river was then low, and these two birds seemed to be losing a favorable opportunity to nest. During the next period of low water, on February 10, a nest was discovered near the middle of a low sand-bar in the same section of the river. It was a shallow pit scooped from rather hard sand, about six inches across, with three eggs. The incubating bird was wary, but twice I watched it come back and settle down. The eggs are dull brownish buff, rather thickly spotted with dark brown. Two of them are more heavily blotched at the blunt end. Dimensions, 43.2×31 , 43.7×30.6 , and 44.3×30.8 mm. In color and size these eggs agree well with a set of three from Nigeria described by Bannerman (1931, p. 112).

That some individuals in the same region of the Congo do breed at the other period of low water, toward August, is proved by a young bird in juvenal dress, with remiges still in sheaths, which was collected in September, 1910, on the lower Ubangi River by the Second Expedition of the Duke of Mecklenburg. The specimen is preserved in the Frankfurt Museum.

The stomachs of two examples from Lukolela contained insect-re-

mains including one mantis, and a bone from a frog or fish. Both birds had swallowed tiny pebbles as well.

***Hemiparra crassirostris crassirostris* (Hartlaub)**

Chettusia crassirostris HARTLAUB, 1855, J. f. O., p. 427 (type locality: "Nubia"; but specimen more likely from upper White Nile).¹—*Hemiparra crassirostris* REICHENOW, 1911, 'Wiss. Ergeb. D. Z.-Afr. Exp.,' III, p. 243 (L. Mohasi; Kasindi).—*Defilippia crassirostris* SALVADORI, 1914, Ann. Mus. Zool. Napoli, IV, No. 10, p. 6 (Kagera R.).—*Defilippia crassirostris* VAN SOMEREN, 1916, Ibis, p. 199 (L. George).

ADULT MALE.—Iris rather dull scarlet, becoming whitish on outer rim, margin of eyelids bright scarlet; basal half of bill light crimson or rose-color, distal portion blackish; soft skin of feet light purplish red, but all large scales on front and back of metatarsi and on toes blackish, as are the claws.

ADULT FEMALE.—Similar, but iris red-brown or brownish red.

DISTRIBUTION OF THE SPECIES.—From the upper White Nile and Bahr-el-Ghazal south through eastern Africa to the Zambesi and Zululand. The typical form, ranging south to Uganda and Lake Edward, has all the remiges dark-colored, with some white only at the bases of the secondaries on their inner webs. A southern form, *H. c. leucoptera* (Reichenow), extending north to Mozambique, Nyasaland, and the Luapula River has all the remiges entirely white, with the exception of the innermost secondaries and outermost primaries. The intervening region is occupied by a rather variable intermediate form, *H. c. hybrida* Reichenow.

Typical *crassirostris* has been found on the western shore of Lake Albert by Grauer, one of whose specimens is in the American Museum. Some of the birds from Lake Edward certainly agree with those of the Bahr-el-Jebel, among them a male which I obtained at Kasindi Landing on the north shore in January, 1927, and two others collected by L. Lippens on the southwest shore. From the remarks by Reichenow (1911) it would seem that he regarded his specimens from Lake Mohasi as *H. c. crassirostris*, yet other writers have reported *hybrida* from the southern shore of Lake Edward.

These long-toed lapwings do not enter the forested area of the Congo, and even about the lakes and rivers of the eastern border they are not numerous. I have seen them only where there were extensive open marshes, usually with a great deal of floating vegetation such as *Pistia*. They are almost as much at home on the floating plants as lily-trotters (*Actophilornis*), walking about singly or in pairs. Now and then they take wing, circle around, and give a loud clicking "kick-k-k-k, kick-k-k-k—"

¹ See Grant and M.-Praed, 1936, B. B. O. C., LVI, pp. 92, 93.

Their food consists of aquatic insects and maggot-like insect-larvæ, dragon-fly nymphs, and small snails. The plumage of *Hemiparra* exhales a musty odor recalling that of petrels.

Hemiparra crassirostris hybrida Reichenow

Hemiparra hybrida REICHENOW, 1909, O. Mb., p. 42 (type locality: German East Africa).—*Chettusia crassirostris* DUBOIS, 1886, Bull. Mus. Roy. Hist. Nat. Belg., IV, p. 149 (L. Tanganyika).—*Hemiparra crassirostris* MATSCHIE, 1887, J. f. O., p. 144 (L. Upemba). SCHOUTEDEN, 1918, Rev. Z. A., V., p. 218 (Plain of Uvira; Kabare).—*Hemiparra leucoptera* REICHENOW, 1900, 'Vög. Afr.,' I, p. 185 (L. Upemba).—*Chætusia crassirostris* DUBOIS, 1905, Ann. Mus. Congo, Zool., I, f. 1, p. 24.—*Hemiparra crassirostris* approaching *leucoptera* SASSI, Ann. Naturh. Hofmus. Wien, XXVI, p. 355 (Urundi; L. Edward).—*Hemiparra crassirostris hybrida* LÖNNBERG, 1917, Arkiv f. Zool., X, No. 24, p. 6 (Kabare). BOWEN, 1933, Ecology, XIV, p. 267, Fig. 10B (map).—*Defilippia hybrida* MENEGAUX, 1923, 'Voyage Babault Afr. Orient.,' Ois., p. 22 ("between lakes Kivu and Leopold").

DISTRIBUTION.—From the eastern and southern shores of L. Victoria and the south side of Lake Edward to Lake Upemba, Lake Rukwa, and possibly northern Nyasaland. To judge from the remarks of Sassi and of Lönnberg, specimens from the southern shore of Lake Edward may be referred to this form. The species seems to be rare in the highlands of the Upper Katanga, but this race does inhabit the marshes about lakes Kisale and Upemba. Conover and Zimmer obtained it at Katobwe on the Lualaba near Lake Upemba.

Nests of *hybrida* along the eastern shore of Lake Victoria² are said to be placed in swamps on islets or mounds of débris. A mound is made of available materials, sometimes damp mosses, so the eggs are raised a few inches above the water-level.

Two, or occasionally three, eggs form a set, though a nest found by Fischer² in northern Tanganyika Territory on July 1 held four. These were dull gray-green with dark brown spots, some rounded, some streak-like. Dimensions 42–44 × 29–30 mm.

Hemiparra crassirostris leucoptera (Reichenow)

Vanellus leucopterus REICHENOW, 1889, J. f. O., p. 265 (type locality: Quelimane, Portuguese East Africa).—*Chætusia leucoptera* DUBOIS, 1905, Ann. Mus. Congo, Zool., I, f. 1, p. 24 (Katanga).

DISTRIBUTION.—Zululand north to Mozambique and the Upper Katanga. The Congo Museum has a mounted specimen collected in the Katanga by Lemaire, and there is a skin in the collection of J. De Rie-

¹ MacInnes, 1933, Journ. E. Afr. Ug. N. H. Soc., Nos. 47–48, p. 129; van Someren, 1935, idem, XII, p. 23.

² 1884, Zeitschr. Ges. Orn., Budapest, p. 392.

maecker from Mwabu, a village near the confluence of the Luombwa with the Luapula River. In these specimens the three outer primaries are blackish, but all the remaining remiges are white, with the exception of about four of the innermost secondaries. All primary-coverts are likewise wholly white.

Subfamily **Arenariinae**

Arenaria interpres interpres (Linnæus)

Tringa interpres LINNÆUS, 1758, 'Syst. Nat.,' 10th Ed., p. 148 (Europe and North America; restricted type locality: Gothland).—*Streptilas interpres* BOCAGE, 1881, 'Orn. Angola,' pt. 2, p. 434 (Shiloango).

DISTRIBUTION OF THE SPECIES.—Breeds in the northern regions of Europe, Asia, and North America, and on the adjacent islands, including Greenland, Iceland, and Novaya Zemlya. *A. i. morinella* (Linnæus), the race breeding on the Arctic coast of North America, west to the Mackenzie River, is somewhat the lighter and more rufous above in breeding dress, and migrates as far as southern Brazil.

The typical race, occupying the remainder of the breeding range, migrates south to the Cape of Good Hope, Madagascar, Australia, and New Zealand, also down the western coast of America to Chile. On its African travels the turnstone keeps almost entirely to the coasts, living in flocks along the beaches, and has been noted only exceptionally on the White Nile and Lake Nyasa. It is certain to occur near Banana, having been taken at many other places both north and south of the Congo mouth.

Subfamily **Hæmatopodinae**

KEY TO THE RACES OF **Hæmatopus ostralegus** OCCURRING IN AFRICA

- 1.—Underparts entirely blackish.....*H. o. moquini*.
Underparts, behind lower fore-neck, entirely white.....2.
- 2.—Metatarsus usually less than 52 mm.....*H. o. ostralegus*.
Metatarsus usually exceeding 52 mm.....*H. o. longipes*.

Hæmatopus ostralegus longipes Buturlin

Hæmatopus ostralegus longipes BUTURLIN, 1910, *Messenger Ornithologique*, Moscow, I, p. 37 (types from Alei R. in Tomsk Govt., and Lenkoran). HARTERT, 1921, 'Vög. pal. Fauna,' II, p. 1678. PETERS, 1934, 'Check-List,' II, p. 232.—*Hæmatopus ostralegus* SCHOUTEDEN, 1936, *Ann. Mus. Congo, Zool.*, I, f. 2, p. 72.

SPECIMEN.—Avakubi, ♀, Oct. 3.

DISTRIBUTION OF THE SPECIES.—According to Peters (1934), from

Iceland, northern Europe, northeastern Asia, Alaska and Virginia south to New Zealand, the Cape of Good Hope, and southern Chile. He admits seventeen races, mostly of pied coloration but some black, following the conclusions of Stresemann.¹ In some cases the black underparts of oyster-catchers indicate only a color-phase, black birds mating with pied. It must be admitted that the black *moquini* of South Africa and *meade-waldoi* of the Canaries are closely allied to the white-bellied oyster-catchers of Europe and Asia, though there are very distinct black species in Australia and southern South America.

In Europe there are four pied races of *ostralegus*. *H. o. ostralegus* Linnæus, usually with rather thin, pointed bill, breeds from Scandinavia to Spain, the northeast Mediterranean, and Black Sea. *H. o. malacophaga* Salomonsen,² of Iceland and the Färoes, is supposedly somewhat longer-winged, and its bill slightly deeper. *H. o. occidentalis* Neumann,³ of the British Isles, has the bill in adults still deeper and more truncate. *H. o. longipes* Buturlin occupies the inland area between the Dnieper and Yenisei rivers, and has a rather long, slender bill, while its metatarsus is longer than in the three preceding forms.

Eastern Asia is occupied by *H. o. osculans* Swinhoe, with a very large bill and metatarsus as long as in *longipes*. This race is not expected to reach Africa on migration, nor are *malacophaga* and *occidentalis*.

The oyster-catchers which migrate down the West African coast to Senegal and the Gambia are supposedly *H. o. ostralegus*, and specimens referred to the same form have been taken along the Red Sea and the coast of East Africa as far south as Mozambique. Recently H. Grote⁴ has pointed out that *H. o. longipes* also winters on the coasts of the Red Sea and northern Somaliland. One scarcely expects to find oyster-catchers far inland, but as Grote⁵ has reported, *longipes* often breeds along fresh water and inland lakes.

H. o. occidentalis and *ostralegus* are often difficult to distinguish. Both have the metatarsus about 47–51 mm., though Hartert gave the maximum as 56 mm. Their bills vary from 60–87 mm., but the majority are less than 80 mm. *H. o. longipes* is a well-marked race, with bills 72–90 mm. and metatarsus 52–60.

Possibly the individual which Colonel Meinertzhagen⁶ noted at Entebbe on Lake Victoria, March 20, was really *longipes*, and I think there

¹ 1927, O. Mb., pp. 71–77.

² 1930, Ibis, p. 58 (Thorsa, Iceland).

³ 1929, Gefiederte Welt, Heft 14, p. 161; 1932, Anz. Orn. Ges. Bayern II, p. 148 (Auskerry, Orkney Is.).

⁴ 1930, Mitt. Zool. Mus. Berlin, XVI, p. 99.

⁵ 1931, J. f. O., pp. 346–349.

⁶ 1922, Ibis, p. 74.

can be no doubt as to the identification of our specimen from Avakubi. It seems to be a second-year bird in autumn plumage, with a white spot on the throat, and the feathering of the back brown and abraded. Its wing measures 255 mm., exposed culmen 80 mm., and metatarsus 56 mm.

It was a great surprise to find this bird feeding along the bank of the Ituri River in a heavily forested area. Doubtless it does not often reach the northeastern Congo, but in view of the Lake Victoria record the occurrence cannot be called purely accidental. The stomach of our specimen contained insects and a millipede. Like many of the shore-birds arriving in central Africa at the same season, this one was decidedly lean.

[*Hæmatopus ostralegus moquini* Bonaparte]

Hæmatopus moquini BONAPARTE, 1856, Compt. Rend. Hebd. Acad. Sci. Paris, XLIII, p. 1020 (type locality: Africa). W. L. SCLATER, 1924, 'Syst. Av. Æth.,' pt. 1, p. 127 (N. to Gaboon on W. Coast).—*Haematopus niger niger* HARTERT, 1921, 'Vög. pal. Fauna,' II, p. 1679.—*Haematopus ostralegus moquini* PETERS, 1934, 'Check-List,' II, p. 233 ("Coasts and islands of South Africa from Walfish Bay to Natal").

The South African black oyster-catcher was once reported by Verreaux from the Gaboon, but it is very doubtful whether it really ranges north of Southwest Africa, its normal range being from Walfish Bay to Natal. Professor G. Smith¹ mentioned a "*Hæmatopus*" as seen in the bay of Bobomga, on the lower Congo, but gave no further clue as to its identity. There is little reason, therefore, to expect *moquini* even at the Congo mouth.

Subfamily **Recurvirostrinæ**

Himantopus himantopus (Linnæus)

Charadrius himantopus LINNÆUS, 1758, 'Syst. Nat.,' 10th Ed., p. 151 (type locality: southern Europe).—*Himantopus autumnalis* EMIN, 1892, Zool. Jahrb., VI, p. 150 (L. Albert).—*Himantopus himantopus* REICHENOW, 1900, 'Vög. Afr.,' I, p. 207; 1911, 'Wiss. Ergeb. D. Z.-Afr. Exp.,' III, p. 245 (Usumbura). SHELLEY, 1901, Ibis, p. 167 (L. Moero). SHARPE, 1902, Ibis, p. 101 (L. Edward). SASSI, 1912, Ann. Naturh. Hofmus. Wien, XXVI, p. 356. LÖNNBERG, 1917, Arkiv f. Zool., X, No. 24, p. 7 (Kabare). SCHOUTEDEN, 1918, Rev. Z. A., V, p. 219 (Beni; Ruzizi); 1936, Ann. Mus. Congo, Zool., I, f. 2, p. 72 (Buta; Mahagi Port). GYLDENSTOLPE, 1924, K. Svenska Vet. Akad. Handl., (3) I, No. 3, p. 300 (Kasenyi on L. Albert).—*Himantopus himantopus himantopus* BANNERMAN, 1931, 'Birds Trop. W. Afr.,' II, p. 123, Fig. 33 ("Congo R."; Landana).

SPECIMEN.—Faradje, ♂, Dec. 27.

MALE IN WINTER PLUMAGE.—Bill black, with a little reddish brown at base; iris dark brown, becoming bright red on outer rim; feet rose-red.

¹ 1818, in Tuckey, 'Narr. Exp. R. Zaire,' p. 334.

DISTRIBUTION.—Southern Europe to India and China, Africa and Madagascar. It seems probable that specimens from Madagascar and South Africa have slightly shorter wings and metatarsi than those of Europe and northern Africa.¹

The black-winged stilt occurs throughout most of Africa except in the forests of the west and of the Upper Congo. While many must be migrants from the north, the species breeds in Northeast Africa, Kenya Colony, along the Loangwa River,² and in South Africa. Thus far the Congo records are almost all from the eastern sections. I have unpublished reports of one killed at Kikondja on Lake Kisale, October 17, by Rodhain and Bequaert, and another collected by H. B. Conover at Katowe on the Lualaba.

In the central Congo basin the stilt is altogether wanting, as it seems to be in the Kasai district. We saw but a single example in the Uelle district, which was secured on a sand-bar in the River Dungu, and was doubtless a migrant from the north. About Lake Edward stilts are abundant. At Katwe, for instance, in January, I have seen approximately 900, mostly wading in a shallow brackish pond. Among them were a score or two with pure white head and neck. I noticed a few at Kabare in May. Specimens are said to have been taken on Lake Edward in June and July, but Léon Lippens tells me that in his experience stilts are present there only from the beginning of September to the middle of May. He is convinced that they do not nest there. They seem not to frequent highland lakes like Kivu or Bunyoni. The occurrence of the stilt in the coastal region of the Gaboon, as well as at Landana, suggests that it may be found also in the Lower Congo.

The four eggs of the stilt are laid either in a nest of rushes built in a swamp or in a slight hollow on a bare stream-bank or sand-bar. They are somewhat pyriform, cream-color to very pale brown, usually tinged with greenish, and spotted and blotched with blackish brown. Dimensions, 38.8–47.9 mm. \times 28–34.8. Neave found a nest on the Loangwa River on June 25. The American Museum has a fledgling from Korole, Kenya Colony, with remiges only partly grown, which was taken on July 27.

***Recurvirostra avosetta* Linnæus**

Recurvirostra avosetta LINNÆUS, 1758, 'Syst. Nat.', 10th Ed., p. 151 (southern Europe). LEACH, 1818, in Tuckey, 'Narr. Exp. R. Zaire,' p. 408 ("Lower Congo"). BANNERMAN, 1931, 'Birds Trop. W. Afr.,' II, p. 126, Fig. 34.—*Recurvirostra avocetta*

¹ See Friedmann, 1930, Bull. 153, U. S. Nat. Mus., p. 181; and Roberts, 1932, Ostrich, III p. 102.

² Neave, 1907, Mem. Proc. Manchester Lit. Phil. Soc., LI, No. 10, p. 14.

HARTLAUB, 1850, 'Beitr. Orn. Westaf.,' p. 42; 1884, J. f. O., p. 299. HEUGLIN, 1873, 'Orn. Nordost-Afr.,' p. 1175. BOCAGE, 1881, 'Orn. Angola,' pt. 2, p. 469. REICHENOW, 1900, 'Vög. Afr.,' I, p. 206.

DISTRIBUTION.—Europe and Asia to Mongolia and India; also widely but locally distributed in Africa, south to Cape Province, and occasionally on Madagascar. In Africa the avocet is found mainly along the coasts, but also about the highland lakes of East and Northeast Africa, especially those that are brackish. Along the west coast it has been taken in Togoland, near the base of Mt. Cameroon, and at Mossamedes; but Tuckey's record from the lower Congo River needs confirmation. There is always a possibility that the specimen was taken on the voyage out, and not in the Congo.

On the west coast north of the equator the avocet is merely a rare migrant from the north; but in East Africa it is resident, and undoubtedly breeds, as it does in South Africa. Possibly it may wander occasionally to the lakes along the eastern Congo border.

Subfamily *Erolinæ*

KEY TO THE SPECIES OF *PISOBIA* TO BE EXPECTED IN THE CONGO

- Metatarsus 20–23 mm. long; outermost pair of rectrices rather light gray-brown, or at least washed with that color near tips and on outer web; shafts of all primaries (from above) are whitish, at least in part *P. minuta*.
Metatarsus shorter, only 18–19 mm.; outermost pair of rectrices pure white; shafts of all primaries (from above) are brownish, except that of the long outermost primary, which is whitish *P. temminckii*.

Pisobia minuta (Leisler)

Tringa minuta LEISLER, 1812, 'Nachtr. zu Bechst. Naturg. Deutschl.,' p. 74 (type locality: Hanau am Main, Germany). Emin, 1892, Zool. Jahrb., VI, p. 150 (L. Albert). REICHENOW, 1900, 'Vög. Afr.,' I, p. 233; 1911, 'Wiss. Ergeb. D. Z.-Afr. Exp.,' III, p. 246 (L. Edward). SASSI, 1912, Ann. Naturh. Hofmus. Wien, XXVI, p. 357 (Mawambi). MENEGAUX, 1918, Rev. Fr. O., V, p. 252 (Zambi).—*Calidris minuta minuta* GROTE, 1930, Mitt. Zool. Mus. Berlin, XVI, p. 89.—*Erolia minuta* PETERS, 1934, 'Check-List,' II, p. 282. SCHOUTEDEN, 1936, Ann. Mus. Congo, Zool., I, f. 2, p. 73 (Buta; Tunguru).

SPECIMENS.—Avakubi, 2 ♂, Oct. 26; ♀, Nov. 24. Faradje, ♀, Sept. 21.

DISTRIBUTION.—The breeding range of the little stint is in northern Europe and Siberia, while the winter range includes India and Africa south to the Cape, and possibly Madagascar. In the Upper Congo it is not very common, but haunts the banks of streams in twos or threes, during the migrations, though rarely seen while going northward. Some of them winter in the Congo, for Emin reported them on Lake Albert in

January, and I have seen them on the sand-bars near Lukolela in February. At Katwe on the north shore of Lake Edward, in the latter half of January, from five to eight frequented a brackish pond.

Pisobia temminckii (Leisler)

Tringa temminckii LEISLER, 1812, 'Nachtr. zu Bechst. Naturg. Deutschl.,' p. 64 (type-locality: Hanau am Main, Germany).—*Erolia temminckii* SCHOUTEDEN, 1937, Bull. C. Z. C., XIII, p. 67 (Albert Nat. Park).

DISTRIBUTION.—Breeding from Scandinavia to eastern Siberia, Temminck's stint winters in the Mediterranean region, and reaches tropical Africa only in small numbers. Its usual southern limit runs from the Gambia to Lake Chad, the White Nile, and Southern Arabia. Bannerman¹ mentioned an occurrence in southwest Ankole, so the species was to be looked for about Lake Albert or Lake Edward. On April 18, 1936, Léon Lippens collected a specimen at Vitshumbi on Lake Edward which I have examined in the Congo Museum.

KEY TO THE SPECIES OF *EROLIA* WHICH MAY BE EXPECTED IN THE CONGO

Upper tail-coverts white all across, often with spots or bars of blackish; bill usually longer, 33–42 mm.; wing 125–137 mm. *E. testacea*.
Median upper tail-coverts blackish or brown, often with rufous tips, lateral tail-coverts white; bill usually shorter, 25–35 mm.; wing 106–122 mm. . . . *E. alpina*.

Erolia testacea (Pallas)

Scolopax testacea PALLAS, 1764, in Vroeg, 'Cat. rais.,' Adumbrat., p. 6 (type locality: Holland).—*Tringa subarquata* SHARPE AND BOUVIER, 1876, Bull. Soc. Zool. France, I, p. 313 (Banana).—*Tringa subarquata* BOCAGE, 1881, 'Orn. Angola,' pt. 2, p. 472. SHELLEY, 1890, Ibis, p. 170 (Aruwimi R.; Lower Congo). SHARPE, 1890, in Jameson, 'Story of Rear Column,' p. 414 (lower Aruwimi R.). REICHENOW, 1900, 'Vög. Afr.,' I, p. 230. LÖNNBERG, 1917, Arkiv f. Zool., X, No. 24, p. 6 (L. Edward). SCHOUTEDEN, 1937, Bull. C. Z. C., XIII, p. 36 (Banana).—*Ancylochilus subarquatus* SHARPE, 1902, Ibis, p. 101 (Katwe on L. Edward).—*Tringa ferruginea* SCHOUTEDEN, 1918, Rev. Z. A., V, p. 220 (Kabare).—*Erolia testacea* FRIEDMANN, 1930, 'Afr. Rep. Liberia Belg. Congo,' II, p. 752 (Kwamouth). BANNERMAN, 1931, 'Birds Trop. W. Afr.,' II, p. 142, Fig. 39. SCHOUTEDEN, 1936, Ann. Mus. Congo, Zool., I, f. 2, 73.

SPECIMENS.—Bafwasende, 2 ♂, Sept. 24. Medje, ♀, Sept. 16. Faradje, ♂, Sept. 30.

DISTRIBUTION.—After nesting on the northern coasts of Asia, curlew-sandpipers migrate through Europe and Asia as far as Australia and South Africa. Migrants are most commonly seen passing through the Upper Congo in September, when they may drop in upon any open ground, often in villages, but never in any great number.

¹ 1931, 'Birds Trop. W. Afr.,' II, p. 149.

Some arrive in South Africa even in August, others spend the winter in the Congo, and have been taken on the Aruwimi and at Kwamouth in December. Near Lukolela I noted a party of eight on March 22. A few must even remain in Africa during the northern summer, since they have been reported from Lake Edward in June and July.

[*Erolia alpina alpina* (Linnæus)]

Tringa alpina LINNÆUS, 1758, 'Syst. Nat.,' 10th Ed., p. 149 (type locality: Lapland).

The typical race of the dunlin, after breeding in the north from Iceland and Spitzbergen to the Yalmal Peninsula, migrates south to the Mediterranean region, the Cape Verde Islands, Rio de Oro, Kordofan, the Red Sea, and the East African coast occasionally to Zanzibar. Possibly the East Coast birds are *E. a. centralis* Buturlin from northern Siberia.

Dr. van Someren¹ mentions the occurrence of *E. a. alpina* on lakes in the Toro district, western Uganda. Otherwise I know of no reason to expect the species in or near the Congo.

[*Calidris canutus canutus* (Linnæus)]

Tringa canutus LINNÆUS, 1758, 'Syst. Nat.,' 10th Ed., p. 149 (Europe; restricted type locality: Sweden).

After breeding in the arctic regions, the knot travels southward to Tierra del Fuego, Australia, New Zealand, India, and Africa. The typical race breeds in Spitzbergen and winters on the African coasts. It must follow the west coast in small numbers, and having been taken on the Gold Coast and at Walfish Bay, is likely to occur at the mouth of the Congo. Dr. van Someren¹ mentioned a specimen taken in 1906 in the Toro district of Uganda, but this seems highly exceptional. In the Anglo-Egyptian Sudan it seldom reaches Khartoum, and on the East Coast it has not been reported south of Zanzibar.

***Philomachus pugnax* (Linnæus)**

Tringa pugnax LINNÆUS, 1758, 'Syst. Nat.,' 10th Ed., p. 148 (Europe; restricted locality: Sweden).—*Pavoncella pugnax* DUBOIS, 1905, Ann. Mus. Congo, Zool., I, f. 1, p. 24 (Banalia). SALVADORI, 1909, Ann. Mus. Civ. Stor. Nat. Genova, (3) IV, p. 326 (Buta-Dungu). LÖNNBERG, 1917, Arkiv f. Zool., X, No. 24, p. 7 (Kabare).—*Totanus pugnax* SCHOUTEDEN, 1918, Rev. Z. A., V, p. 219. SCHUBOTZ, 1921, 'Tageb. Emin Pascha,' VI, p. 48 (Tunguru). DE RIEMAECKER, 1927, Rev. Z. A., XIV, p. 259 (Elisabethville).—*Tosanus pugnax* SCHOUTEDEN, 1920, Rev.

¹ 1931, Journ. E. Afr. Ug. N. H. Soc., Spec. Suppl. No. 4, p. 32.

Z. A., VII, p. 189 (Malela).—*Philomachus pugnax* SCHOUTEDEN, 1923, Rev. Z. A., XI, p. 317 (Tshikapa); 1936, Ann. Mus. Congo, Zool., I, f. 2, p. 73 (Buta; Nian-gara).

SPECIMENS.—Medje, ♀, May 8. Faradje, 2 ♂, Sept. 22, 24; 2 ♀, May 10, Sept. 24.

DISTRIBUTION.—From its breeding grounds, northern France and Scandinavia to the Kolyma River in Siberia, the ruff migrates to India and the Cape of Good Hope, some reaching South Africa as early as August. Only traces, at most, of the nuptial dress, are generally to be noticed upon males taken in Africa. They have the appearance therefore of large plain-colored sandpipers, about one-fourth larger than females of the same species.

Ruffs seem to avoid, for the most part, the forest areas of the Congo. When seen in the Uelle and Ituri, they are usually single and not shy, quite silent, walking upon expanses of open ground in villages or near marshes. Few winter north of the equator, but there are records in November from Lake Edward and the southern Kasai, in December from Elisabethville, and January 1 from Malela on the lower Congo. In January and March, I noted ruffs on Lake Edward and along the Rutshuru River, and at Lukolela on March 22 a couple on a sand-bar in the Congo River.

Crocethia alba (Pallas)

Trynga alba PALLAS, 1764, in Vroeg, 'Cat. rais.,' Adumbrat., p. 7 (type locality: coast of the North Sea).—*Calidris arenaria* DE RIEMAECKER, 1927, Rev. Z. A., XIV, p. 259 (Lubumbashi R.).

The sanderling breeds in the arctic regions of both hemispheres, migrating southward to southern Chile, Australia, India, Madagascar, and Africa. In the last-named continent it reaches the Cape Province, but is seldom seen away from sea-coasts, though occurrences have been reported at Khartoum, Bukoba on Lake Victoria, and Lake Nakuru. There are numerous records from along the western coast, including the Gaboon, Portuguese Congo, and southern Angola; so it may be taken for granted that the species occurs regularly at the mouth of the Congo. The record from the Lubumbashi River in the Upper Katanga, October 20, is remarkably far inland.

Subfamily **Tringinae**

Actitis hypoleucos (Linnæus)

Tringa hypoleucos LINNÆUS, 1758, 'Syst. Nat.,' 10th Ed., p. 149 (Europe; restricted type locality: Sweden).—*Tringoides hypoleucos* JOHNSTON, 1884, 'River Congo,' p. 368 (Cataract region). SHELLEY, 1890, Ibis, p. 170 (Yambuya). SHARPE,

1890, in Jameson, 'Story of Rear Column,' p. 404. SALVADORI, 1911, Ann. Mus. Civ. Stor. Nat. Genova, (3) V, p. 456 (Uelle); 1914, Ann. Mus. Zool. Napoli, IV, No. 10, p. 6 (L. Bangweolo). SASSI, 1912, Ann. Naturh. Hofmus. Wien, XXVI, p. 357 (Uvira; Beni; Beni-Mawambi). MOURITZ, 1914, Ibis, p. 32 (S. E. Katanga).—*Actitis hypoleucos* DUBOIS, 1886, Bull. Mus. Roy. Hist. Nat. Belg., IV, p. 149 (L. Tanganyika). SCHWEINFURTH AND RATZEL, 1888, 'Emin-Pascha,' German Ed., p. 194 (Tingasi). GYLDENSTOLPE, 1924, K. Svenska Vet. Akad. Handl., (3) I, No. 3, p. 300 (Goma; Angi). DE RIEMAECKER, 1927, Rev. Z. A., XIV, p. 259 (Kifumanshi R. in Katanga). SCHOUTEDEN, 1930, Rev. Z. A., XVIII, p. 281 (Elisabethville); 1932, idem, XXII, p. 247 (Lulenga; Nya-Muzinga; Kisenyi; Ngoma); 1933, idem, XXII, p. 380; 1935, idem, XXVII, p. 401 (Luvungi; Nyanza on L. Tanganyika); 1936, Ann. Mus. Congo, Zool., I, f. 2, p. 73 (Djamba; Kotili; Buta; Bambili; Panga; Niangara; Mauda; Dungu).—*Actitis hypoleucos* SCHALOW, 1886, J. f. O., p. 436 (Katapena); 1887, idem, p. 226 (W. of L. Tanganyika). MARSCHKE, 1887, J. f. O., p. 145 (Lufuku; "Lualaba" = Luvua; Lufira Falls; Likulwe). REICHENOW, 1887, J. f. O., p. 306 (Stanleyville). SCHOUTEDEN, 1926, Rev. Z. A., XIII, p. 187 (Lower Congo). PETIT, 1926, 'Dix Années de Chasses,' p. 121 (Boma).—*Totanus hypoleucos* EMIN, 1894, J. f. O., p. 165 (Irumu). FLOWER, 1894, P. Z. S. Lond., p. 603 (Valiasnge on Lindi R.).—*Tringoides hypoleucos* REICHENOW, 1900, 'Vög. Afr.,' I, p. 224 (Mswa); 1911, 'Wiss. Ergeb. D. Z.-Afr. Exp.,' III, p. 246 (Usumbura). SCHOUTEDEN, 1918, Rev. Z. A., V, p. 219 (Lesse; L. Edward; Talia-Semliki confluence; Masidongo; old Mission St. Gustave; Molekera; Kaniki; Kabare; Kayera); 1920, idem, VII, p. 189 (Malela).—*Actitis hypoleuca* DUBOIS, 1905, Ann. Mus. Congo, Zool., I, f. 1, p. 24 (Lower Congo; Kisantu; Ituri; Prov. Orientale). SCHOUTEDEN, 1923, Rev. Z. A., XI, pp. 317, 389 (Tshikapa; "all rivers of the Kasai"; Kwamouth); 1924, idem, XII, pp. 262, 410 (Kidada; Kisantu; Leopoldville; Eala); 1925, idem, XIII, p. 6 (Bolobo region).—*Actitis hypoleucos hypoleucos* BANNERMAN, 1922, Rev. Z. A., X, p. 189.—*Tringa hypoleuca* BERLIOZ, 1922, Bull. Mus. Paris, p. 396 (Kibali-Dungu confluence). F. DE SCHAECK, 1927, Bull. Soc. Zool. Genève, III, f. 6, p. 79 (Luluabourg).

SPECIMENS.—Stanleyville, ♂, Aug. 11. Avakubi, 3 ♀, Oct. 8, 22, Dec. 8. Ngayu, ♀, Dec. 11. Faradje, 2 ♂, Apr. 8, Sept. 11; ♀, Aug. 19.

DISTRIBUTION.—The common sandpiper breeds from the British Isles to Japan, north about to the Arctic Circle and south to the Mediterranean and Kashmir. On its migrations it reaches Australia and the Cape Province of South Africa, yet some individuals winter as far north as the Mediterranean and the Red Sea. The lengthy list of references for the Congo proves that there, too, it is a most common sandpiper. It would be superfluous for me to add all the localities at which I have seen it.

Of its nesting in tropical Africa I am still skeptical. The van Somerens¹ have published a photograph taken in Uganda of a bird supposedly sitting on its nest, and Colonel Meinertzhagen,² too, reported young

¹ 1910, 'Studies of Bird Life in Uganda,' p. 10, Pl. x.

² 1919, Ibis, p. 388.

common sandpipers with their parents on the Kagiado River in Kenya Colony. A female specimen taken on June 19, 1906, was listed by van Someren;¹ and Hartert,² too, collected one at Loko on the Benue River in June. Exceptional occurrences like these last are known in the case of other northern shore-birds.

The astonishingly early arrival of birds from the north has often led to the assumption that they had bred near the equator. On Lake Albert I have noted them at Butiaba on August 9 and at Kasenyi on August 10. Near 7° south latitude Böhm found the common sandpiper along the Lufuku River on August 4, and I have observed it at Ankoro on the Lualaba on August 7. At Avakubi on the Ituri, 1° 20' north latitude, I have seen them on July 21, and at Mobeka on the middle Congo, on July 25. Here they are not even suspected of breeding.

From this time on, until as late as April 28, they remain in the region and almost give the impression of a resident species. In May and June, however, not a single bird ever came to my notice. During their long stay in Africa, these sandpipers are to be found from sea-level up to 6000 feet along the banks of almost every river even though wooded, or around any lake or open marshy spot, usually in small numbers, often singly. Their habits are closely similar to those of the American spotted sandpiper, even to the "teetering," but the scaling flight is perhaps less pronounced, and the shrill "tweet-tweet" not so loud.

At Avakubi, we noted that while the individuals were widely scattered during the day, they gathered at sundown into parties of three to a dozen, and then flew down the river to roost on rocks in rapids. Very early in the morning they might be seen going up again, and on these journeys they flew very low over the water, often spread out in a straight line. I once witnessed an amusing duel between common sandpipers on a log, the two birds going at each other like young cocks, pecking mostly at the feathers of the opponent's neck.

Of three stomachs examined, two contained the hard shells of insects, mingled with small stones; the third held fly-maggots.

***Terekia cinerea* (Güldenstädt)**

Scolopax cinerea GÜLDENSTÄDT, 1774, Novi Comm. Acad. Sci. Petrop., XIX, p. 473 (type locality: Terek R., S. E. Russia).—*Terekia cinerea* SHARPE, 1896, 'Cat. Birds Brit. Mus.,' XXIV, p. 763 (Congo R.). SCHOUTEDEN, 1935, Bull. C. Z. C., XII, p. 35 (Kansenia).—*Xenus cinereus* PETERS, 1934, 'Check-List,' II, p. 268 (winters in eastern Africa).

¹ 1916, Ibis, p. 201.

² 1886, J. f. O., p. 608.

DISTRIBUTION.—Northeastern Europe and northern Siberia; south in winter to Australia, India, Africa, Mauritius, and Madagascar. There is doubtless a fairly regular migration of Terek sandpipers along the East African coast, taking them as far as the Cape Province; but speci-

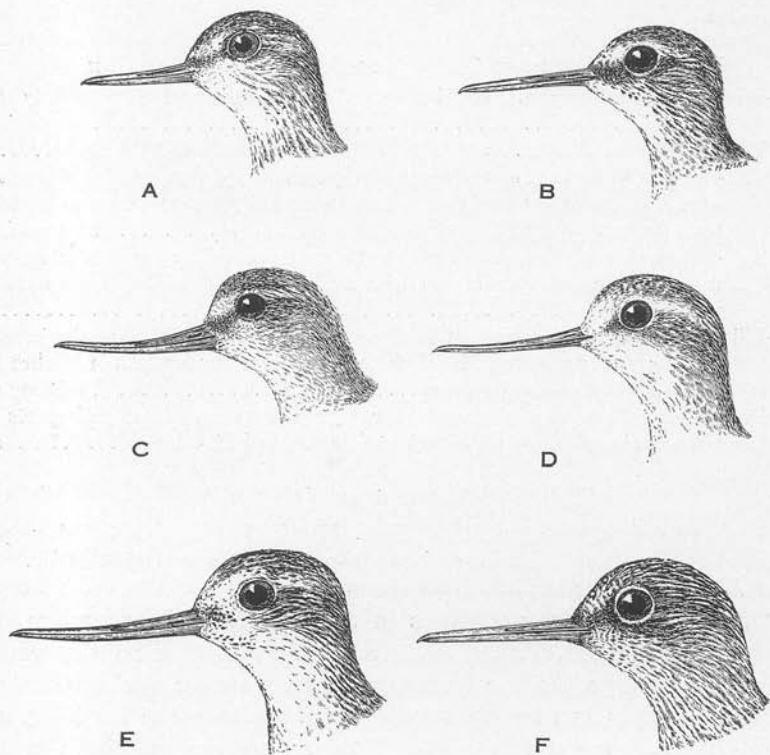


Fig. 10. Heads of tattlers: A, *Rhyacophilus glareola*; B, *Tringa ochropus*; C, *Terekia cinerea*; D, *Totanus stagnatilis*; E, *Totanus nebularius*; F, *Totanus totanus*. All $\times 1/2$.

mens have also been procured on the southwestern coast, and supposedly as far north as Landana.

Sharpe recorded a specimen from the lower Congo River which was collected by Dr. Lucan, possibly the same one mentioned by Bocage¹ as taken by Lucan and Petit at Landana. Grote² questions the Landana

¹ 1881, 'Orn. Angola,' pt. 2, p. 463.

² 1930, Mitt. Zool. Mus. Berlin, XVI, p. 94.

record, mainly because the species is not known to come south along the West African coast, although it is so definitely a coastwise bird. However, it still seems likely that the Terek sandpiper may occasionally be found near the mouth of the Congo. In any case, I have seen one specimen in the Congo Museum, secured at Kansenia, Katanga, by G. F. de Witte.

KEY TO THE SPECIES OF *TOTANUS* TO BE EXPECTED IN THE CONGO

- 1.—Wing less than 150 mm. long; bill exceedingly slender and often slightly upcurved. *T. stagnatilis*.
 Wing more than 150 mm. long; bill stouter, though sometimes upcurved. 2.
- 2.—Tail-feathers white with more or less zigzag bars of dusky brown, but the outer ones mainly white, their inner webs almost wholly white; tarsus at least 55 mm. long; wing usually over 180 mm. *T. nebularius*.
 Tail-feathers all more regularly banded with dusky brown, or the outermost ones may be largely dusky brown with broken bars of white; wing usually under 173 mm. 3.
- 3.—Bill (exposed culmen) more than 50 mm. long; inner border of primaries irregularly barred or speckled with dark gray or brown; underparts in full breeding plumage are blackish gray. *T. erythropus*.
 Bill less than 50 mm. long; inner border of primaries plain white; underparts in full breeding plumage thickly spotted or streaked with dusky. *T. totanus*.

[*Totanus totanus totanus* (Linnæus)]

Scolopax totanus LINNÆUS, 1758, 'Syst. Nat.,' 10th Ed., p. 145 (Europe; restricted type locality: Sweden).—*Tringa totanus totanus* HARTERT, 1921, 'Vög. pal. Fauna,' II, p. 1609 (Africa, south to the Cape).

The common redshank breeds in the Palæarctic Region, migrating south to Africa, India, and the Malay countries. The typical race breeds throughout Europe and western Siberia, and in winter reaches the Red Sea and Zanzibar, but travels in larger numbers down the West African coast, some even to Cape Province. There is no record from the vicinity of the Congo mouth, but I have little doubt of their passage along the coast at this point.

Mr. H. B. Conover tells me that he saw a redshank at Katobwe on the Lualaba River, but cannot be sure whether it was *totanus* or *erythropus*. I had a similar experience on the Congo near Lukolela on March 27; a couple of birds standing in shallow water near a sand-bar escaped me, but seemed almost certainly to be *totanus*. This is the commoner species in West Africa.¹ Mr. C. R. Stegall writes me from the Kasai that he shot a redshank on the Fua River which he believed to be of this same species, but unfortunately he did not preserve it.

¹ See Bannerman, 1931, 'Birds Trop. W. Afr.,' II, pp. 169-172.

Totanus erythropus (Pallas)

Scolopax erythropus PALLAS, 1764, in Vroeg, 'Cat. rais.,' Adumbrat., p. 6 (type locality: Holland).—*Totanus fuscus* SHARPE AND BOUVIER, 1876, Bull. Soc. Zool. France, I, p. 313 (Quitta).—*Tringa erythropus* PETERS, 1934, 'Check-List,' II, p. 264 (winters south to Africa, etc.).

DISTRIBUTION.—The dusky redshank breeds in northern Scandinavia, northern Russia, and northern Asia east to Kamchatka, migrating as far as South Africa, Ceylon, Burma, and China. Many winter in the Mediterranean countries, and relatively few reach the equator.

Lucan and Petit are said to have obtained a specimen at Quitta on the Loango Coast, so it may be expected near the Congo mouth. Léon Lippens collected two examples at Vitshumbi, Lake Edward, on January 16, 1936, so the species is now known with certainty from the eastern Congo.

Totanus nebularius (Gunnerus)

Scolopax nebularia GUNNERUS, 1767, in Leem, 'Beskr. Finn. Lapp.,' p. 251 (type locality: Norway).—*Totanus canescens* BOCAGE, 1881, 'Orn. Angola,' pt. 2, p. 464 (Landana).—*Totanus glottis* DUBOIS, 1886, Bull. Mus. Roy. Hist. Nat. Belg., IV, p. 149 (L. Tanganyika); 1905, Ann. Mus. Congo, Zool., I, f. 1, p. 24 (Lower Congo; Kisantu). OUSTALET, 1893, Naturaliste, VII, p. 128.—*Glottis nebularius* HARTERT, 1899, in Ansonge, 'Under the African Sun,' App., p. 327 (Kibero on E. shore of L. Albert). BANNERMAN, 1931, 'Birds Trop. W. Afr.,' II, p. 172, Fig. 51 (Congo).—*Totanus littoreus* REICHENOW, 1900, 'Vög. Afr.,' I, p. 217 (Ubangi River); 1911, 'Wiss. Ergeb. D. Z.-Afr. Exp.,' III, p. 245 (Usumbura). MENEGAUX, 1918, Rev. Fr. O., V, p. 252 (Zambi).—*Totanus littoreus* SCHOUTEDEN, 1920, Rev. Z. A., VII, p. 189 (Malela).—*Tringa nebularia* SCHOUTEDEN, 1932, Rev. Z. A., XXII, p. 247 (Ngoma); 1935, idem, XXVII, p. 401 (Luvungi); 1936, Ann. Mus. Congo, Zool., I, f. 2, p. 74 (Buta; Titule).

DISTRIBUTION.—Northern Europe and Asia, from Scotland to Kamchatka; south in winter to New Zealand, Tasmania, India, Madagascar, and the Cape Province in Africa. The greenshank travels not only along the eastern and western coasts of Africa, but also through the Nile Valley, and visits the larger lakes of the eastern half of Africa. It also frequents the main stream of the Congo-Lualaba, as it does the larger rivers of West Africa.

This large tattler is almost never seen along the lesser streams in the Upper Congo, and is not a sociable bird. Mr. Berlioz writes me that Dybowski's specimen came from Ouadda on the Ubangi River. In December I have observed the greenshank between Stanley Pool and Kwamouth, and on February 9 and April 3 saw single individuals on sand-bars near Lukolela. H. B. Conover collected it at Katobwe on the Lualaba River, and Dr. J. C. Phillips obtained a specimen on Lake Edward as late

as May 5. De Riemaeker has one from the Luapula River. A few are known to remain in tropical and southern Africa even during the northern summer.

Totanus stagnatilis Bechstein

Totanus stagnatilis BECHSTEIN, 1803, 'Orn. Taschenb.,' II, p. 292, Pl. xxix (type locality: Germany). DUBOIS, 1886, Bull. Mus. Roy. Hist. Nat. Belg., IV, p. 149 (L. Tanganyika); 1905, Ann. Mus. Congo, Zool., I, f. 1, p. 24 (Karema; Landana). REICHENOW, 1900, 'Vög. Afr.,' I, p. 220; 1911, 'Wiss. Ergeb. D. Z.-Afr. Exp.,' III, p. 245. LÖNNBERG, 1917, Arkiv f. Zool., X, No. 24, p. 6 (Kabare). MENEGAUX, 1918, Rev. Fr. O., V, p. 252 (Zambi). SCHOUTEDEN, 1918, Rev. Z. A., V, p. 219 (Beni); 1930, idem, XVIII, p. 281 (Kafubu R. near Elisabethville). EMIN, in Stuhlmann, 1922, 'Tageb. Emin Pascha,' III, p. 406 (Tunguru on L. Albert).—*Totanus stagnatilis* SCHOUTEDEN, 1920, Rev. Z. A., VII, p. 189 (Malela).—*Tringa stagnatilis* GROTE, 1930, Mitt. Zool. Mus. Berlin, XVI, p. 92. SCHOUTEDEN, 1936, Ann. Mus. Congo, Zool., I, f. 2, p. 74.

DISTRIBUTION.—The marsh sandpiper breeds in southeastern Europe, Turkestan, and southern Siberia, migrating to Australia, India, and South Africa. It is widely distributed in Africa, some wintering as far north as the Sudan, others reaching the Cape Province, and is not restricted to the coasts, but occurs in the Nile Valley and about the lakes of the eastern half of tropical Africa. Like the greenshank, however, it does not find the smaller rivers of the Upper Congo suited to its needs.

Lang and I did not meet with it during our first expedition, but it is not uncommon about Lake Edward, and Conover found it at Katobwe on the Lualaba River. Rockefeller and Murphy collected a male in breeding dress at Moba on Lake Tanganyika as late as May 22.

Rhyacophilus glareola (Linnæus)

Tringa glareola LINNÆUS, 1758, 'Syst. Nat.,' 10th Ed., p. 149 (Europe; restricted type locality: Sweden). F. DE SCHAECK, 1927, Bull. Soc. Zool. Genève, III, f. 6, p. 80 (Luluabourg). SCHOUTEDEN, 1932, Rev. Z. A., XXII, p. 247 (Nyamuzinga; L. Gando; Lulenga); 1933, idem, XXII, p. 380 (Kisenyi-Ruhengere); 1936, Ann. Mus. Congo, Zool., I, f. 2, p. 74 (Buta; Panga; Niangara; Aru).—*Totanus glareola* DUBOIS, 1886, Bull. Mus. Roy. Hist. Nat. Belg., IV, p. 149 (L. Tanganyika); 1905, Ann. Mus. Congo, Zool., I, f. 1, p. 24 (Lower Congo; Kisantu; Yindu [= Kindu?]). REICHENOW, 1911, 'Wiss. Ergeb. D. Z.-Afr. Exp.,' III, p. 246 (L. Karago). SASSI, 1912, Ann. Naturh. Hofmus. Wien, XXVI, p. 357 (Kisaka). MENEGAUX, 1918, Rev. Fr. O., V, p. 252 (Zambi). SCHOUTEDEN, 1918, Rev. Z. A., V, p. 219 (Beni). DE RIEMAECKER, 1927, Rev. Z. A., XIV, p. 258 (Elisabethville).—*Rhyacophilus glareola* SCHOUTEDEN, 1923, Rev. Z. A., XI, p. 389 (Kwamouth); 1924, idem, XII, p. 262 (Kidada); 1930, idem, XVIII, p. 281 (Kafubu R. near Elisabethville). FRIEDMANN, 1930, Bull. 153, U. S. Nat. Mus., p. 180 (L. Edward).

SPECIMENS.—Stanleyville, 2 ♀, Aug. 16, Nov. 22. Avakubi, 2 ♂, Feb. 14, Nov. 24. Niangara, ♂, Nov. 17. Faradje, 2 ♂, Sept. 7, Oct. 12.

DISTRIBUTION.—Breeds in northern Europe and Asia, migrating to India, Australia, and South Africa. In the northeastern Congo, in savanna and forest country alike, it is a rather common bird along the rivers from September to March; and, as our first record proves, it may even be seen in August. It winters throughout the whole colony, as shown by the published records, except on the very high mountains. Nevertheless, Rockefeller and Murphy obtained one at 7050 feet, at Kasengala in Marungu; and at slightly lower elevation Dr. J. C. Phillips secured specimens on lakes Chahafi and Mutanda, northeast of the Kivu Volcanoes. On the Lualaba River Mr. Conover collected the wood-sandpiper at Katobwe, and I noted two on the middle Congo near Lukolela on March 22.

In the Congo the wood-sandpiper is not particularly fond of woods, but is found usually in open or grassy spots near marshes and watercourses, or on bars in rivers at low water. It reminded me strongly of our American solitary sandpiper, *Tringa solitaria* Wilson.¹

Tringa ochropus Linnæus

Tringa ochropus LINNÆUS, 1758, 'Syst. Nat.,' 10th Ed., p. 149 (Europe; restricted type locality: Sweden). BANNERMAN, 1931, 'Birds Trop. W. Afr.,' II, p. 165, Fig. 48 (Mfumbiro volcanoes).—*Totanus ochropus* SALVADORI, 1907, Boll. Mus. Zool. Anat. Torino, XXII, No. 570, p. 9 (near Lukonzolwa, L. Moero). O.-GRANT, 1910, Tr. Z. S. Lond., XIX, p. 446 (E. Ruwenzori, up to 10,000 ft.). REICHENOW, 1911, 'Wiss. Ergeb. D. Z.-Afr. Exp.,' III, p. 246 (S. slope Kivu Volcanoes; W. base of Ruwenzori). MENEGAUX, 1918, Rev. Fr. O., V, p. 252 (Lower Congo).—*Tringa ochropus* SCHOUTEDEN, 1923, Rev. Z. A., XI, p. 317 (Tshikapa); 1924, idem, XII, p. 410 (Eala); 1936, Ann. Mus. Congo, Zool., I, f. 2, p. 74 (Buta; Mahagi Port). CHAPIN, 1927, Bull. A. M. N. H., LIII, p. 538.

SPECIMENS.—Avakubi, ♂, Feb. 15, ♀, Feb. 26. Nala, ♂, Oct. 25.

DISTRIBUTION.—Breeding from Scandinavia and northern Germany to Siberia and the Amur River; in winter to the Philippines, Ceylon, and Africa south to Angola, Nyasaland, and Beira on the eastern coast, occasionally even to Natal.² The green sandpiper will be found throughout the Congo, save perhaps in the highlands of the Katanga. It has been noted on Ruwenzori up to an elevation of 10,000 feet.

In the Congo, as a rule, this sandpiper is seen in small numbers along the rivers. We noted it on the Uelle, the Dungu, and the Ituri, and more

¹ Bocage (1881, 'Orn. Angola,' pt. 2, p. 468) recorded one specimen of the American solitary sandpiper, under the name *Totanus chloropygus* Vieillot, as having been taken by Anchieta at Cabinda, close to the Congo mouth. He regarded the occurrence as purely accidental, but emphasized the care with which he had made his determination.

² Chubb, 1912, Journ. S. Afr. Orn. Union, VIII, p. 2.

recently I have seen it at Irumu, on the north shore of Lake Edward, and on the Rutshuru River. Wooded banks are not distasteful to it, and it may be seen feeding about water-soaked logs even where overhung by forest trees. At Lukolela I have flushed it from a muddy pool in a forest swamp. In flight the dark wings serve to distinguish it from the wood-sandpiper; both species are usually silent.

The stomach of one specimen contained pieces of fresh-water shrimps and insects, the latter including a dragon-fly larva. A second bird was found to have swallowed pieces of mollusk shell.

***Limosa limosa limosa* (Linnæus)**

Scolopax limosa LINNÆUS, 1758, 'Syst. Nat.,' 10th Ed., p. 147 (Europe; restricted type locality: Sweden).—*Limosa limosa limosa* SCHOUTEDEN, 1938, 'Expl. P. N. A. Mission de Witte,' f. 9, p. 50 (Bitshumbi).

DISTRIBUTION.—The typical race of the black-tailed godwit nests from Belgium eastward to the Altai Mountains, and migrates southward to the Mediterranean Basin, Africa, India, and Ceylon. In Africa it reaches the Gambia, Sierra Leone, Nigeria, the White Nile, and the Tana River. Occasionally it wanders to Lake Edward, where it has recently been observed, but not collected, by Léon Lippens at Vitshumbi.

KEY TO THE SPECIES OF **NUMENIUS** IN THE CONGO

Crown with a light median stripe, and on each side a broad dark brown longitudinal band; bill less than 90 mm. long; wing less than 265 mm. long. . . . *N. phæopus*.
Whole crown streaked with dark brown on a lighter, dull buff ground; bill more than 100 mm. long; wing usually more than 270 mm. long. *N. arquata*.

***Numenius phæopus phæopus* (Linnæus)**

Scolopax phæopus LINNÆUS, 1758, 'Syst. Nat.,' 10th Ed., p. 146 (Europe; restricted type locality: Sweden).—*Numenius phæopus* BÜTTIKOFER, 1888, Notes Leyden Mus., X, p. 212 (Banana).—*Numenius phæopus phæopus* BANNERMAN, 1931, 'Birds Trop. W. Afr.,' II, p. 186. SCHOUTEDEN, 1936, Ann. Mus. Congo, Zool., I, f. 2, p. 74 (near Aba).

DISTRIBUTION OF THE SPECIES.—Breeds in the northern parts of Europe and Asia, from Iceland and the Orkneys to East Siberia, also in Arctic America, if *N. hudsonicus* Latham is regarded as a race of *phæopus*.

N. p. phæopus migrates from northern Europe and western Siberia to Cape Province, Madagascar, the Seychelles, and northwestern India, *N. p. variegatus* (Scopoli), breeding in Siberia east of the Lena River, travels as far as Tasmania. *N. p. alboaxillaris* Lowe,¹ if valid, is likely

¹ 1921, B. B. O. C., XLI, p. 110 (Inhambane, Port. E. Afr.).

to nest in Siberia rather than along the East Coast or on Mauritius.

Whimbrels of the typical race travel not only along both coasts of Africa, but also ascend the Nile and reach some of the lakes in eastern Africa. Dr. van Someren has taken them on Lakes Nakuru and Victoria, and there is a male specimen in the Rothschild Collection obtained by Camburn at Irumu in the northeastern Congo, August 22, 1906. Léon Lippens tells me that he observed one near the outlet of Lake Edward.

Along the West Coast whimbrels occur in numbers, especially in Sierra Leone. They reach the islands in the Gulf of Guinea, and the coast of Southwest and South Africa. A single specimen was collected by van der Kellen at Banana, where they are probably not at all uncommon.

***Numenius arquata arquata* (Linnaeus)**

Scolopax arquata LINNÆUS, 1758, 'Syst. Nat.,' 10th Ed., p. 145 (Europe; restricted type locality: Sweden).—*Numenius arcuatus* REICHENOW, 1877, J. f. O., p. 12 (Chinchoxo).—*Numenius arquatus* SHARPE, 1896, 'Cat. Birds Brit. Mus.,' XXIV, p. 341 (Ambriz, Angola). SCHOUTEDEN, 1930, Bull. C. Z. C., VII, p. 82 (Congo). OUSTIMOVITCH, 1930, idem, VII, p. 93 (Kwango).—*Numenius arquata* GROTE, 1930, Mitt. Zool. Mus. Berlin, XVI, p. 95 (L. Tanganyika).—*Numenius arquata arquata* BANNERMAN, 1931, 'Birds Trop. W. Afr.,' II, p. 182, Fig. 54 (Congo mouth). SCHOUTEDEN, 1936, Ann. Mus. Congo, Zool., I, f. 2, p. 74 (in part. Leopoldville).

DISTRIBUTION OF THE SPECIES.—Breeds in Europe and northern Asia. The typical race makes its home from Ireland to northern Russia and Dobrudja. *N. a. orientalis*, of lighter color and with bill averaging longer, nests from western Siberia to Transbaikalia. *N. a. suschkini* Neumann,¹ colored like *orientalis* but smaller, with bill decidedly shorter, appears to breed in the region between the Volga River and the upper Tobol; but its validity is not fully established.

Females usually have longer bills than males. Disregarding sexual difference, the bill has been found to measure 110–166 mm. in *arquata*, 134–184 mm. in *orientalis*, and 118–139 mm. in *suschkini*.

N. a. arquata migrates southward along both eastern and western coasts of Africa, as far as the Cape Province, and to some extent up the Nile. It also reaches Madagascar. Occurrences at Chinchoxo and Ambriz prove that this curlew must be found near Banana. Some records of the species farther inland are based on individuals of this race, as for instance one from Leopoldville (Van Delft) in the Congo Museum. It has the wing 286 mm. long, culmen 126 mm., and appeared to me to be a male of *N. a. arquata*. Its longer upper tail-coverts are definitely dark-

¹ 1929, O. Mb., p. 76 (Degama, Senegal).

barred on both webs, and the white axillaries have imperfect blackish bars near their tips.

***Numenius arquata orientalis* C. L. Brehm**

Numenius orientalis C. L. BREHM, 1831, 'Handb. Naturg. Vög. Deutschl.,' p. 610 (type locality: East Indies).—*Numenius arcuatus* SCHOUTEDEN, 1930, Bull. C. Z. C., VII, p. 11 (Buta).—*Numenius arquata lineatus* BANNERMAN, 1931, 'Birds Trop. W. Afr.,' II, p. 184 (Gold Coast; Angola; etc.).—*Numenius arcuatus* SCHOUTEDEN, 1935, Bull. C. Z. C., XII, p. 43.—*Numenius arquata arquata* SCHOUTEDEN, 1936, Ann. Mus. Congo, Zool., I, f. 2, p. 74 (in part. Buta).

DISTRIBUTION.—The eastern curlew breeds in the southern Baikal region, Dauria, and West Siberia, and is known to migrate south to the Philippines, the Greater Sunda Islands, Madagascar, and Walfish Bay in Southwest Africa. Inasmuch as it has been taken on the Niger, in Sierra Leone, and on the Gold Coast, it may be expected to occur near the Congo mouth. Records from the White Nile suggested that it might also reach the eastern Congo.

In recent years Brother Joseph Hutsebaut has collected two examples near Buta, Lower Uelle district, which are in the Congo Museum. That they belong to this race is clear from their nearly pure white axillaries, and upper tail-coverts white with dark streaks but only a few bars, at most, on the inner webs of the longest central coverts. The larger of the two was sexed as a female, and was taken on September 10; the other, not sexed, may be a male. Wings, 292, 298 mm.; bills, 152, 174. Léon Lippens observed the curlew at Vitshumbi on Lake Edward, but did not secure a specimen.

Evidence is still lacking that *N. a. suschkini* migrates farther south than the coast of Upper Guinea and the mouth of the Niger, though it may also be expected in northeastern Africa.

Subfamily Scolopacinae

***Lymnocyptes minima* (Brünnich)**

Scolopax minima BRÜNNICH, 1764, 'Orn. Borealis,' p. 49 (type locality: Christiansøe, Denmark).—*Lymnocyptes minima* JACKSON, 1926, 'Notes on Game Birds of Kenya and Uganda,' p. 188 (Butiaba on L. Albert).

From northern Europe and Asia the jack snipe migrates south to Formosa, Burma, and tropical Africa. A few specimens are known from Nigeria,¹ and in East Africa it reaches Lake Nakuru, Lake Naivasha, and the country west of Ngorongoro in Tanganyika Territory.² At Bu-

¹ Bannerman, 1931, 'Birds Trop. W. Afr.,' II, p. 140.

² Moreau, 1935, Ibis, p. 667.

tiaba on the east shore of Lake Albert, Archer obtained ten specimens in December, 1901, so it is quite likely to occur on the western shore of the same lake.

KEY TO THE SPECIES OF *CAPELLA* IN THE CONGO

- 1.—The three outermost rectrices washed in part with rufous and barred or mottled with blackish; outermost feather at least 7 mm. broad; bill 64–77 mm. long. *C. gallinago*.
Three outermost rectrices pure white, or with a few blackish-brown bars, but not tinged with rufous. 2.
- 2.—Outermost tail-feather only 3.5–6 mm. wide; shortest secondaries extending well beyond the primary-coverts; bill 68–87 mm. *C. nigripennis*.
Outermost tail-feather 6.5–9 mm. wide, shortest secondaries extending but little beyond the primary-coverts; bill 58–68 mm. *C. media*.

Capella media (Latham)

Scolopax media LATHAM, 1787, 'Gen. Synops. Birds,' Suppl. I, p. 292 (type locality: England).—*Gallinago media* DUBOIS, 1905, Ann. Mus. Congo, Zool., I, f. 1, p. 24 (Umani). REICHENOW, 1911, 'Wiss. Ergeb. D. Z.-Afr. Exp.,' III, p. 246 (L. Edward; Usumbura). DE RIEMAECKER, 1927, Rev. Z. A., XIV, p. 258 (Elisabethville).—*Gallinago nigripennis* O.-GRANT, 1910, Tr. Z. S. Lond., XIX, p. 446 (Basoko). REICHENOW, 1911, "Wiss. Ergeb. D. Z.-Afr. Exp.,' III, p. 246 (in part. Basoko).—*Capella media* MRS. A. MEINERTZHAGEN, 1926, Ibis, pp. 490, 492 (L. Moero). GROTE, 1930, Mitt. Zool. Mus. Berlin, XVI, p. 97. SCHOUTEDEN, 1932, Rev. Z. A., XXII, p. 247 (Lulenga); 1933, idem, XXII, p. 380 (Kisenyi); 1936, Ann. Mus. Congo, Zool., I, f. 2, p. 73 (Buta).

SPECIMENS.—Stanleyville, ♂, Nov. 15; ♀, Nov. 22. Avakubi, ♂, Nov. 30. Faradje, 4 ♂, Sept. 7, 22, Oct. 19, 22; ♀, Nov. 15.

DISTRIBUTION.—Europe and northwest Asia, south in winter to Nigeria and Cape Province. Widely distributed in eastern equatorial Africa during this migration, in small numbers even in the forested area of the Upper Congo. Like the two following species, the great snipe is usually found in marshy spots, but flushing without any vocal noise, so far as I could observe. A single bird was found at Faradje in a dry field.

South of the forest belt, at Luluabourg, Father Callewaert obtained two of these snipe on December 2 and 11; and others have been reported from the Upper Katanga. It seems likely, therefore, that the species will be found throughout the eastern half of our area, except on the higher mountains. September 7 is the earliest date of arrival in the Congo, but records during the northward migration are wanting. In Kenya Colony, on the other hand, Meinertzhagen¹ considered November 30 as the date of the first arrivals, and noted that snipe of this species were common un-

¹ 1922, Ibis, p. 74.

til the end of April. Both Meinertzhagen and van Someren¹ mention occurrences in Kenya Colony during May.

***Capella gallinago gallinago* (Linnæus)**

Scolopax gallinago LINNÆUS, 1758, 'Syst. Nat.,' 10th Ed., p. 147 (Europe; restricted type locality: Sweden).—*Gallinago gallinago* O.-GRANT, 1905, Ibis, p. 205 (L. Ruaketenge in S. W. Ankole). SCHOUTEDEN, 1918, Rev. Z. A., V, p. 220 (Beni).—*Capella gallinago gallinago* MRS. A. MEINERTZHAGEN, 1926, Ibis, pp. 485-489 (Aruwimi R.). GROTE, 1930, Mitt. Zool. Mus. Berlin, XVI, p. 96. SCHOUTEDEN, 1936, Ann. Mus. Congo, Zool., I, f. 2, p. 72 (Buta; Mahagi Port).

SPECIMENS.—Stanleyville, 2 ♀, Nov. 22. Avakubi, ♂, Dec. 24. Faradje, 2 ♂, Sept. 24, Dec. 14; 2 ♀, Mar. 9, 11.

DISTRIBUTION OF THE SPECIES.—In the breeding season from Iceland, the British Isles, and the Pyrenees to Japan and the Kurile Islands. *C. delicata* Ord of North America is so closely allied that it has sometimes been regarded as a race.

C. g. faeroeensis (C. L. Brehm) of Iceland and the Färoes does not migrate beyond Great Britain. *C. g. gallinago*, which occupies the remainder of the breeding range, migrates southward to India, Borneo, and Africa at least to the equator, and in eastern Africa to Mombasa and Tanganyika Territory. It is not yet known from south of the Congo forest belt; the snipe collected by Whyte on the upper Shire River and formerly referred to *gallinago* has proved to be *nigripennis*.

While wintering in the northern Congo the common snipe chooses the very same haunts as the great or "double" snipe, and is flushed from the borders of marshy spots in the savanna near river-banks, in pastures or other clearings in the forested regions. In life I could not distinguish between the three species of *Capella* observed; more than two or three individuals were never found together, and they appeared to be more common toward November and again in March and April than during the middle of the northern winter.

In our small series of Congo specimens the variation in length of bill is even greater than the figures usually given; those of the three males: 66.5, 69, and 77 mm., of the four females: 69-73 mm. The three males have the dusky bars on the axillaries largely interrupted or wanting; so that these feathers are much whiter than in the females. The latter have them regularly barred as in both sexes of *C. media*.

¹ 1922, Nov. Zool., XXIX, p. 20.

Capella nigripennis (Bonaparte)

Gallinago nigripennis BONAPARTE, 1832, 'Icon. Faun. Ital., Ucc.,' f. 25, p. 4, text to Pl. XLIII (type locality: Cape of Good Hope). REICHENOW, 1900, 'Vög. Afr.,' I, p. 236 (Songa); 1911, 'Wiss. Ergeb. D. Z.-Afr. Exp.,' III, p. 246 (in part. Lake Ruaketenge). SHELLEY, 1901, Ibis, p. 167 (E. shore of L. Moero). O.-GRANT, 1905, Ibis, p. 205 (L. Ruaketenge in S. W. Ankole). GYLDENSTOLPE, 1924, K. Svenska Vet. Akad. Handl., (3) I, No. 3, p. 299 (Mt. Muhavura, 3100 m.; Mt. Sabinyo, 2650 m.).—*Gallinago macrodactyla* = *G. aequatorialis* EMIN, 1922, in Stuhlmann, 'Tageb. Emin Pascha,' III, p. 426 (Tunguru on L. Albert).—*Capella nigripennis* MRS. A. MEINERTZHAGEN, 1926, Ibis, p. 502. FRIEDMANN, 1930, Bull. 153, U. S. Nat. Mus., p. 175 (Kivu Volcanoes). SCHOUTEDEN, 1932, Rev. Z. A., XXII, p. 247 (Lulenga); 1936, Ann. Mus. Congo, Zool., I, f. 2, p. 73 (Djalasinda).

SPECIMEN.—Faradje, ♂, Apr. 16.

DISTRIBUTION.—Resident in South and East Africa, from Cape Province north to Abyssinia, and west to the Upper Uelle district and Angola. Rare within our limits, except in the eastern highlands, and unknown in the lowland forests of the Congo. A supposed record from Basoko, November 16, by R. E. Dent was due to misidentification of a skin of *C. media*.

Our single example of the Ethiopian snipe was shot in a grassy marsh, and was not in breeding condition. Its bill measures 83 mm., exceeding the maxima for *C. media* and *C. gallinago*. Its axillaries are nearly pure white, and its outermost pair of rectrices extremely narrow. The white outer web of the outermost primary is also characteristic.

Another specimen of *C. nigripennis* has been collected by Dr. Schouteden at Djalasinda near Mahagi. On the Kivu Volcanoes in February, Count Gyldenstolpe found them more numerous:

"On the highest point of the saddles between Muhavura and Mgahinga, and between Mgahinga and Sabinio there were some open, swampy patches of ground covered with high grass, and on these places Snipe were rather abundant.

"Especially in the saddle between the latter two mountains they were quite numerous and offered good sport. Besides the present three birds, several more were shot for the pot. All the specimens obtained belonged to the above-mentioned race, and not a single individual of the common European form was met with."

At Lukumi, near 12,000 feet on Mt. Karisimbi, Léon Lippens also saw about twenty of these snipe in May.

Capella nigripennis is certainly to be expected in the Upper Katanga; and at Lake Suse in southern Marungu, Rockefeller and Murphy collected an adult male on March 23. They found this snipe common on

swampy ground near the lake. We have no records from the lowlands of the Kasai district.

In South Africa they were found breeding by Layard and by Ayres in August and September, whereas in Abyssinia Cheesman¹ noted nests with three eggs on July 7 and September 10, during the heavy rains. The nests are built in grass-tussocks, and the eggs are olive-buff spotted and blotched, chiefly at the obtuse end, with two or three shades of dark brown. Dimensions 41–44.5 mm. \times 30–31.7.

During the breeding season these snipe fly over the marshes, rising and falling, and at each descent make a whirring noise repeated six times, which Cheesman compares to the wing-beat of a swan in the distance.

FAMILY Phalaropodidæ. PHALAROPES

[*Phalaropus fulicarius* (Linnæus)]

Tringa fulicaria LINNÆUS, 1758, 'Syst. Nat.,' 10th Ed., p. 148 (America; restricted type locality: Hudson Bay).

The gray phalarope—or red phalarope, as it is called in America—breeds on the arctic coasts and islands of both hemispheres, and travels southward mostly at sea or along the coasts as far as Chile and Southwest Africa. There are several records from the west coast of Africa,² suggesting that the species will be found to pass on migration, or perhaps winter at sea somewhere near the mouth of the Congo.

The red-necked or northern phalarope, *P. lobatus*, is not likely to reach the Congo coast, as it is not yet reported south of the coast of Rio de Oro.³

FAMILY Glareolidæ. COURSERS, PRATINCOLES

KEY TO THE AFRICAN GENERA OF GLAREOLIDÆ

- 1.—Tail rounded or nearly square, but never forked; longest primaries extending little if at all beyond inner secondaries when wing is folded; no hind toe. . . . 2.
Tail forked; wings long and pointed, tips of primaries extending 30 mm. or more beyond the longest secondaries; hind toe present. 4.
- 2.—Metatarsus with four rows of scutes, two in front and two behind; wing-coverts and scapulars largely light gray-blue, middle of back and crown black, and a black band across breast. PLUVIANUS, p. 111.
Metatarsus with two rows of scutes, one in front, one behind; wing-coverts not gray-blue, but usually brownish. 3.

¹ 1935, *Ibis*, p. 303.

² Roberts, 1924, *Auk*, p. 600. Sclater, 1924, 'Syst. Av. Æth.,' pt. 1, n. 135. Meinertzhagen, 1925, *Ibis*, pp. 326, 328, 332. Ticehurst, 1925, *Ibis*, p. 747. Allen, 1926, *Bull. Essex Co. Orn. Cl.*, VIII, p. 10. Bannerman, 1931, 'Birds Trop. W. Afr.,' II, p. 190.

³ Tåning, 1933, *Ibis*, p. 133.

- 3.—Distance from tip of maxilla to anterior border of nostril exceeding length of inner toe with claw; no blackish band across breast. . . . CURSORIUS, p. 113.
 Distance from tip of maxilla to anterior border of nostril shorter than inner toe with claw; one or more blackish bands across breast. . RHINOPTILUS, p. 113.
 4.—Fork in tail more than 20 mm. deep; wing always exceeding 170 mm. in length. . . . GLAREOLA, p. 121.
 Fork in tail less than 20 mm. deep; wing usually less than 170 mm. long¹. . . . GALACHRYSLA, p. 117.

Subfamily Cursoriinae

Pluvianus ægyptius ægyptius (Linnæus)

Charadrius ægyptius LINNÆUS, 1758, 'Syst. Nat.,' 10th Ed., p. 150 (type locality: Egypt).—*Pluvianus ægyptius ægyptius* GROTE, 1928, J. f. O., p. 750, footnote (Fort de Possel on Ubangi R.).

DISTRIBUTION OF THE SPECIES.—From Egypt and the Blue Nile to Senegal, south through West Africa to the River Kwanza, but on the White Nile scarcely south of Nimule. Strangely enough, *Pluvianus ægyptius* has never been recorded from any of the great lakes of Africa.

The typical race of Egypt and the Sudan west to Senegal, has wings measuring 130–144 mm. In Angola and the southern Congo, *P. æ. angolæ* has shorter wings: 125–131 mm. The species is rare in the forested belt of the Congo and one might expect that the northern Congo would be occupied by the same race as the Sudan. Some specimens from the northern Congo are probably large enough to be referred to *P. æ. ægyptius*. Our four skins from the Uelle district, however, have wings only 128.5–134 mm., so that, while somewhat intermediate, they are better referred to *angolæ*. The largest bird is a male from Niangara. Six adults in the Congo Museum from Libenge on the Ubangi River have wings 128–134 mm.

Pluvianus ægyptius angolæ A. Meinertzhagen

Pluvianus ægyptius angolæ MRS. A. MEINERTZHAGEN, 1927, B. B. O. C., XLVII, p. 100 (type locality: Cunga on Kwanza R., Angola. Also from Leopoldville); 1927, Ibis, p. 471. SCLATER, 1930, 'Syst. Av. Æth.,' App., p. 847. BANNERMAN, 1931, 'Birds Trop. W. Afr.,' II, pp. 203, 207 (western Belgian Congo). PETERS, 1934, 'Check-List,' II, p. 298.—*Pluvianus ægyptius* JOHNSTON, 1884, 'The River Congo,' pp. 357, 368 (Congo R. up to Bolobo). REICHENOW, 1900, 'Vög. Afr.,' I, p. 150 (Kwango R.). OUSTALET, 1905, Bull. Mus. Paris, p. 16 (Ubangi). DUBOIS, 1905, Ann. Mus. Congo, Zool., I, f. 1, p. 24 (Uelle). SALVADORI, 1911, Ann. Mus. Civ. Stor. Nat. Genova, (3) V, p. 456. SCHOUTEDEN, 1923, Rev. Z. A., XI, pp. 317, 389 (Basongo; Djoko-Punda; Luebo; Mushie; Kwamouth); 1924, idem, XII, pp. 262, 410 (Kidada; Bikoro); 1925, idem, XIII, p. 6 (Bolobo); 1936, Ann. Mus. Congo,

¹ The exception is *Galachrysla ocularis* (Verreaux) of East Africa and Madagascar, with wing measuring 180–205 mm.

Zool., I, f. 2, p. 75 (Uelle). BLANCOU, 1933, Ois. R. F. O., (N. S.) III, p. 36 (lower Ubangi R.).—*Hyas aegyptius* REICHENOW, 1887, J. f. O., p. 302 (Leopoldville).

SPECIMENS.—Near Lukolela, 1 adult. Niangara, 2 ♂, Mar. 5, June 11; ♀ Mar. 5. Faradje, ♀, Feb. 5.

ADULTS.—Iris dark brown; bill black with a little light green just above nostril, and some light blue beneath base of mandible; feet light blue, claws black.

DISTRIBUTION.—*Pluvianus æ. angolæ* extends from the Kwanza and Kwango rivers to the Kasai district, the Congo River at least from Leopoldville to Lukolela, as well as the Ubangi and Uelle rivers. It is not known from the heavily forested section of the Congo River, but the Ubangi may serve as a line of communication between the northern and southern savanna districts. Three specimens from northern Cameroon were said by Mrs. Meinertzhagen to have wings of 126–130 mm., really nearer *angolæ* than to *aegyptius*.

Pluvianus is not a very common bird along the middle Congo River. None was noted in the Ituri district, and the specimens secured were practically all that we saw while in the Uelle district. Very plover-like in behavior, they were found on the banks or sandy islets along large rivers, such as the Dungu, Uelle, and Congo. Except for a low, hoarse “chack” repeated several times, we heard no sound from them. Other observers have reported a longer series of notes, higher in pitch.

The crocodile-bird or Egyptian plover has long been famous for its supposed habit of entering the open mouths of sleeping crocodiles, perhaps to remove parasites such as leeches. Certainly *Pluvianus* betrays no fear in the immediate vicinity of crocodiles, yet few recent observers claim to have seen it pick food from the gaping jaws. Brehm stated that he had repeatedly watched the operation; but Flower¹ has cast very serious doubts upon any such behavior. Three stomachs which we examined contained in each case insect-remains, with the addition in one case of small stones, in another of small millet-like seeds.

Along the Nile, the crocodile bird lays two to four eggs, and the incubating bird covers its eggs with sand.² They are light to deep buff, speckled and flecked with gray and reddish browns, 29–35 mm. × 23–25. Not only the eggs, but also the young chicks, are buried in the sand, and the parents sometimes moisten the sandy covering by regurgitating water over it.³ Breeding is carried on during the dry season, or when the rivers are lowest.

¹ 1908, Avicul. Mag., (2) VI, pp. 139–144.

² Reichenow, 1900, Vog. Afr., I, p. 152; Hawker, 1902, Ibis, p. 457; “B,” 1918, Sudan Notes, I, p. 162; Koenig, 1926, J. f. O., Sonderheft, pp. 139–145.

³ Butler, 1931, Ibis, pp. 345–347; 1932, idem, p. 163.

***Cursorius temminckii temminckii* Swainson**

Cursorius temminckii SWAINSON, 1822, 'Zool. Illustr.,' II, text to Pl. cvi (type locality: Senegal).—*Cursorius senegalensis* DE SOUSA, 1886, Journ. Sci. Lisboa, XI, p. 80 (Tenke); 1886, in Capello and Ivens, 'De Angola a Contra-Costa,' II, p. 446. DUBOIS, 1886, Bull. Mus. Roy. Hist. Nat. Belg., IV, p. 149 (L. Tanganyika).—*Cursorius temminckii* DUBOIS, 1905, Ann. Mus. Congo, Zool., I, f. 1, p. 24 (Mpala). SCHOUTEDEN, 1918, Rev. Z. A., V, p. 217 (Kabare).—*Cursorius temminckii* SCHOUTEDEN, 1930, Rev. Z. A., XVIII, p. 281 (Lubumbashi R. near Elisabethville).—*Cursorius temminckii temminckii* SCHOUTEDEN, 1936, Ann. Mus. Congo, Zool., I, f. 2, p. 74 (Mahagi Port).

DISTRIBUTION OF THE SPECIES.—From Senegal east to Sennar and Abyssinia, then south through eastern Africa to Natal and eastern Cape Colony, and west again—south of the equatorial forests—to the Kasai district, the coast of Angola, and Damaraland. Besides the typical race, occupying most of this territory, there is a somewhat paler one, *C. t. damarensis* Reichenow, in Southwest Africa.

Temminck's courser shuns the entire forested region of the Congo, and has been found only in the eastern and southern savannas. Schouteden collected it at the north end of Lake Albert, and it is not uncommon about the shores of Lake Edward, where I, too, have seen it near Kasindi. There are no records from the higher plateaus of the Kivu district; but it seems to be widespread in the grasslands from Lake Tanganyika to the Kasai, also in the southern Katanga. H. B. Conover collected specimens for the Field Museum at Katobwe on the Lualaba, and Father Callewaert sent us two from Luluabourg. One taken on October 8 retains most of its juvenal plumage. Occurrences at Chinchoxo and in the Gaboon indicate that it must cross the Lower Congo.

This courser is found in pairs or small parties on open ground, preferably in sandy spots or where the grass has been burned. Somewhat plover-like in appearance, it is a rapid runner, but often fairly tame. Two eggs are laid during the dry season on the bare ground. They have been described as whitish or buff with gray shell-markings and thick scrawlings of dark brown. Dimensions, 26–31 mm. \times 21.5–24.5.¹

KEY TO THE SPECIES OF **RHINOPTILUS** THAT MAY BE EXPECTED TO
REACH THE CONGO

- 1.—A broad band of gray-brown crossing the upper chest, bordered posteriorly by a narrower blackish band; most of the primaries with spots of metallic purple or bronze at their tips.....*R. chalconotus*.
Chest not colored as above, no metallic spots at tips of primaries.....2.

¹ Reichenow, 1900, 'Vög. Afr.,' I, p. 156; Bannerman, 1931, 'Birds Trop. W. Afr.,' II, p. 198; Krienke, 1931, Ostrich, II, p. 45; van Someren, 1934, Journ. E. Afr. Ug. N. H. Soc., No. 49–50, p. 168.

- 2.—Two black bands across the chest, and above them the fore-neck finely streaked with blackish; metatarsus less than 56 mm. long. *R. africanus*
A rufous crescent on the fore-neck and a rufous band across the breast, between them a broader area streaked with blackish, and just behind that a blackish band crossing the chest; metatarsus more than 57 mm. long. *R. cinctus*.

[*Rhinoptilus africanus bisignatus* (Hartlaub)]

Cursorius bisignatus HARTLAUB, 1865, P. Z. S. Lond., p. 87 (type locality: Benguella).

Rhinoptilus africanus (Temminck), the two-banded courser, ranges from Somaliland through the drier parts of East Africa to the Cape Province and the southwest coast north to Benguella. Five races are recognized by Mr. Sclater, and eight by Dr. Friedmann.¹ There is a possibility that either *R. a. bisignatus* (Hartlaub), of Angola, or *R. a. gracilis* (Fischer and Reichenow), of inland Tanganyika Territory and Kenya Colony, may yet be found in some district of the southeastern Congo.

[*Rhinoptilus cinctus cinctus* (Heuglin)]

Hemerodromus cinctus HEUGLIN, 1863, Ibis, p. 31, Pl. I (type locality: Gondokoro, White Nile).

The three-banded courser, *Rhinoptilus cinctus*, ranges from the upper White Nile and Abyssinia south through the arid sections of East Africa and Rhodesia to Southwest Africa. The typical race occupies the northern portion of this area, and approaches the northeastern corner of the Congo in the vicinity of the Bahr-el-Jebel, so it may yet be found, at least occasionally, in the Lugware country or near Mahagi. Its metatarsus is somewhat shorter than those of the other two races, measuring only 57–64 mm.

[*Rhinoptilus cinctus emini* Zedlitz]

Rhinoptilus cinctus emini ZEDLITZ, 1914, J. f. O., p. 624 (type locality: Ukerewe I. in L. Victoria).

Differs from typical *cinctus* in having the upperparts duller brown, less rufous, and the white areas on outer rectrices more restricted. Its metatarsus is longer, 63–73 mm.

This race inhabits the country to the south and southwest of Lake Victoria, as well as the islands in the southern part of that lake, and may reach Congo territory in the neighborhood of Urundi.

¹ 1930, Bull. 153, U. S. Nat. Mus., pp. 187, 188.

[Rhinoptilus cinctus seebohmii Sharpe]

Rhinoptilus seebohmii SHARPE, 1893, B. B. O. C., III, p. xiii, (type locality: Ondonga, Ovampoland).

Likewise with long metatarsus, 68 mm. or more. In color it is like *emini*, or lighter above, and has as little or less white on the outer rectrices. Ranges from Southwest Africa to southern Angola and Northern Rhodesia. In the Loangwa Valley Neave¹ reported it as common, but there are no records actually from Congo territory.

***Rhinoptilus chalcopterus chalcopterus* (Temminck)**

Cursorius chalcopterus TEMMINCK, 1824, 'Planches Coloriées,' livr. 50, Pl. CCXCVIII (type locality: Senegal).—*Rhinoptilus chalcopterus* SCHOUTEDEN, 1918, Rev. Z. A., V, p. 217 (Kabare). *Rhinoptilus chalcopterus chalcopterus* SCHOUTEDEN, 1936, Ann. Mus. Congo, Zool., I, f. 2, p. 74 (Mahagi Port).

SPECIMEN.—Garamba, ♀ juv., Mar. 14.

This bird in juvenal plumage, with wings only two-thirds grown, shows an extremely close resemblance to the adult, although the blackish breast band is narrower, and the brown feathers of chest and back are varied with faint light-and-dark edgings. Even the violet-and-green metallic tips are present on the primaries.

DISTRIBUTION OF THE SPECIES.—From Senegal and northern Cameroun across the Sudan to Sennar and Bogosland, then south through eastern Africa to the Cape Province and west to Angola and the Portuguese Congo. The typical race occupies the northern part of the range; and it is doubtful whether the specimen recorded from Kabare on Lake Edward belongs with the northern form, or with *R. c. albofasciatus* Sharpe, which is perhaps slightly darker on the upperparts.

Courser shun heavily forested regions, and even in the savannas of the Uelle are all but unknown. Our single specimen of *R. c. chalcopterus* was taken at Garamba, on the Sudan border, in March; yet a stay of several months in that neighborhood, from May to July, failed to reveal any further specimens. It seems that the breeding season in the Bahr-el-Ghazal Province and northern Uganda falls in the dry months of February and March, and the northern bronze-wing courser may withdraw from the northern Congo border during the rains.

The peculiar habits of this courser were well described by A. L. Butler,² who observed it between Chak Chak and the Pongo River, Bahr-el-Ghazal. On February 9 he flushed three pairs in savanna woods, where they lay till almost trodden on, then rose with twisting flight. Again at the same spot, late in the evening of March 19, he

¹ 1910, Ibis, p. 93.

² 1908, Ibis, p. 263.

found a female with an egg almost ready to be laid. Early the following morning a second female, non-breeding, was secured. He concluded that their habits were crepuscular and nightjar-like.

Captain Pitman¹ obtained a set of three well-incubated eggs on March 25 at Lango, northern Uganda. These were colored like those of the southern race, to be described below, and measured 34.3–36 mm. \times 26.3–26.9.

***Rhinoptilus chalcopterus albofasciatus* Sharpe**

Rhinoptilus albofasciatus SHARPE, 1893, B. B. O. C., III, p. 14 (South Africa; type from Colenso, Natal).²—*Rhinoptilus chalcopterus* NEAVE, 1910, Ibis, p. 93 (Upper Lualaba, 3500 ft.). DE RIEMAECKER, 1927, Rev. Z. A., XIV, p. 259 (Elisabethville; Kifumanshi R.).—*Rhinoptilus chalcopterus obscurus* SCHOUTEDEN, 1930, Rev. Z. A., XVIII, p. 281 (Kimilolo R. near Elisabethville).—*Rhinoptilus chalcopterus albofasciatus* PETERS, 1934, 'Check-List,' II, p. 302 (Loango coast).

DISTRIBUTION.—From Cape Province north to the coast of the Portuguese Congo, the Katanga, Ankole, and Nairobi and Mombasa in Kenya Colony. To be expected near the Congo mouth, but not reported from the Kasai district.

Grant and Mackworth-Praed³ have recently denied the validity of this southern race, asserting that southern birds are not consistently darker than northern. We have not sufficient material of the northern race for a satisfactory comparison.

East of Lake Tanganyika Böhm found the bronze-winged courser in open plains dotted with *Borassus* palms, as well as in a wood where the grass had recently been burned. After being forced to flight they would soon drop to the ground again to seek safety in running. Dr. J. Bequaert examined a specimen killed at Bukama on May 16, 1911. Near Elisabethville, writes De Riemaeker, they run at night on paths and sandy roads, and are abundant in April and May. Winterbottom reports that they visit Northern Rhodesia from mid-June to late August. In Southern Rhodesia⁴ they are said to arrive about August, and to breed from September to December. Some remain near Bulawayo in January and February. After the breeding season this race appears to migrate southward. South of Ovambo Land and the Limpopo River it is believed to be only a summer visitor.

In the Katanga it occurs from April to November, at least, and should be found breeding. In southern Ankole on August 23, Captain

¹ 1932, Ool. Rec., XI, pp. 18, 21.

² *Rhinoptilus chalcopterus obscurus* Neumann, 1910, O. Mb., p. 11 (Fort Quinungo, Mossamedes) is a synonym.

³ 1936, B. B. O. C., LVI, pp. 103, 104.

⁴ Krienke, 1931, Ostrich, II, p. 45; Carlisle, 1932, Ool. Rec., XII, pp. 45, 46.

Pitman¹ found a nest with three eggs in an area of extensive grassy flats which had just been burnt off. Others discovered by A. D. Millar² near Beira, Portuguese East Africa (September), by J. S. Carlisle and Captain Priest in Southern Rhodesia (October, November, December), and by Captain Pitman in Northern Rhodesia (September) were usually depressions in the ground with two or three eggs. These are cream-colored to rich buff, with a pinkish tinge when fresh, profusely blotched with dark brown and black, most heavily on the blunt end, and with underlying spots of lilac and gray. Dimensions are said to vary from 32.6–40 mm. \times 25–30.

Subfamily Glareolinæ

KEY TO THE CONGO SPECIES OF GALACHRYSLA

- Throat and breast white, usually with a faint wash of cinnamon-buff; a black stripe extends from about the posterior margin of the eye down across the ear-region to the side of the neck. *G. cinerea*.
 Throat and breast gray; no black stripe from rear of eye down to side of neck; in adults a white band from eye to hind-neck. *G. nuchalis*.

Galachryslia nuchalis nuchalis (Gray)

Glareola nuchalis G. R. GRAY, 1849, P. Z. S. Lond., p. 63, Aves, Pl. ix (type locality: Fifth Cataract of the Nile, near Berber). OUSTALET, 1893, Naturaliste, VII, p. 128. SHELLEY, 1901, Ibis, p. 167 (E. shore L. Moero). DUBOIS, 1905, Ann. Mus. Congo, Zool., I, f. 1, p. 25 (Prov. Orientale; Umangi). REICHENOW, 1911, 'Wiss. Ergeb. D. Z.-Afr. Exp.,' III, p. 242 (Irumu; Beni). BERLIOZ, 1922, Bull. Mus. Paris, p. 396 (Uelle R.).—*Glareola nuchalis* var. *marchei* OUSTALET, 1877, Bull. Soc. Philom. Paris, (7) I, p. 104 (type locality: Ogowé R., Gaboon).—?*Glareola nordmani* JOHNSTON, 'River Congo,' pp. 124, 358 (Congo R. between Isangila and Manyanga).—*Glareola emini* SHELLEY, 1888, P. Z. S. Lond., p. 49 (type locality: Foda, near Wadelai). EMIN, 1894, J. f. O., p. 165 (old Irumu).—*Glareola nuchalis emini* REICHENOW, 1900, 'Vög. Afr.,' I, p. 147 ("Ubangi R."; Irumu).—*Galachrysea nuchalis* HARTERT, 1900, Nov. Zool., VII, p. 27 (Enguatuara on Ituri R.).—*Galactochrysea emini* SALVADORI, 1907, Boll. Mus. Zool. Anat., Torino, XXII, No. 570, p. 9 (near Lukonzolwa, L. Moero). NEAVE, 1910, Ibis, p. 92 (Lubudi R.; Lufupa R.).—*Glareola antænia* REICHENOW, 1908, O. Mb., p. 191 (type locality: Mawambi); 1911, 'Wiss. Ergeb. D. Z.-Afr. Exp.,' III, p. 241.—*Galactochrysea emini* O.-GRANT, 1910, Tr. Z. S. Lond., XIX, p. 445 (Beni).—*Galachrysea nuchalis emini* BANNERMAN, 1922, Rev. Z. A., X, p. 187.—*Galachryslia nuchalis emini* SCHOUTEDEN, 1923, Rev. Z. A., XI, pp. 318, 389 (Kasai R.; Lulua R.; Tshikapa; Kwamouth); 1924, idem, XII, pp. 263, 410 (Stanley Pool; region of Eala and L. Tumba). W. L. SCLATER, 1924, 'Syst. Av. Æth.,' pt. 1, p. 140.—*Galachryslia nuchalis antænia* W. L. SCLATER, 1924, 'Syst. Av. Æth.,' pt. 1, p. 141 (Ituri distr.).—*Glareola nuchalis marchei* Mrs. A. MEINERTZHAGEN, 1927, Ibis, p. 496 (Semliki Valley; Uelle R.; Poko; N. E. of

¹ 1932, Ool. Rec., XII, pp. 16–23.

² Sclater, 1906, 'Birds of S. Afr.,' IV, p. 331.

Bombe, Ituri R.; Lufufa R. near L. Moero).—*Galachrysis nuchalis marchei* W. L. SCLATER, 1930, 'Syst. Av. Æth.', App., p. 846.—*Galachrysis nuchalis nuchalis* BANNERMAN, 1931, 'Birds Trop. W. Afr.', II, p. 212 (upper Uelle R.; Ubangi R.). BOWEN, 1933, Ecology, XIV, p. 257, Fig. 6C. SCHOUTEDEN, 1936, Ann. Mus. Congo, Zool., I, f. 2, p. 75 (Buta; Angodia; Panga; Kotili).—*Glareola nuchalis nuchalis* PETERS, 1934, 'Check-List,' II, p. 305.

SPECIMENS.—Stanleyville, ♂, ♀, Aug. 24. Avakubi, 2 ♂, Jan. 2, Apr. 24; ♂ im., Apr. 24. Between Penge and Avakubi, ♂ im., ♀ im., Apr. 27. Bafwabaka, 2 ♂, 2 ♀, Jan. 2. Gamangui, 2 ♂, Jan. 27, 28; ♀, Jan. 28, ♀ juv., Feb. 12. Dungu, ♂, June 27. Nzoro, ♂, Aug. 1. Faradje, ♂, Feb. 16; ♀, May 2.

ADULTS.—Iris dark brown; basal half of bill orange-red, outer half black; feet reddish orange, claws black.

DISTRIBUTION OF THE SPECIES.—From Sierra Leone, Lake Chad, and the River Nile below Khartoum, southward to the Kwanza River and the Zambesi River above Tete. The eastern limits are marked by Gondar, Abyssinia, the islands in Lake Victoria, and the vicinity of Lake Moero. There are only two valid races, for *emini* and *marchei* have proved not to be separable from *nuchalis*. The principal character of *G. n. liberix* (Schlegel),¹ ranging from western Cameroon to Sierra Leone, is the rufous nape-band, this area being white in *nuchalis*.

The type of *nuchalis* had white borders on the bases of the outer webs of the secondaries, which are present in one male bird in our series, from Faradje. The type of *marchei* was said to have the wing only 125 mm. long but ten skins from the Ogowé River in the Rothschild Collection have wings 137–154 mm. It may be added that three specimens from Luluabourg, Kasai district, have wings 153–156 mm., and eleven specimens from the Nepoko River, Ituri River, and the upper Uelle drainage, 144–155, with one exceptionally long, 160 mm. There is no perceptible difference between the sexes.

We first saw flocks of white-collared pratincoles on low rocks in the Congo River not more than one day above Stanley Pool. From there up to Stanley Falls, at low water in July–August, we repeatedly met flocks numbering fully two hundred. They would crowd together on the tops of rocks in a strikingly upright posture. At other times they flew actively about, swallow-like, for they caught their insect food entirely in the air. Dr. Schouteden found them breeding on the rocks in the mouth of the Kasai River in mid-June.

Though they were not nesting at Stanley Falls in August, their abundance and their egg-laying did seem correlated with the level of the

¹ 1881, Notes Leyden Mus., III, p. 58 (Liberia).

water in the rivers, so that they might be all but absent when it was high.

At Gamangui on the Nepoko River toward the end of January we found them nesting. Many rough gray rocks rose from two to five feet above the water, and in a slight depression in the top of one of them were two eggs. No nesting material was used, and the sitting bird was visible from a neighboring island. Both sexes incubate, for one was seen to relieve the other. Considerable anxiety was shown for the eggs. The only call we heard was a dry "kĕk-kĕk-kĕk-kĕk—" uttered by male and female alike. A half-dozen pairs frequented this section of the river.

The eggs are greenish white in ground-color, thickly blotched with dark greenish brown. My measurements of five eggs are 28.7–31.5 mm. \times 21.5–22.4.¹

On February 12, also at Gamangui, another set of two eggs was found, as well as a single chick. When approached, this youngster crouched beneath a projecting rock, where its color rendered it nearly invisible. Its natal down was brownish gray above, more or less speckled throughout with dusky. An indistinct blackish line ran down the middle of the crown, widening on the nape, where it was joined by a black line from the hind corner of the eye. The lores, too, were crossed by a narrow black line. On the back there was no distinct pattern, and the throat was uniform smoky gray, the belly a little lighter. Iris dark brownish gray, bill and feet gray.

The juvenal plumage which follows next is still radically different from the adult, for there is no trace of the white collar, and aside from the white upper and lower tail-coverts and belly, the young bird is mostly dull gray, speckled all over—crown, back, wing-coverts, and breast—with dirty whitish. Base of bill orange, feet orange-pink. Such birds are seen commonly on the Ituri River in March and April, but soon molt to a plumage approximating the adult. The type of *Glareola antænia* Reichenow was presumably an immature bird which had molted its speckled plumage but had not yet assumed the white collar.

In the eastern Uelle, even along the main rivers, *Galachrysis nuchalis* is less abundant than farther south. Some were noted along the Kibali River near Dungu and Nzoro in June and August, one pair incubating an egg as late as June 5. For a long time none was seen on the Dungu River at Faradje, but one was taken in early May on the Atua River.

¹ Nesting habits and eggs of this pratincole from the Muzima Rocks, L. Victoria, were described by Pitman, 1926, Ool. Rec., VI, pp. 11–23, 3 photos (of eggs on rocks); 1927, *idem*, VII, pp. 15–19, 56–61; 1930, Bateleur, II, pp. 42–44 (measurements of eggs).

On the Uelle River above Niangara, in early March, they were rather common about exposed rocks. On the Ubangi River Dr. Schubotz obtained specimens at Yakoma and Mobaye.

In descending the Aruwimi River, in September, 1914, we saw a few flocks of these small pratincoles. There were few places they could alight on sand or rocks, but on one occasion we watched a whole flock perch in the leafy top of a tree projecting above the water, and it was no rare sight to see a few of them perched on dead limbs.

Traveling down the Congo River from Stanleyville to Leopoldville in December, 1915, during high water, I noted the species only once, near Coquilhatville. Similarly, at Lukolela during 1930 and 1931, I noted that the white-collared pratincole was absent during the periods when the river was in flood, but present in fair numbers during the month of March, sitting on rocks where available, but also mingling with flocks of *Galachrysis cinerea* on open sand-bars. The seasonal movements of some of the common water birds in this equatorial river-system deserve much more investigation.

Galachrysis cinerea cinerea (Fraser)

Glareola cinerea FRASER, 1843, P. Z. S. Lond., p. 26 (type locality: mouth of river Nùn, S. Nigeria). REICHENOW, 1887, J. f. O., p. 299 (Manyanga); 1900, 'Vög. Afr.,' I, p. 149 ('Ubangi R.'). OUSTALET, 1893, Naturaliste, VII, p. 128. DUBOIS, 1905, Ann. Mus. Congo, Zool., I, f. 1, p. 25 (Prov. Orientale; Umangi). MENEGAUX 1918, Rev. Fr. O., V, p. 253 (Zambi). MRS. A. MEINERTZHAGEN, 1927, Ibis, p. 498 (Belgian Congo).—? *Glareola cinerea* JOHNSTON, 1884, 'River Congo,' pp. 358, 359 (Msuata).¹—*Galachrysis cinerea* SCHOUTEDEN, 1923, Rev. Z. A., XI, pp. 318, 389 (Basongo; Kwamouth); 1924, idem, XII, pp. 263, 410 (Leopoldville; Eala; Ikengo); 1926, idem, XIII, p. 188 (Banc d'Anvers near Boma). W. L. SCLATER, 1924, 'Syst. Av. Æth.,' pt. 1, p. 141 (Congo R.). BANNERMAN, 1931, 'Birds Trop. W. Afr.,' II, p. 217, Fig. 61 (Belgian Congo).—*Glareola cinerea cinerea* PETERS, 1934, 'Check-List,' II, p. 306.

SPECIMENS.—Zambi, ♀, ♀ juv., June 22.

ADULTS.—Iris dark brown; bill reddish orange on basal half, black distally; feet orange-red on metatarsus, but more brownish on toes, claws blackish.

This adult female has a well-marked cinnamon patch on the hind-neck, extending round toward the side of the head, but scarcely a trace of buff on the breast.

The nestling, whose wing is still only 55 mm. long, is very different from its parent, for while the wing-tips are black, the greater coverts whitish and the remaining coverts gray, the crown and back are cinnamon, faintly barred with dusky, the greater tail-coverts white, but the middle rectrices cinnamon spotted with black. The belly is white, but the breast has a band of pale cinnamon. Ear-coverts pale cinnamon, with no trace of a black band.

¹His note on the nest almost certainly refers to *G. nuchalis*.

These are, of course, the colors of the juvenal plumage, and it should be noted how very different is the pattern of this stage in *G. cinerea* and *G. nuchalis*.

Enough of the natal down still adheres to our specimen to show that on the throat and whole underparts it is white, unmarked, while above its color is a light grayish buff, finely marked, on the back at least, with dusky. Here again there is a great difference from the natal down of *G. nuchalis*.

DISTRIBUTION OF THE SPECIES.—From the upper Niger River and the western Gold Coast to the lower Congo River, and eastward along all the larger streams to the Shari, the lower Ubangi, and the Kasai rivers.

Birds from the upper Niger, above Mopti, are stated to be more rufous on nape and breast, and separated as *G. c. colorata* Bates.¹ The rest of the range is occupied by *G. c. cinerea*.

Along the Congo River, up to Basoko at least, the gray pratincole is seen commonly during low water, in July and August, and from February to early April. When the water was high I did not notice any. Flying about over the river to feed, or alighting on sand-bars, they often gather in considerable flocks, sometimes two or three hundred together. The call-note, a hoarse "kree-kree-kree—" is often reiterated as they run on the sand.

Near Zambi on the lower Congo, Lang found them nesting in June on the same small sandy islands as the skimmers, but farther back from the shore. There he found the chick squatting in a slight depression in the sand.

Near Lukolela I doubted if they were nesting in February and March, because they were continually in flocks, and adult specimens collected were in non-breeding condition. On August 9, however, I found three pairs on a sandy islet. One of the birds ran along with both wings extended, and then settled down in an old hippo footprint, scratching sand up behind its tail. Next it walked to another spot and settled down again. There I found a circular depression with one egg, while the female again ran about extending her wings. Dissection showed that she would probably not have laid a second egg. In West Africa sets of two and of one egg have been found.²

Eggs of *G. cinerea* are creamy white to yellowish, spotted and mottled with dull olive-brown and umber, and with some underlying grayer markings. Dimensions, 25.5–27.5 mm. × 19.2–21.

KEY TO THE CONGO SPECIES OF *GLAREOLA*

- Axillaries rufous or chestnut, as are many of the longer under wing-coverts, though the under coverts of the manus are usually blackish. *G. pratincola*.
 Axillaries and virtually all the under wing-coverts black, though they may be narrowly tipped with rufous in the young. *G. nordmanni*.

¹ 1932, B. B. O. C., LIII, p. 11 (Niger R. between Segou and Kulikoro).

² Reichenow, 1900, "Vög. Afr.," I, p. 149.

Glareola pratincola fülleborni Neumann

Glareola fusca fülleborni NEUMANN, 1910, O. Mb., p. 10 (type locality: L. Rukwa). SASSI, 1912, Ann. Naturh. Hofmus. Wien, XXVI, p. 357 (Urundi; Kasindi-Beni).—*Glareola pratincola* SHARPE, 1896, 'Cat. Birds Brit. Mus.,' XXIV, p. 725 (L. Edward). O.-GRANT, 1910, Tr. Z. S. Lond., XIX, p. 445 (Mokia, S. E. of Ruwenzori).—*Glareola fusca* REICHENOW, 1911, 'Wiss. Ergeb. D. Z.-Afr. Exp.,' III, p. 241. LÖNNBERG, 1917, Arkiv f. Zool., X, No. 24, p. 5 (L. Edward). SCHOUTEDEN, 1918, Rev. Z. A., V, p. 217 (Lume, near Beni; Kasindi-Beni).—?*Glareola pratincola limbata* MRS. A. MEINERTZHAGEN, 1927, Ibis, p. 489 (Mokia, S. E. Ruwenzori).—*Glareola pratincola erlangeri* MRS. A. MEINERTZHAGEN, 1927, Ibis, p. 490 (Ruwenzori distr.; L. Edward).—*Glareola pratincola fülleborni* MRS. A. MEINERTZHAGEN, 1927, Ibis, p. 491 (Ruwenzori distr.; L. Albert). SCHOUTEDEN, 1936, Ann. Mus. Congo, Zool., I, f. 2, p. 75 (Medje; Buta).—*Glareola pratincola fülleborni* FRIEDMANN, 1930, Bull. 153, U. S. Nat. Mus., p. 192 (Eastern Belgian Congo). BOWEN, 1931, Proc. Acad. Nat. Sci. Phila., LXXXIII, pp. 271, 273, map (Lualaba R.). PETERS, 1934, 'Check-List,' II, p. 304.

DISTRIBUTION OF THE SPECIES.—From southern Europe eastward to Turkestan and northwestern India, and southward through the more open plains regions of Africa to the Cape Province. *G. p. pratincola* (Linnæus)¹ of the Mediterranean region and western Asia migrates south only to the Cape Verde Islands and the White Nile.

Of the four slightly differentiated races in tropical Africa, *G. p. erlangeri* Neumann is the darkest and smallest, with wings 171–183 mm. It inhabits the coast of southern Somaliland. *G. p. fülleborni* is slightly larger, wings 173–193 mm., and not quite so dark. It ranges from the Cape Province and Natal to Kenya Colony, Lake Albert, the Lomami River, and the Kwanza River in Angola. *G. p. boweni* of the western Sudan and perhaps the Gaboon, a shade lighter than *fülleborni*, has wings 179–196 mm. Finally, *G. p. limbata* Rüppell of Northeast Africa and southern Arabia, with wings 181–200 mm., is so closely similar to *G. p. pratincola* as to be scarcely distinguishable.

Glareola p. fülleborni inhabits the eastern and southeastern Congo, mainly the dry lake-shores, open plains, and sand-bars in rivers. It also drops into clearings in the forest, but only rarely.

The Congo Museum has four specimens from the Katanga and Lomami districts. Three are adults in full plumage, from Lake Musolo, August 29 (de Baillet-Latour), from the upper Luapula R., October 29 (de Witte), and from Mutombo-Mukulu, Lomami, without date (Dr. Bouvier). The fourth is an immature example from Kando, near

¹ 1766, 'Syst. Nat.,' 12th Ed., I, p. 345 (Austria).

Tenke, in early April (de Witte). Bowen (1931) reported seeing pratincoles toward September 1 on the sand-bars in the Lualaba River, and from the date they must have been *fülleborni*.

A number of specimens have been secured in the region of Lake Edward, in April, June, July, and December. In this region the pre-nuptial molt begins in April. Other examples were obtained by Grauer in Urundi and on the western shore of Lake Albert.

A single bird in the Congo Museum, collected by Dr. Christy at Medje, in the Ituri forest, April 27, appears to be adult and is changing to nuptial plumage. Another from Buta, received from Brother Hutsebaut, is immature, but likewise beginning to molt. These may be regarded as "strays" from the east or south of the forest.

In flight and general behavior Fülleborn's pratincole resembles *G. nordmanni*, but it is much less common in Congo territory. It often resorts to sand-banks in rivers, forming small flocks. In northern Kenya Colony Dr. van Someren¹ found them breeding on the plains around Koroli in June. Small colonies of birds had sets of two to three eggs, in shallow scrapings in the sand. The eggs were pale stone-gray with spots, lines, and blotches of dark brown and black.

In Northern Rhodesia Captain Pitman² observed nesting during September and October on the Kafue Flats; and near Durban, Natal, exceptional colonies of "hundreds" of birds were discovered by Millar³ on ploughed land, in November of 1907 and 1908. The old birds fluttered on the ground or feigned lameness. According to Chubb the ground-color of the eggs varies from pale cream to rich buff, their form is ovate, and dimensions 29.2-33.5 mm. \times 22.9-24.4.

***Glareola pratincola boweni* Bannerman**

Glareola pratincola boweni BANNERMAN, 1930, B. B. O. C., LI, p. 28, (type locality: Nokunda, Gambia). PETERS, 1934, 'Check-List,' II, p. 304, (S. to Gaboon). —*Glareola pratincola* DUBOIS, 1905, Ann. Mus. Congo, Zool., I, f. 1, p. 25 (Lower Congo; Mateba I.).

DISTRIBUTION.—Senegal to Lake Chad, possibly also in the grasslands of the Gaboon, Lower Congo, and northern Angola. This race is so closely similar to *limbata* that many specimens must be indistinguishable, others resemble *fülleborni*, and wear of the plumage increases the difficulties.

In the Congo Museum there is an old abraded adult from Mateba Island in the lower Congo, almost without buff on throat or breast.

¹ 1934, Journ. E. Afr. Ug. N. H. Soc., No. 49-50, pp. 175, 176.

² 1934, Rep. Faunal Survey N. Rhodesia, p. 204.

³ 1908, Ibis, pp. 385, 386. Also Chubb, 1914, Ann. Durban Mus., I, p. 42.

Another from Stanley Pool in July (Van Delft) is very richly colored, with an unusual amount of buff. I am inclined to refer these two skins, with wings 191.5 and 185 mm., to *boweni*.

In Angola Bowen collected a female on the Kwanza R. which was dark even for *fülleborni*, while the Rothschild Collection contains a male from the same river light enough to have been identified by Hartert¹ as *limbata*. Migration has not been demonstrated, and the tropical races seem very slightly differentiated from one another.

Glareola nordmanni Fischer

Glareola nordmanni FISCHER, 1842, in Nordmann, Bull. Soc. Imp. Naturalistes Moscou, XV, p. 314, Pl. II (type locality: Southern Russia). MRS. A. MEINERTZ-HAGEN, 1927, Ibis, p. 494 (Ituri R.). GROTE, 1930, Mitt. Zool. Mus. Berlin, XVI, p. 84 (middle Ubangi R.; Urundi). BANNERMAN, 1931, 'Birds Trop. W. Afr.,' II, p. 211. BERLIOZ, 1935, Bull. Mus. Hist. Nat. Paris, VII, p. 159 (Kadjudju, near L. Kivu). SCHOUTEDEN, 1936, Ann. Mus. Congo, Zool., I, f. 2, p. 75 (Buta; Titule; Panga).—*Glareola melanoptera* DUBOIS, 1905, Ann. Mus. Congo, Zool., I, f. 1, p. 25 (Banalia). SASSI, 1912, Ann. Naturh. Hofmus., Wien, XXVI, p. 357 (Urundi).

SPECIMENS.—Lubila R., ♀ im., Sept. 20. Panga, ♀, ♀ im., Sept. 18. Avakubi, ♀, Nov. 18. Bafwabaka, ♀, Apr. 14. Faradje, 4 ♂, 4 ♀, Apr. 3; ♂ im., Sept. 22.

ADULTS.—Iris dark brown; bill blackish, corners of mouth orange; feet dusky brown.

DISTRIBUTION.—Southeastern Europe and western Asia, from the Dobrudja to Tomsk in Siberia, migrating southward through western and central Africa as far as the Cape Province. There are very few records from the region of the Great Lakes; and this is one case where the Congo forests in no way bar the route of a typical plains bird—evidently because of its powers of flight. The earliest date of arrival at Avakubi was September 5, 1913. Beginning in September, every year, pratincoles of this species drop in for a rest, by ones or twos, in the larger clearings, in or about villages between Stanleyville and the Ituri. At this season none of the birds show a clearly defined black line encircling the throat, yet some of them are plainly adult. This autumn plumage of the adult is comparable to that of *G. pratincola*, and differs from the breeding plumage in being duller, more worn throughout, lacking the warm buffy coloration of throat and breast, and even the black line running down from the eye. The sides of the head and throat are streaked with dark grayish, the feathers of the forehead and crown dull brown with pale, narrow edgings.

Birds of the year are rather similar, but the fork of the tail is not so

¹ 1920, 'Vög. pal. Fauna,' II, p. 1529.

deep, and the under wing-coverts and axillaries often tipped with reddish brown. The young bird from the Lubila River was still in juvenal dress, very much spotted and edged with dull buff.

During the middle of the northern winter none of these pratincoles are seen in the Ituri and Uelle; they reappear around the first of April, presumably going north. The vast majority must pass over the whole forest belt at a great height, without pausing.

An observation made at Faradje lends support to this theory. Late in the afternoon of April 3, 1911, a large compact flock of birds was seen passing overhead at such a height that they were mere unidentifiable specks. They disappeared, then turned and were seen coming back. Shortly they began to come down. The closely massed body of birds changed to a long wavering column, descending obliquely. Five hundred I believed to be a conservative estimate of their number. When close to the ground they flew to and fro as though examining it, and thus broke up into two or three divisions with the evident object of seeking sleeping quarters.

Night was now fast approaching. Flocks passed us several times, but besides the swish of many wings an occasional "k'ip - ĩp" was the only sound they made. They were flying so closely massed that one shot from my gun brought down ten birds. Darkness quickly hid the rest, and I could only suppose that they finally settled down on some cultivated ground.

The crops and stomachs of these individuals were all distended with winged termites. Their flight in pursuit of insects, though exceptionally swift and graceful, is still distinctly limicoline.

The following year, near Faradje, on April 4, another flock not quite so large was seen high in the air, and on September 22 a solitary bird was taken there.

In South Africa *Glareola nordmanni* is famed as a hunter of locusts, and it must not be thought that in the Congo its food consists solely of the winged termites mentioned above. The stomachs of five other individuals were examined by us: three contained only beetles; another ants; and the last some termites, a small beetle, a grasshopper, and a cockroach.

ORDER LARIFORMES

FAMILY *Laridæ*. SKUAS, GULLS, TERNS, SKIMMERSKEY TO THE GENERA OF *LARIDÆ* TO BE EXPECTED IN THE CONGO

- 1.—Horny sheath of bill consisting of several distinct parts, the covering of the terminal hook of the maxilla sharply separate from that of the basal portion of the culmen; plumage of upperparts mostly dark brown or blackish; wing at least 295 mm. long; median pair of rectrices often lengthened
 *STERCORARIUS*, p. 126.
- 2.—Horny sheath of bill undivided 2.
- 3.—Tail square or only slightly rounded; maxilla often hooked at tip 3.
- 4.—Tail forked, emarginate, or more or less graduated; tip of maxilla never hooked. 4.
- 3.—Wing less than 330 mm. long; in breeding plumage head and throat are gray, darkest on hind-crown and lower throat; at other seasons head white but with a blackish spot on ear-region *HYDROCOLÆUS*, p. 129.
- Wing more than 400 mm. long; in breeding plumage whole head white, in other plumages more or less diffusely streaked or mottled with brownish, but not white with blackish ear-spot *LARUS*, p. 128.
- 4.—Mandible distinctly longer than maxilla, and excessively compressed, forming a thin blade; tail forked *RYNCHOPS*, p. 140.
- Mandible and maxilla of approximately equal length, neither of them more than moderately compressed 5.
- 5.—Outermost rectrices much shorter than the more central ones, though the median pairs are again somewhat shortened; plumage largely dark brown or blackish *ANOUS*, p. 131.
- Tail forked or emarginate, the outermost pair, or two outermost pairs, the longest 6.
- 6.—Webbing of toes reduced in extent, inner web reaching only to end of basal phalanx on inner and middle toes, outer web to the second phalanx of middle toe; tail not deeply forked; wing not more than 245 mm. long
 *CHLIDONIAS*, p. 131.
- Webbing of toes more extensive, reaching distal phalanges of toes 7.
- 7.—Metatarsus always as long as, or longer than, middle toe with claw; bill black throughout life, and less than 45 mm. long *GELOCHELIDON*, p. 139.
- Metatarsus shorter than middle toe with claw, or if longer, then bill exceeds 45 mm. in length; bill yellow, red, or black 8.
- 8.—Metatarsus more than 35 mm. long; bill very thick, 19–20 mm. deep at nostril
 *HYDROPROGNE*, p. 139.
- Metatarsus less than 35 mm. long; bill scarcely more than 15 mm. deep at nostril, generally much less *STERNA*, p. 135.

Subfamily *Stercorariinæ*KEY TO THE SPECIES OF *STERCORARIUS*

- 1.—Wing more than 340 mm. long; middle toe with claw more than 45 mm. long; median pair of rectrices somewhat lengthened, but not narrowed toward tip, though often twisted distally into a somewhat upright plane
 *S. pomarinus*.
- Wing less than 335 mm. long; middle toe with claw less than 45 mm. long; median pair of rectrices lengthened and tapering distally to a narrow point, their tips not twisted 2.

- 2.—At least three, and sometimes four or more outer primaries with whitish shafts; tail of adults with median rectrices only 200–220 mm. long; wing 315–335 mm.; culmen 28–31 mm.....*S. parasiticus*.
 Only two, or rarely three, outermost primaries with whitish shafts; tail of adults with median rectrices much longer, 300–360 mm.; wing only 296–320 mm.; culmen only 25–29 mm.....*S. longicaudus*.

[*Stercorarius parasiticus* (Linnæus)]

Larus parasiticus LINNÆUS, 1758, 'Syst. Nat.,' 10th Ed., p. 136 (restricted type locality: coasts of Sweden).—*Stercorarius parasiticus* BANNERMAN, 1931, 'Birds Trop. W. Afr.,' II, p. 221, Fig. 62 (Atlantic Coast to Cape of Good Hope).

There is little doubt that Richardson's skua—the parasitic jaeger of American lists—will be found off the mouth of the Congo. It breeds in the arctic and subarctic regions of both hemispheres, and migrates southward to Peru, Rio de Janeiro, and the Cape of Good Hope. Not uncommon along the West African coast, it has been taken in the Gaboon and at Mossamedes. As early as September 2, in 1927, I noted a party of ten or twelve some two hundred miles off the western coast of Liberia.

Stercorarius longicaudus Vieillot, the long-tailed skua, may also migrate to the western coast of Africa,¹ but thus far has not been found in the Gulf of Guinea.

[*Stercorarius pomarinus* (Temminck)]

Lestris pomarinus TEMMINCK, 1815, 'Man. d'Orn.,' 1st Ed., p. 514 (type locality: Arctic regions).—*Stercorarius pomarinus* BANNERMAN, 1931, 'Birds Trop. W. Afr.,' II, p. 223, Fig. 63 (Atlantic coast to Walfish Bay).

The pomatorhine skua—or pomarine jaeger—likewise breeds in the arctic regions and migrates southward to Peru, Australia, and southern Africa; but it is supposedly less common along the West African coast than the preceding species. It has, however, been reported from the Gold Coast and Walfish Bay.

On the return voyage from the Congo, between Sierra Leone and Dakar at the end of February, 1915, I noticed a number of these skuas; sometimes as many as six or eight would be following our ship.

More surprising is it that during the outward voyage, on June 12, 1909, we saw three of these same skuas a few hours after sailing from Dakar. Again on July 3, 1930, I watched four of them over the ship's wake off the coast of Senegal; and on May 1 and 2, 1931, four or five were noted off Portuguese Guinea and near Cape Verde. It is evident that some remain in that vicinity throughout the year.

¹ Peters, 1934, 'Check-List,' II, p. 312.

Subfamily *Larinæ**Larus fuscus fuscus* Linnæus

Larus fuscus LINNÆUS, 1758, 'Syst. Nat.,' 10th Ed., p. 136 (Europe; restricted type locality: Sweden). EMIN, 1892, Zool. Jahrb., VI, p. 151 (S. end L. Albert); 1922, in Stuhlmann, 'Tageb. Emin Pascha,' III, pp. 404, 421 (N. end L. Albert). REICHENOW, 1900, 'Vög. Afr.,' I, p. 41; 1911, 'Wiss. Ergeb. D. Z.-Afr. Exp.,' III, p. 237 (Kisenyi). SASSI, 1912, Ann. Naturh. Hofmus. Wien, XXVI, p. 355. SCHOUTEDEN, 1918, Rev. Z. A., V, p. 213 (Katana). GROTE, 1930, Mitt. Zool. Mus. Berlin, XVI, p. 102 (Lower Congo; L. Kivu).—*Larus fuscus fuscus* SCHOUTEDEN, 1924, Rev. Z. A., XII (Bamu I. in Stanley Pool); 1932, idem, XXII, p. 246 (Kisenyi); 1936, Ann. Mus. Congo, Zool., I, f. 2, p. 76 (near Mahagi). DWIGHT, 1925, Bull. A. M. N. H., LII, pp. 208, 210 (eastern Congo). BANNERMAN, 1931, 'Birds Trop. W. Afr.,' II, p. 230. C. GRANT, 1933, Ibis, p. 548 (L. Tanganyika). SCHÜTZ, 1934, Vogelzug, pp. 126, 132, map (middle Congo R.); 1935, idem, p. 80 (Lukolela). MEINERTZ-HAGEN, 1935, Ibis, p. 772 (central Congo).

SPECIMENS.—Avakubi, ♂ im., Sept. 20; ♀ im., Oct. 27. Faradje, ♀ im., Sept. 28.

DISTRIBUTION OF THE SPECIES.—Breeding in the Azores, the Canary Islands, northern Europe, and northwestern Asia to the Taimyr Peninsula. Dwight (1925) recognized four races, but *atlantis* is often regarded by others as a subspecies of *L. argentatus*. Stegmann¹ would make the species far more comprehensive, including even *argentatus* and *californicus*.

L. f. fuscus, with the most blackish mantle of all, nests from Scandinavia eastward to the Dwina River, and migrates southward to the Red Sea, Lake Naivasha, Lake Tanganyika, Lake Nyasa, the Kasai district, and Sierra Leone. Some individuals, even adults, spend the northern summer on Lake Victoria and other bodies of water in tropical Africa, but I cannot believe that they ever breed there.

This is the only gull we ever saw on the rivers of the northern Congo, and not a common bird there, no adults being noticed. Our three specimens, all birds of the first winter, were identified by Doctor J. Dwight. These young examples were emaciated, as though from starvation, and a single fish scale was all that we could find in their stomachs. One of them weighed only 377 grams. Another young gull, presumably of this species, was noticed several times at Stanleyville from November 20 to 28, 1914; and on July 20, 1930 a sub-adult in abraded plumage was observed at Kinshasa on Stanley Pool. Schütz (1934, 1935) reported a bird taken between Ngombe and Coquilhatville which had been banded

¹ 1934, J. f. O., pp. 340-380.

as a transient at Rossitten, Germany, and another from Lukolela which had been similarly marked on the west coast of Finland.

On Lake Edward I saw a black-backed gull in adult plumage at Katwe on January 21, 1927, while Sage noted another at Kasindi Landing about the same date. Two more were seen together at Kabare on the south shore of the same lake on May 12, 1927, so it seems that a few may remain there through the northern summer. An example in adult plumage was collected in June, 1937, by C. R. Stegall on Lake Munkamba in the Kasai.

Larus fuscus graellsii A. E. Brehm, with the mantle of adults not quite so black, breeds from the Faeroes to the western coast of France, and migrates southward occasionally to the Niger delta. It is not likely to reach the Congo.

[*Larus fuscus atlantis* Dwight]

Larus fuscus atlantis DWIGHT, 1922, A. M. Nov., No. 44, p. 1 (type locality: Fayal, Azores).—*Larus argentatus atlantis* GROTE, 1930, Mitt. Zool. Mus. Berlin, XVI, p. 102 (S. to Angola ?).—*Larus atlantis* BANNERMAN, 1931, 'Birds Trop. W. Afr.,' II, p. 228 (to Gambia, possibly to Angola).

The Atlantic Islands gull breeds on the Azores and the Canary Islands. While many remain in the Azores in mid-winter, as I can state from personal observation, others wander southward to the Cape Verde Islands and the Gambia. The mantle in this form is nearly as pale gray as in a herring gull, so for many years it was confused with *Larus cachinnans* Pallas, which breeds from the Adriatic Sea to Lake Baikal, and is usually regarded as a race of *L. argentatus*.

It now seems certain that *cachinnans* reaches Africa only on the shores of the Mediterranean and Red Sea, and it is very doubtful whether *atlantis* ever travels south to Angola. Nowhere near the Congo mouth have I ever seen a gull of this appearance.

Hydrocolæus cirrocephalus (Vieillot)

Larus cirrocephalus VIEILLOT, 1818, 'Nouv. Dict. Hist. Nat.,' XXI, p. 502 (type locality: Brazil). REICHENOW, 1900, 'Vög. Afr.,' p. 44 (L. Edward; L. Tanganyika); 1911, 'Wiss. Ergeb. D. Z.-Afr. Exp.,' III, p. 237 (Kisenyi; Usumbura). JOHNSTON, 1908, 'George Grenfell and the Congo,' II, p. 927 (Tanganyika and other lakes). NEAVE, 1910, Ibis, p. 89 (L. Bangweolo). SASSI, 1912, Ann. Naturh. Hofmus. Wien, XXVI, p. 355. PILETTE, 1914, 'A Travers l'Afrique Equatoriale,' p. 187, Fig. 45 (S. of L. Edward). LÖNNBERG, 1917, Arkiv f. Zool., X, No. 24, p. 4 (Kabare). SCHOUTEDEN, 1918, Rev. Z. A., V, p. 214 (Kilewa; Baraka; Katana); 1935, idem, XXVII, p. 401 (Nyanza on L. Tanganyika); 1936, Ann. Mus. Congo, Zool., I, f. 2, p. 76 (near Mahagi). W. L. SCLATER, 1924, 'Syst. Av. Æth.,' pt. 1, p. 145. BANNER-

MAN, 1931, 'Birds Trop. W. Afr.,' II, p. 235, Fig. 66 (Abyssinia to L. Nyasa).—*Larus phaeocephalus* DUBOIS, 1886, Bull. Mus. Roy. Hist. Nat. Belg., IV, p. 150 (L. Tanganyika).—*Larus cirrhocephalus* SAUNDERS, 1896, 'Cat. Birds Brit. Mus.,' XXV, p. 198 (Ujiji). DUBOIS, 1905, Ann. Mus. Congo, Zool., I, f. 1, p. 23. SALVADORI, 1914, Ann. Mus. Zool. Napoli, IV, No. 10, p. 4 (L. Kivu). GYLDENSTOLPE, 1924, K. Svenska Vet.-Akad. Handl., (3) I, No. 3, p. 301. DE RIEMAECKER, 1927, Rev. Z. A., XIV, p. 257 (Kasenga on Luapula R.). SCHOUTEDEN, 1932, Rev. Z. A., XXII, p. 246; 1933, idem, p. 380.—*Hydrocolæus cirrhocephalus phaeocephalus* DWIGHT, 1925, Bull. A. M. N. H., LII, pp. 270, 271.—*Hydrocoloeus cirrhocephalus poiocephalus* FRIEDMANN, 1930, Bull. 153, U. S. Nat. Mus., p. 194.—*Hydrocolæus cirrocephalus phaeocephalus* C. GRANT, 1931, B. B. O. C., LI, pp. 56, 57.—*Larus cirrocephalus poicephalus* BANGS AND LOVERIDGE, 1933, Bull. Mus. Comp. Zool., LXXXV, p. 162 (Kalambo R. mouth on L. Tanganyika).—*Larus cirrocephalus poiocephalus* PETERS, 1934, 'Check-List,' II, p. 321.

DISTRIBUTION.—In South America from Argentina to southeast Brazil and Peru; in Africa from the Gambia, Lake Chad, and southern Abyssinia to Walfish Bay and Natal, not only on the coasts, but on the larger inland lakes; also on lakes in Madagascar. Doctor Dwight believed that the African birds were darker and smaller, with decidedly smaller white spots near the tips of the primaries, than those of South America. While there may be a slight average difference in these respects, it seems scarcely sufficient for subspecific differentiation.¹

Within our limits the gray-headed gull is largely restricted to the great lakes of the eastern border, where it is rather common, save on Lake Albert. On Lake Edward it has been found in January, May, June, July, and November, so there is a possibility that it nests there. I have seen it in April on Lake Bunyoni, and in July on Lake Kivu. Along the eastern shore of Lake Tanganyika Claude Grant observed it throughout the year, yet failed to find a breeding locality. Neave collected an adult male on Lake Bangweolo in July. This gull has long been known to breed on a rocky islet near the western shore of Lake Victoria.² It laid its eggs during June in sets of two or three, and occasionally as many as five, on rocks overgrown with ferns. Only seldom was a nest built of dry grass. The eggs were described as whitish gray, pale greenish, or buff, with large violet-gray shell-markings and sepia-brown spots. Dimensions, 49.5–56.5 mm. × 34.5–38.5. Captain Pitman³ reports that the breeding season begins there in April, and sometimes continues till September.

Nests found by Doctor Mearns on the swampy shore of Lake Nai-

¹ Names applicable to the African representative are *Larus poiocephalus* Swainson, 1837, 'Birds W. Afr.,' II, p. 245, Pl. xxix (Western Africa); and *Xema phaeocephala* Strickland and Selater, 1852, 'Jardine's Contrib. Orn.,' p. 160 (Western Africa).

² Neumann, 1898, J. f. O., p. 248.

³ 1934, Ibis, p. 209.

vasha were built of pieces of aquatic plants and grasses, mixed with mud, so that they resembled those of coots. Other localities where the species nests are Lake Stefanie, Lake Rudolf, and Zululand.

Subfamily Sterninæ

Anous stolidus stolidus (Linnæus)

Sterna stolidus LINNÆUS, 1758, 'Syst. Nat.,' 10th Ed., p. 137 (American seas; restricted type locality: West Indies).—*Sterna senex* LEACH, 1818, in Tuckey, 'Narr. Exp. R. Zaire,' p. 408 (Lower Congo). BOCAGE, 1881, 'Orn. Angola,' pt. 2, p. 515 ("Zaire").—?*Sterna* C. SMITH, 1818, in Tuckey, 'Narr. Exp. R. Zaire,' p. 290 (Mampenga I. in lower Congo).—*Anous tenuirostris* HARTLAUB, 1850, 'Beitr. Orn. Westafr.,' p. 44; 1857, 'Syst. Orn. Westafr.,' p. 256; 1884, J. f. O., p. 307.—*Anous stolidus* REICHENOW, 1900, 'Vög. Afr.,' I, p. 74.—*Anous stolidus stolidus* W. L. SCLATER, 1924, 'Syst. Av. Æth.,' pt. 1, p. 154.

DISTRIBUTION OF THE SPECIES.—Wide-ranging through the tropical seas, the typical race occupying the coasts and islands of the Atlantic, from the Gulf of Mexico and the West Indies to the Tristan group, St. Helena, Ascension, and the west coast of Africa between the Gold Coast and the Cameroon. Four other races range from the Red Sea across the Indian and Pacific Oceans.

That the noddly brought back from Tuckey's expedition really came from the Lower Congo cannot be considered proved. No one has recently found the species there, nor on the adjacent coast. But I have seen a skin from Batanga, Cameroon, obtained by J. A. Reis for the Carnegie Museum; and others have been procured on São Tomé and Rollas Island. So the noddly may occasionally wander to the Congo mouth.

KEY TO THE SPECIES OF *CHLIDONIAS*

- 1.—Metatarsus not more than 17 mm. long, wing-length 205–220 mm.; in breeding plumage whole head and breast are blackish or sooty gray, upper wing-coverts ashy gray; in winter plumage adults and young have white breasts, and a sooty black patch extends over hind-crown, nape, and ear-coverts. *C. nigra*.
- Metatarsus longer than 17 mm. 2.
- 2.—Head and neck wholly black; upper wing-coverts pearl-gray, changing to white toward the carpal and patagial borders of the wing. *C. leucoptera* (br. pl.).
- Whole head not black. 3.
- 3.—Forehead, crown, and nape black; cheeks and throat white; breast gray, abdomen or flanks more blackish. *C. hybrida* (br. pl.).
- Forehead and throat white; hind-crown and nape heavily streaked or spotted with blackish. 4.
- 4.—Wing-length 200–215 mm., exposed culmen less than 26 mm. *C. leucoptera* (non-breeding and imm.)
- Wing-length 225–240 mm., exposed culmen more than 26 mm. *C. hybrida* (non-breeding and imm.)

Chlidonias nigra nigra (Linnæus)

Sterna nigra LINNÆUS, 1758, 'Syst. Nat.,' 10th Ed., p. 137 (Europe; restricted type locality: Sweden).—*Hydrochelidon nigra* SHARPE AND BOUVIER, 1876, Bull. Soc. Zool. France, I, p. 314 (Banana). EMIN, 1892, Zool. Jahrb., VI, p. 151 (L. Albert). REICHENOW, 1900, 'Vög. Afr.,' I, p. 70.—*Hydrochelidon nigra nigra* HARTERT, 1921, 'Vög. pal. Fauna,' II, p. 1683.—*Chlidonias nigra* W. B. ALEXANDER, 1928, 'Birds of the Ocean,' p. 188 (Loango; "Tanganyika").—*Chlidonias nigra nigra* BANNERMAN, 1931, 'Birds Trop. W. Afr.,' II, p. 269, Fig. 78. PETERS, 1934, 'Check-List,' II, p. 328.

DISTRIBUTION OF THE SPECIES.—Breeding in North America, Europe, and western Asia, at least to the Obi River; migrating south to Chile, Angola, Lake Victoria, and perhaps Tanganyika Territory. The American race is *C. n. surinamensis* (Gmelin). The typical form is a common winter visitant in Upper Guinea, but rare in the eastern half of the continent. The black tern, it seems, seldom crosses the equator.

The specimen from Banana may well have been *nigra*, but I shared the doubts expressed by Professor Reichenow as to the identification of birds from Lake Albert and the Kivu Volcanoes. It seemed far more probable that they were *leucoptera*. Mr. Bannerman has kindly examined the Kivu specimen in the British Museum and pronounces it *leucoptera*. On the other hand, Colonel Meinertzhagen did collect *nigra* in breeding plumage at Kisumu on Lake Victoria, April 30, 1916, so possibly it does occur on Lake Albert.

Chlidonias leucoptera (Temminck)

Sterna leucoptera TEMMINCK, 1815, 'Man. d'Orn.,' p. 483 (type locality: coasts of the Mediterranean).—*Hydrochelidon nigra* DUBOIS, 1886, Bull. Mus. Roy. Hist. Nat. Belg., IV, p. 150 (L. Tanganyika). O.-GRANT, 1908, Ibis, p. 316 (Mfumbiro Volcanoes, 5000 ft.). REICHENOW, 1911, 'Wiss. Ergeb. D. Z.-Afr. Exp.,' III, p. 237.—*Hydrochelidon leucoptera* HARTERT, 1899, in Ansorge, 'Under the African Sun,' App., p. 326 (Pongo west of L. Albert). REICHENOW, 1900, 'Vög. Afr.,' I, p. 71 (L. Edward); 1911, 'Wiss. Ergeb. D. Z.-Afr. Exp.,' III, p. 237 (L. Kivu; Kisenyi). DUBOIS, 1905, Ann. Mus. Congo, Zool., I, f. 1, p. 23 (Mpala). SASSI, 1912, Ann. Naturh. Hofmus. Wien, XXVI, p. 354. LÖNNBERG, 1917, Arkiv f. Zool., X, No. 24, p. 4. SCHOUTEDEN, 1918, Rev. Z. A., V, p. 214 (Kasindi; Kabare; Plain Saint-Louis, Kilewa).—*Hydrochelidon leucoptera leucoptera* GYLDENSTOLPE, 1924, K. Svenska Vet. Akad. Handl., (3) I, No. 3, p. 302 (L. Albert).—*Chlidonias nigra nigra* GROTE, 1930, Mitt. Zool. Mus. Berlin, XVI, p. 99 (in part. Kivu Volcanoes). SCHOUTEDEN, 1933, Rev. Z. A., XXII, p. 379 ("Muhavura").—*Chlidonias leucopterus* SCHOUTEDEN, 1932, Rev. Z. A., XXII, p. 246 (Mai-ya-Moto Bay on L. Kivu).—*Chlidonias leucoptera* SCHOUTEDEN, 1936 Ann. Mus. Congo, Zool., I, f. 2, p. 76 (Mahagi Port).

SPECIMENS.—Avakubi, 2 ♂, Dec. 2, 5; ♀, Nov. 16. Faradje, ♀, Oct. 27.

All four specimens are in winter or immature plumage. The female from Faradje has the rump pure white, but the tail gray; the other specimens all have the rump pearl-gray.

DISTRIBUTION.—Middle and southern Europe, east to China, migrating to New Zealand, Australia, and South Africa. Every year, in October or November, these terns appear along the rivers of the northeastern Congo, flying up and down, either over the water or over the clearings nearby. There are seldom more than three together, and they are rarely seen to alight. Probably the insects, sometimes as large as grasshoppers, which we found in their stomachs, are taken on the wing.

In 1912 we first noted the species at Faradje on October 27; in 1913 they were rather common at Avakubi by November 16. Only a single bird in the breeding plumage was seen in the Uelle district, at Faradje, May 1, 1912.

At the south end of Lake Edward, on May 10, 1927, the white-winged black tern was still common, both in the marshes and out on the lake. One flock of forty to fifty was noticed, but the birds in pale "immature" plumage outnumbered those with blackish head and breast by fifteen to one. Two of the latter were shot, and were found to be females with very slight enlargement of the ovary. They had not quite completed the prenuptial molt.

As this marsh tern has been reported from Lake Edward in June, and Lake Albert in August, it is evident that some remain in Central Africa during the northern summer. At Jinja on Lake Victoria, I myself noticed one in adult black-headed dress and five in white-headed plumage on August 1. There is no reason to suspect that they breed anywhere in tropical Africa, and Jackson's notes on nesting at Lake Naivasha, quoted by Bannerman,¹ undoubtedly refer to *C. hybrida sclateri*.

At Lukolela on the middle Congo I failed to notice any white-winged black terns during the autumnal migration of 1930, but from the middle of February to the end of March they became increasingly numerous. Flocks of thirty to one hundred and fifty wandered over the river and alighted on bars. Lower down the river, near Kunzulu, they were even more abundant on April 8. So the species is by no means confined to the eastern half of the Congo, though it is said to be rare west of the Cameroon.

¹ 1931, 'Birds Trop. W. Afr.,' II, pp. 273, 274.

***Chlidonias hybrida hybrida* (Pallas)**

Sterna hybrida PALLAS, 1811, 'Zoogr. Rosso-Asiat.,' II, p. 338 (type locality: Southern Volga and Sarpa Lake, S. E. Russia).—*Sterna leucopareia* TEMMINCK, 1820, 'Man. d'Orn.,' 2nd Ed., II, p. 746 (type locality: Hungary).—*Hydrochelidon leucopareia* SCHOUTEDEN, 1918, Rev. Z. A., V, p. 214 (Kabare).

DISTRIBUTION OF THE SPECIES.—From Europe, Turkestan, and China to Australia, Ceylon, South Africa, and Madagascar. The typical race breeds from Spain and North Africa to Russia and Turkestan, migrating southward to the Gambia, upper Niger River, the Congo, and White Nile. *C. h. sclateri* of southern and eastern Africa, and of Madagascar, is darker gray above and below. Three other races of the whiskered tern occupy India, southern China, New Guinea, and Australia.

The example reported from Kabare (November 14) is preserved in the Congo Museum, and to me it seems certainly *C. h. hybrida*. It is doubtful, however, whether the typical form migrates to Kenya Colony, where *sclateri* breeds in June and July on Lake Naivasha. Along the middle Congo near Lukolela, on March 22, 1931, I watched an adult *C. h. hybrida* in breeding dress as it flew by, and a week later another—if it was not the same individual—standing on the sand with a flock of more than a hundred *C. leucoptera*. It is proved, therefore, that a few of the northern whiskered terns do reach the Congo River.

***Chlidonias hybrida sclateri* Mathews and Iredale**

Chlidonias leucopareia sclateri MATHEWS AND IREDALE, 1921, 'Man. Birds Austr.,' I, p. 84 (type locality: South Africa).—*?Hydrochelidon hybrida* PAGET-WILKES, 1926, S. Afr. Journ. Nat. Hist., VI, p. 69 (upper Kafue R. near Ndola).

DISTRIBUTION.—The South African race of the whiskered tern extends north from Cape Province to Kenya Colony, the Lualaba River, and Angola, besides being found in Madagascar.

At Lake Naivasha in Kenya Colony, July 11, 1926, we collected one adult male in breeding plumage, and saw three or four others in similar dress. Both the season and the dark gray color of the back indicate that our bird belongs to the African race, which seems therefore to breed at Lake Naivasha. I have no doubt that this was really the tern found nesting there by Sir Frederick Jackson in June and July.¹ It built nests of dry grass on lily leaves, floating reeds, or old grebe nests, and laid two or three eggs, cream-colored to buff, sometimes tinged with green, spotted and blotched with reddish or blackish brown and dark gray, with underlying mauve markings. Dimensions, 37–40.5 mm. × 29–29.5.

¹ Bannerman, 1931, 'Birds Trop. W. Afr.,' II, p. 273.

Loveridge has noted that *C. h. sclateri* was apparently nesting in the marshes at Nzingi, Tanganyika Territory, late in May; and Paget-Wilkes and Belcher have both found it breeding at Lake Chilwa, Nyasaland, in September. Belcher believed that it migrated northward in November, while Roberts has seen it in the Union of South Africa only during the summer months.

Whether this tern breeds in the southeastern Congo is doubtful; but at the outlet of Lake Kisale, on August 9, 1927, I secured a non-breeding male in off-season plumage, and saw a half dozen others flying up and down over the river. These may have been migrants from farther south. On the upper Kafue River, Paget-Wilkes reported *hybrida* as arriving at the beginning of January, mostly in immature plumage. It seems scarcely possible that the European race migrates so far south, and I am not sure that his identification was correct.

KEY TO THE SPECIES OF *STERNA* TO BE EXPECTED IN OR NEAR THE CONGO

- 1.—Back and upper surface of wings black, blackish gray, or dusky brown.....2.
 Back and wings light gray, though sometimes washed or edged with brownish when young.....3.
- 2.—Back blackish, almost like crown; white eyebrow stopping above eye; wing usually exceeding 275 mm.....*S. fuscata*.
 Back very dark gray-brown, sharply separated from black crown; white eyebrow continuing a little beyond eye; wing usually less than 275 mm.....*S. anæthetus*.
- 3.—Size large, wing exceeding 285 mm.; feet blackish even in adults.....4.
 Size smaller, wing usually less than 285 mm.; feet red or yellow in adults, retaining a light or buff color in dried skins.....6.
- 4.—Bill black with yellowish tip, 52–58 mm. long; wing-length 285–328 mm.....*S. sandvicensis*.
 Bill orange or red, with a little blackish at most toward tip; wing-length 335 mm. or more.....5.
- 5.—Wing less than 365 mm. long; metatarsus less than 35 mm. long; tail of adult forked to almost one-half its length.....*S. maxima*.
 Wing more than 390 mm.; metatarsus more than 40 mm. long; tail of adult forked for much less than half its length.....See *Hydroprogne caspia*.
- 6.—Wing more than 240 mm. long.....7.
 Wing less than 190 mm. long.....9.
- 7.—Bill entirely red, becoming yellowish brown in dried skins; metatarsus less than 18 mm. long.....*S. paradisæa*.
 Bill not entirely red, blackish at tip or black throughout.....8.
- 8.—Metatarsus 18 mm. or longer.....*S. hirundo*.
 Metatarsus less than 18 mm. long.....*S. paradisæa* (imm.).
- 9.—Bill blackish at all seasons; adult in breeding plumage with forehead black like crown; shafts of outer primaries white above.....*S. balænarum*.
 Bill yellow in adult breeding plumage, usually a little dusky at very tip, but often

blackish in other plumages; forehead in breeding season with a white patch which extends back over the eye; shaft of next-to-outermost primary blackish brown, that of outermost the same, or striped with whitish down its middle.....*S. albifrons*.

[*Sterna fuscata fuscata* Linnæus]

Sterna fuscata LINNÆUS, 1766, 'Syst. Nat.,' 12th Ed., p. 228 (type locality: Santo Domingo).

The sooty tern breeds on islands in the Atlantic, Indian, and Pacific oceans, and may be divisible into about five races. The typical race is confined to the Atlantic, and has been found about the islands of Fernando Po and São Tomé. While it has not been taken along the West African coast south of the Cameroon, there is always a possibility that it may wander to the mouth of the Congo.

[*Sterna anæthetus melanoptera* Swainson]

Sterna melanoptera SWAINSON, 1837, 'Birds W. Afr.,' II, p. 249 (type locality: West Africa).

The bridled tern inhabits tropical and subtropical seas, around the world, and has been divided in seven races. The present race has been recorded from Princes Island and from rocky islets off São Tomé, but is less likely to occur along the Congo coast than *fuscata*.

[*Sterna albifrons guineæ* Bannerman]

Sterna albifrons guineæ BANNERMAN, 1931, B. B. O. C., LI, p. 70 (Loko, Benue R., Nigeria); 1931, 'Birds Trop. W. Afr.,' II, p. 262, Figs. 74, 75 (Gaboon; Mundjaffa on Shari R.).—*Sterna albifrons* subsp.? HARTERT, 1921, 'Vög. pal. Fauna,' II, p. 1714 (Gaboon).

This wide-ranging little tern is represented in Western Africa by a race which differs from the typical European form only in being slightly smaller, with bill sometimes thicker, and almost entirely yellow, merely dusky at the tip. The range of *guineæ* is known to extend from the Gold Coast to the Shari River, and south to the Gaboon, so it is not unlikely to occur at the mouth of the Congo.

Sterna balænarum (Strickland)

Sternula balænarum STRICKLAND, 1852, Jardine's Contrib. Orn., p. 160 (type locality: Damaraland, probably Walfish Bay).—*Sterna balænarum* SHARPE AND BOUVIER, 1876, Bull. Soc. Zool. France, I, p. 314 (Massabe). REICHENOW, 1877, J. f. O., p. 11 (Loango Coast). BOCAGE, 1881, 'Orn. Angola,' pt. 2, p. 512 (Landana). W. B. ALEXANDER, 1928, 'Birds of the Ocean,' p. 193. BANNERMAN, 1931, 'Birds Trop. W. Afr.,' II, p. 264. PETERS, 1934, 'Check-List,' II, p. 339.

The Damara tern ranges from Table Bay along the coasts of southwestern Africa as far as Massabe near Landana, and thus undoubtedly occurs at the mouth of the Congo. Arriving at Banana on June 21, 1909, I noted a number of terns of two sizes, and have no doubt that the smaller ones were *S. balænarum*. They are of about the same size as *S. albifrons*.

At Walfish Bay Anderson¹ found the species breeding. Its eggs were deposited in a slight hollow scooped in the sand.

Sterna hirundo hirundo Linnæus

Sterna hirundo LINNÆUS, 1758, 'Syst. Nat.,' 10th Ed., p. 137 (Europe; restricted type locality: Sweden). BANNERMAN, 1931, 'Birds Trop. W. Afr.,' II, p. 249 (W. coast to Cape Province).—*Sterna macroptera* BOCAGE, 1881, 'Orn. Angola,' pt. 2, p. 510 (Landana; Shiloango).—*Sterna hirundo hirundo* PETERS, 1934, 'Check-List,' II, p. 332.

DISTRIBUTION OF THE SPECIES.—The breeding range of the typical race covers a large part of North America, Europe, and western Asia. south to the Bahamas, Canary Islands, North Africa, and Persia. Its migration routes extend down the West African coast to the Cape of Good Hope, also to the Malay Peninsula and China. Three other races occupy central and eastern Asia.

There is no doubt that the common tern occurs frequently at the mouth of the Congo, for it has been taken during its winter migration at many places along the west coast. Specimens are known from the Gaboon coast, Landana, and Benguella; and birds ringed in East Prussia and Sweden have been recovered in West and South Africa.²

Terns supposedly of this species are often to be seen off Banana, even in July; but no one appears to have collected *S. hirundo* nearer than at Landana.

[*Sterna paradisæa* Pontoppidan]

Sterna paradisæa PONTOPPIDAN, 1763, 'Danske Atlas,' I, p. 622 (type locality: Christiansoë, Denmark).—*Sterna macrura* BANNERMAN, 1931, 'Birds Trop. W. Afr.,' II, p. 251 (Cameroon; Table Bay).

The arctic tern breeds in the northern portions of both hemispheres, migrating southward as far as New Zealand and the Antarctic seas. It has been taken on the coast of Cameroon, Cape Province, and Natal, and therefore may be found occasionally off the Congo mouth.

Birds banded as downy chicks in Maine and Labrador have been

¹ 1872, 'Birds of Damaraland,' p. 362.

² Selater, 1922, *Ibis*, p. 603; 1922, *Brit. Birds*, XVI, p. 88. Lucanus, 1928, 'Rätsel des Vogelzuges,' 3rd Ed., p. 42. Jägerskiöld, 1929, 'Göteborgs Biol. Förening 1904-1929,' pp. 47, 80.

recovered in the Niger River delta and near Port Shepstone, Natal, so it seems that there is a regular migration route from the northeast American coast across the North Atlantic and down the west coast of Africa.¹ The one banded in Maine was at first believed to be *S. hirundo*, but now appears certainly to have been *paradisæa*. Another individual banded in southern Sweden was likewise recovered near Cape Town.²

Sterna sandvicensis sandvicensis Latham

Sterna sandvicensis LATHAM, 1787, 'Gen. Synops. Birds,' Suppl. I, p. 296 (type locality: England, i.e., Sandwich, Kent).—*Sterna cantiaxa* SHARPE AND BOUVIER, 1876, Bull. Soc. Zool. France, I, p. 314 (Banana). REICHENOW, 1900, 'Vög. Afr.,' I, p. 62.—*Sterna sandvicensis sandvicensis* BANNERMAN, 1931, 'Birds Trop. W. Afr.,' II, p. 254, Fig. 72.—*Thalasseus sandvicensis sandvicensis* PETERS, 1934, 'Check-List,' II, p. 344.

DISTRIBUTION OF THE SPECIES.—An American race, *S. s. acuflavida* Cabot, nests on the southeastern coasts of North America and migrates south as far as Brazil. Typical *sandvicensis* breeds on the coasts of western Europe, and about the Mediterranean, Black, and Caspian seas. The Sandwich tern goes southward on the winter migration to the Cape of Good Hope, but avoids the East African coast. Lucan and Petit obtained one adult specimen at Banana, where I too have seen one in winter plumage flying close to the ship on April 25, 1931. Many others have been taken along the West African coasts, including a surprising number of birds banded in Great Britain, Holland, Germany, and Denmark.³

Sterna maxima albididorsalis Hartert

Sterna maxima albididorsalis HARTERT, 1921, 'Vög. pal. Fauna,' II, p. 1698 (type locality: Baie du Lévrier, Cape Blanco. Also West African coast from Gibraltar to Cameroon and Benguela).—*Sterna bergii* DUBOIS, 1905, Ann. Mus. Congo, Zool. I, f. 1, p. 23 (Mayombe).—*Sterna maxima albididorsalis* BANNERMAN, 1931, 'Birds Trop. W. Afr.,' II, p. 259, Fig. 73 (Cameroon coast; St. Paul de Loanda).—*Thalasseus maximus albididorsalis* PETERS, 1934, 'Check-List,' II, p. 343.

DISTRIBUTION OF THE SPECIES.—The royal tern is found along the American coasts from Virginia and Lower California southward, reaching Argentina and Peru, at least in the northern winter. It is also represented on the western coasts of Africa, from Gibraltar to Benguela, by the present subspecies, which is distinguished by paler gray upper-

¹ O. L. Austin, 1932, 'Birds of Newfoundland Labrador,' pp. 125, 126. F. C. Lincoln, 1933, in 'Fifty Years Progress Amer. Orn.,' pp. 80, 84; 1933, 'Ann. Rep. Smiths. Inst.,' (1932), p. 345, Fig. 3.

² Schüz, 1932, Vogelzug, III, p. 174.

³ See Schüz and Weigold, 1931, 'Atlas Vogelzug,' pp. 60, 150, Pl. cv; Bannerman, 1931, 'Birds Trop. W. Afr.,' II, pp. 256-258; Witherby, 1930, Brit. Birds, XXIII, p. 303; 1931, idem, XXIV, p. 215, XXV, p. 77; 1934, idem, XXVII, p. 250; idem, XXVIII, p. 72; van Oort, 1931, Zool. Meded., Leiden, XIV, p. 16; Schüz, 1932, Vogelzug, III, pp. 33, 137, 174.

parts, especially the wing-coverts, and by a deeper bill. The wing and tail of *albididorsalis* are often somewhat longer than those of the American *maxima*.

The known range of this race, of which specimens had been taken at Landana and Loanda, made its occurrence near Banana certain. In late July, 1920, Dr. Schouteden collected one immature example there, and noted the species as common. *Sterna bergii* Lichtenstein is an allied species of South Africa and the Indian Ocean, and the specimen reported by Dubois as from the Mayombe was also *albididorsalis*. It is still in the Congo Museum.

Going northward along the Gaboon coast in February, 1915, I often saw these large terns sitting on buoys or logs in the harbors, but never in numbers. They were then in non-breeding or immature plumage. While some are present on the Cameroon and Congo coasts even during the northern summer, their nesting places remain to be discovered.

[*Hydroprogne caspia caspia* (Pallas)]

Sterna caspia PALLAS, 1770, Novi. Comm. Acad. Sci. Petrop., XIV, pt. 1, p. 582 (type locality: Caspian Sea).—? *Sterna caspia* JOHNSTON, 1884, 'River Congo,' p. 368 ("Stanley Pool to Bolobo").—*Hydroprogne tschegrava tschegrava* PETERS, 1934, 'Check-List,' II, p. 331.

The Caspian tern breeds locally in North America, Europe, Asia, and Australia,¹ also probably on the east and west coasts of Africa, and certainly on Lake Rudolf and in South Africa. It is also somewhat migratory, particularly in the northern parts of its range. It has been reported from a number of places along the West African coast, including the Gaboon and Walfish Bay, so it is to be expected at the mouth of the Congo.

Little importance can be attached to Sir Harry Johnston's statement that the Caspian tern is "common on the upper river." It is quite unknown there. He could scarcely have confused the skimmer with it, for *Rynchops* is listed on the same page.

Gelochelidon nilotica nilotica (Gmelin)

Sterna nilotica GMELIN, 1789, 'Syst. Nat.,' I, pt. 2, p. 606 (type locality: Egypt).—*Gelochelidon nilotica* LÖNNBERG, 1917, Arkiv f. Zool., X, No. 24, p. 4 (L. Edward). SCHOUTEDEN, 1918, Rev. Z. A., V, p. 214 (Katana). W. L. SCLATER, 1924, 'Syst. Av. Æth.,' pt. 1, p. 148.—*Gelochelidon nilotica nilotica* GROTE, 1930, Mitt. Zool. Mus. Berlin, XVI, p. 101 (L. Rukwa). BANNERMAN, 1931, 'Birds Trop. W. Afr.,' II, p. 244, Fig. 69.

¹ *H. c. strenua* (Gould) of Australia and New Zealand is the only race that can be separated from the typical form.

DISTRIBUTION OF THE SPECIES.—Southern North America to Argentine; western Europe and northwest Africa to Ceylon, southern Mongolia, and southern China, migrating southward in the Old World to equatorial Africa and the Sunda Islands; breeds also in Australia. Five races are admitted by Dr. Hartert, the typical one migrating south from the Palæarctic region to Sierra Leone, Lake Rukwa, the southern shore of Lake Victoria, and Zanzibar on the east coast.

Specimens have been taken on Lake Edward in January, May, June, and November, and on Lake Kivu in November; they doubtless come south by way of the Nile, and may also be expected on Lake Albert.

Subfamily Rynchopinæ

Rynchops flavirostris Vieillot

Rhyncops flavirostris VIEILLLOT, 1816, 'Nouv. Dict. Hist. Nat.,' III, p. 338 (type locality: "Australasie" erroneous; Senegal, *op. cit.*, 1819, XXIX, p. 283).—*Rhynchops niger* LEACH, 1818, in Tuckey, 'Narr. Exp. R. Zaire,' p. 408 (Lower Congo).—*Rhynchops flavirostris* HEUGLIN, 1873, 'Orn. Nordost-Afr.,' p. 163 (Congo). DUBOIS, 1886, Bull. Mus. Roy. Hist. Nat. Belg., IV, p. 150 (L. Tanganyika); 1905, Ann. Mus. Congo, Zool., I f. 1, p. 23 (Umani; Province Orientale). OUSTALET, 1893, Naturaliste, VII, p. 128 (Stanley Pool). LÖNNBERG, 1917, Arkiv f. Zool., X, No. 24, p. 3 (L. Edward). SCHOUTEDEN, 1918, Rev. Z. A., V, p. 214 (Kabare; Katana); 1920, idem, VII, p. 188 (Malela); 1926, idem, XIII, p. 188 (Malela). GYLDENSTOLPE, 1924, K. Svenska Vet. Akad. Handl., (3) I, No. 3, p. 302, Fig. 16 (mouth of Rutshuru R.). BLANCOU, 1933, Ois. R. F. O., (N. S.) III, p. 17 (lower Ubangi R.).—*Rhyncops* sp. JOHNSTON, 1884, 'The River Congo,' p. 368 (upper Congo R.).—*Rynchops flavirostris* REICHENOW, 1900, 'Vög. Afr.,' I, p. 76 ("Ubangi River"); 1911, 'Wiss. Ergeb. D. Z.-Afr. Exp.,' III, p. 238 (Usumbura). HARTERT, 1921, 'Vög. pal. Fauna,' II, p. 1754. SCHOUTEDEN, 1923, Rev. Z. A., XI, pp. 318, 390 (Basongo; Kabambaie; rivers of the Kasai; Kwamouth); 1924, idem, XII, pp. 263, 410 (Stanley Pool; Eala; Bikoro); 1925, idem, XIII, p. 7 (Mongende); 1933, Bull. C. Z. C., X, p. 32 (Buta); 1936, Ann. Mus. Congo, Zool., I, f. 2, p. 77 (Mahagi Port). BANNERMAN, 1931, 'Birds Trop. W. Afr.,' II, p. 280, Pl. ix, fig. 82.

SPECIMENS.—Zambi, ♂, June 28; ♀, June 22, 2 ♂ juv., June 25; 3 ♀ juv., June 24. Lukolela, 1 without sex or date.

ADULTS.—Despite the specific name, the bill is largely scarlet, changing to yellow on the distal third, so that the tips of both maxilla and mandible are yellow. Iris dark brown; feet red, claws blackish.

DISTRIBUTION.—Tropical Africa from Senegal and Upper Egypt south to the Orange River. In the Congo, skimmers are found only along the larger rivers and lakes, and were never seen by us along the Uelle River above Niangara, or the Ituri-Aruwimi down as far as Banalia. One specimen taken at Poko on the Bomokandi River was shown

me by a Belgian officer; in the Congo Museum there is another from Buta.

We first observed the species in fair numbers during our voyage up the Congo between Stanley Pool and Lisala in July, 1909, during a period of low water. The largest flock, numbering forty birds, was seen near Lisala; another of thirty, on a sand-bar near Irebu.

On my way down the Congo from Stanleyville to Leopoldville in December, 1914, when the water was extremely high, no skimmers were noticed at all. Again in 1930-31, near Lukolela, skimmers were common at both seasons of low water, yet wholly wanting at high water from September to December. I believe that like many other water-birds they will be found to perform short migrations, dependent upon the change of level in rivers, low water being much more favorable for their fishing and nesting.

During the middle of the day they are seen resting on bars and sandy beaches among the islands, but toward sundown they become much more active. Only then and shortly after sundown did I see them plowing the surface of the river with their blade-like mandibles. The head is held rather low, the wings beating slowly, always above the horizontal plane.¹ When not plowing, the bird flies more like a large tern, and the downward sweep of the wing-tips carries them well below the bird's body. One evening at 6:50 I watched a skimmer cutting the water with its bill and the wake showed as a white line by the moonlight. The call is usually a high-pitched "kip!" or "peep!" repeated several times, and occasionally prolonged with a tern-like trill. Perhaps because of the resemblance of the notes to those of *Xiphidiopterus*, as well as a certain similarity in color, the Mobangi tribe near Lukolela use the same word, "Ndawle," as the name of both skimmer and lapwing.

I suppose that these skimmers nest along the middle Congo above Stanley Pool toward July, and they certainly do so in March. Near Lukolela we found a number of nests on a sand-bar on March 22, 1931, with sets of two and of three eggs. These were laid in round depressions scooped in the sand, and about them were radiating grooves where the incubating birds had rested their long beaks. Those not occupied with incubation were apt to sit in groups and to take wing in a body. When disturbed, all the members of a colony will fly about in a compact flock perhaps of twenty-five to thirty or more, displaying perfect coördination.

¹ See Young, 1928, *Ibis*, p. 767, Fig. 18, for a diagram showing *R. cinerascens* thus engaged. A theory as to the function of the oblique ridges on the mandible is offered by Schildmacher, 1931, *O. Mb.*, pp. 37-41.

Once I watched two skimmers hotly pursuing a peregrine falcon, darting at it from above!

The eggs are pale buff, freely spotted with warm dark brown. Some of the spots are clouded over and more grayish. Dimensions of five eggs (two sets) from the vicinity of Lukolela, 37–41.5 mm. \times 28–29.2.

On the lower Congo, near Zambi, in June, 1915, Lang found the skimmers breeding on four or five small islands. Each colony consisted of about five pairs, each with two eggs or young. By June 25, many young were rapidly developing their juvenal plumage. Breeding stations of *Rynchops flavirostris* are scattered widely over the African continent, from the Senegal River, the Niger, and Dongola south at least to the Zambesi. In Sudanese latitudes and on Lake Rudolf it nests in April and May; in Tanganyika Territory toward September; and along the Zambesi and Kafue Rivers in September and October, but also in June.

On Lake Edward skimmers have been collected in June and November. At the mouths of the Rutshuru and Ruindi rivers, in April, Count Gyldenstolpe and Léon Lippens both saw hundreds frequenting the sand-banks, though they were not nesting there. When I visited the same locality in May, 1927, the water of the lake was high, covering these banks, and not one skimmer was noticed during a stay of four days. Along the upper Lualaba, in 1926, we watched skimmers from the steamer during the period of low water. Near Kadia, August 9, there were three; and above Kiabo, the following day, first two and then a flock of twenty-five. Flying buoyantly with very slow wing-beats, they would sometimes utter an excited gull-like call: "kek-kek-kek—."

There can be no doubt that skimmers capture fish. In the stomach of an adult *R. flavirostris* Lang found a fish 8 cm. long. I too have watched the American *R. nigra* come to its nest with thin eel-like fish in its beak.

ORDER COLUMBIFORMES

FAMILY Pteroclidæ. SAND-GROUSE

KEY TO THE SPECIES OF SAND-GROUSE FOUND NEAR THE BORDERS OF THE CONGO¹

- 1.—Median pair of rectrices with long narrow tips which exceed the next pair of tail-feathers by at least 17 mm. and often by 40 mm. or more; adult male with no bars across forehead and a single black band across upper breast; female with chest flecked with dark brown. *Pterocles exustus*.

¹ It seems better to unite all the African species in one genus, *Pterocles*, rather than to recognize the genera *Eremialector* or *Nyctiperdix*. For a full discussion of the characters see Bowen, 1927. A. M. Nov., No. 273.

- Median pair of rectrices little if at all longer than next pair, though the tips may be slightly pointed. 2.
- 2.—Black and white bars across forehead. 3.
No black or white bars across forehead. 4.
- 3.—Upper breast crossed by a rufous band, below this by a white band, and sometimes by a third blackish band. *Pterocles quadricinctus* ♂.
Upper breast crossed by a white band, and below this a distinct black band. *Pterocles bicinctus* ♂.
- 4.—Throat and cheeks whitish washed with ochreous and enclosed by a broad black crescent; lower underparts dark-colored but not barred; wing-length more than 200 mm. *Pterocles gutturalis* ♂.
Throat not enclosed by a black crescent; lower underparts barred with blackish. 5.
- 5.—Wing-length exceeding 195 mm.; under tail-coverts barred with rufous and black, or uniform rufous. *Pterocles gutturalis* ♀.
Wing-length less than 190 mm.; under tail-coverts barred with buff and black. 6.
- 6.—Fore-neck and upper chest uniform buff, or with only scattered blackish bars. *Pterocles quadricinctus* ♀.
Fore-neck and chest regularly barred with blackish on a buff ground. *Pterocles bicinctus* ♀.

***Pterocles gutturalis tanganjicæ* Reichenow**

Pterocles gutturalis tanganjicæ REICHENOW, 1919, J. f. O., p. 226 (type locality: country east of L. Tanganyika).—*Pterocles gutturalis* DUBOIS, 1886, Bull. Mus. Roy. Hist. Nat. Belg., IV, p. 149 (L. Tanganyika); 1905, Ann. Mus. Congo, Zool., I, f. 1, p. 27. SHELLEY, 1894, Ibis, p. 24 (Chisila R. plains, near L. Moero). REICHENOW, 1900, 'Vög. Afr.', I, p. 305 (L. Moero).

DISTRIBUTION OF THE SPECIES.—Eastern Africa from Eritrea to the Orange River. Of the three subspecies recognized, *P. g. gutturalis* (Smith) ranges from western Transvaal and Bechuanaland north to Nyasaland and the Kafue River. *P. g. tanganjicæ* occupies southwestern Tanganyika Territory, and apparently extends to the district about Lake Moero, though not yet reported from the Katanga proper. Storms' specimen from Tanganyika may have been taken on the eastern side of the lake, though the majority of his birds came from the vicinity of Mpala. The status of this sand-grouse as a Congo bird is therefore somewhat uncertain. *P. g. saturatior* (Hartert) continues the range of the species through the drier parts of East Africa to Abyssinia and Eritrea.

[*Pterocles exustus emini* (Reichenow)]

Pteroclorus exustus emini REICHENOW, 1919, J. f. O., p. 226 (type locality: N. W. of Victoria Nyanza).

The chestnut-bellied sand-grouse, as a species, ranges from Senegal across the Sudan to Egypt and Abyssinia, and south in East Africa to

the Kilimanjaro district; also through Somaliland and Arabia to India. Five races are listed in Selater's 'Systema,' but there is little likelihood of the typical Sudanese race occurring along the northern border of the Congo. *P. e. emini* was described from a single female taken by Emin and Stuhlmann in "the region northwest of Lake Victoria," supposed to differ from the typical form in the paler, sandier ground-color of its upperparts and narrower rufous bars on the abdomen. The status of the race is extremely uncertain.

Little is known of the occurrence of the species near the type locality of *emini*, perhaps it will be found in the dry areas of Ankole or near Lake George, not far from the Congo border. But Sir Frederick Jackson did not mention any sand-grouse as occurring in that part of Uganda.

[*Pterocles bicinctus multicolor* Hartert]

Pterocles bicinctus multicolor HARTERT, 1908, B. B. O. C., XXI, p. 53 (type locality: Rustenburg, Transvaal).—*Pterocles bicinctus* NEAVE, 1907, Mem. Pro. Manchester Lit. Phil. Soc., LI, No. 10, p. 7 (near Petauke; Loangwa R.); 1910, Ibis, p. 86 (Loangwa Valley).—*Eremialector bicinctus multicolor* W. L. SCLATER, 1924, 'Syst. Av. Æth.,' pt. 1, p. 159.

The double-banded sand-grouse ranges from Little Namaqualand and the Transvaal north to Benguella and to the Loangwa Valley in northeastern Rhodesia. The typical race occupies the western portion of the range, north to Benguella; and *N. b. multicolor* the countries from the Transvaal to the Loangwa Valley. It is doubtful whether the species reaches any part of the Katanga district; Neave regarded it as confined to the Loangwa Valley, where it was not uncommon, in pairs, in "Mopani" flats and sandy areas near the larger rivers.

[*Pterocles quadricinctus lowei* Grant]

Pterocles quadricinctus lowei C. GRANT, 1914, B. B. O. C., XXXV, p. 19 (type locality: Renk, White Nile).—*Pterocles quadricinctus* O.-GRANT, 1893, 'Cat. Birds Brit. Mus.,' XXII, p. 32 (Lado).

The four-banded sand-grouse, divisible in two races, extends from Senegal to the region of Lake Chad, the Upper Nile Valley, and the northern part of Uganda. Its eastern form, *lowei*, has been found in the Shari River region, at Raffali rapids in the Bahr-el-Ghazal province, and at Lado on the Bahr-el-Jebel; but it can only occur accidentally, if at all, along the northern Congo border. There are no records thus far.

FAMILY *Columbidæ*. DOVES, PIGEONS

KEY TO THE CONGO GENERA OF COLUMBIDÆ

- 1.—Front of metatarsus feathered for more than half its length, plumage largely greenish or yellow.....VINAGO, p. 173.
Front of metatarsus not feathered for half its length, or only in exceptional cases; plumage not mainly green or yellow.....2.
- 2.—Upper surface of wings with white spots on many of the coverts, or with a few metallic spots on inner secondaries and their coverts.....3.
Upper surface of wings without white spots or metallic spots, though some or many of the coverts may be edged with pale gray or rufous.....7.
- 3.—White spots on upper wing-coverts, wing more than 200 mm. long.....COLUMBA, p. 167.
No white spots on upper wing-coverts, but a few metallic blue, green, or coppery spots on inner secondaries and some of their coverts; wing less than 160 mm. long.....4.
- 4.—Outermost primary strikingly narrowed toward tip; breast white or gray; but tail rounded, not graduated, and not so long as wing. TYMPANISTRIA, p. 150.
Outermost primary not markedly narrowed, its inner web only very slightly emarginate if at all; breast light brownish vinaceous or rufous, or if gray or white then tail is graduated and much longer than wing.....5.
- 5.—Tail graduated and median rectrices prolonged, much longer than wing; breast white or gray, throat and fore-neck in adult male black.....ÆNA, p. 146.
Tail not longer than wing; breast brownish vinaceous or rufous; head largely bluish or blue-gray.....6.
- 6.—Wing exceeding 125 mm. in length; body-plumage rufous above and below.....CALOPELIA, p. 151.
Wing less than 120 mm. long; back duller and grayer or browner than breast, which is somewhat vinaceous.....TURTUR, p. 147.
- 7.—Hind-neck glossed with metallic green, lilac, or coppery, but never crossed by a black collar.....8.
Hind-neck without metallic gloss, with or without black collar, and occasionally with pointed feathers.....9.
- 8.—Metatarsus approximately as long as middle toe with claw; feathering of tibia not extending to upper end of metatarsus.....APLOPELIA, p. 164.
Metatarsus shorter than middle toe with claw, and its upper portion somewhat feathered in front.....TURTURÆNA, p. 166.
- 9.—Neck with a rather extensive spotted patch of bifurcate feathers (most visible on its front and sides), which are black basally and tipped with vinaceous rufous.....STIGMATOPELIA, p. 153.
No bifurcate feathers on neck, which is of uniform coloration, or with pointed feathers tipped with lavender or gray on hind-neck, or with a black or black-and-white collar behind, sometimes interrupted in mid-line.....10.
- 10.—Wing exceeding 195 mm. in length, no distinct collar, though feathers of hind-neck are sometimes pointed.....COLUMBA, p. 167.
Wing less than 190 mm. long; a black collar on hind-neck, sometimes interrupted in mid-line, and its feathers sometimes tipped with light gray or white.....STREPTOPELIA, p. 155.

Subfamily Columbinae

Oena capensis capensis (Linnæus)

Columba capensis LINNÆUS, 1766, 'Syst. Nat.,' 12th Ed., I, p. 286 (type locality: Cape of Good Hope, ex Brisson).—*Oena capensis* DUBOIS, 1886, Bull. Mus. Roy. Hist. Nat. Belg., IV, p. 149 (region of L. Tanganyika); 1905, Ann. Mus. Congo, Zool., I, f. 1, p. 27 (Karema). SCHALOW, 1886, J. f. O., p. 431 (Lulenge R.). MATSCHIE, 1887, J. f. O., p. 147. PETIT, 1899, Mem. Soc. Zool. France, XII, p. 95 (Mayumba; Landana; Boma). REICHENOW, 1901, 'Vög. Afr.,' I, p. 429. NEAVE, 1910, Ibis, p. 87 (Katanga distr.). SCLATER AND M.-PRAED, 1920, Ibis, p. 836 (Meridi). DE RIEMAECKER, 1927, Rev. Z. A., XIV, p. 268 (between Elisabethville and Kafubu R.). SCHOUTEDEN, 1934, Bull. C. Z. C., IX, p. 9 (Tembwe); 1935, idem, XII, p. 75 (Buta); 1936, Ann. Mus. Congo, Zool., I, f. 2, p. 79 (Kabalo).—*Oena capensis capensis* BANNERMAN, 1931, 'Birds Trop. W. Afr.,' II, p. 355, Pl. XIII.

SPECIMEN.—Faradje, ♂, Mar. 13.

ADULT MALE.—Iris dark brown, eyelids grayish; basal half of bill dark red, outer half orange; feet purplish red.

DISTRIBUTION OF THE SPECIES.—From Senegal, Asben, Berber Province, and southern Arabia, south to the Cape Province; also on Socotra and Madagascar. Unknown, however, in the heavy forests of western and central Africa. There are no racial differences among birds from the African mainland, only the Madagascar *O. c. aliena* Bangs being separable.

The Namaqua dove is known from several border districts of the Belgian Congo: the Uelle, Tanganyika, and Upper Katanga; and it must occur near the Congo mouth, since it ranges north to the Gaboon. It may also be expected around the shores of Lake Edward, for I have collected one between Kasindi and Katwe.

In the Katanga it is common, frequenting native gardens, in Marungu apparently less so. In the Uelle our single example was killed by a native chief, who found it in his village feeding on *Eleusine* millet. The record from Buta is altogether exceptional.

The voice is a feeble cooing, so low as almost to pass unnoticed. It resembles the weak initial notes of *Turtur afer*, carried no further.¹ The bird keeps very much to low bushes and the ground.

Reproduction takes place largely during the dry season, and the nest is a frail structure of twigs, fine rootlets, or grass, placed not far above the ground. The two elliptical eggs are cream-colored, 19–21.5 mm. × 14.5–15.5.

¹ Bates, 1934, Ibis, p. 221.

KEY TO THE SPECIES OF **TURTUR**

- 1.—Metallic spots on the wings green.....*T. chalcospilos*.
Metallic spots on the upper surface of the wings deep blue or violet.....2.
- 2.—Bill blackish; chest pale pinkish gray; upper tail-coverts gray, the longest ones tipped with black.....*T. abyssinicus*.
Bill pink or orange-red with darker reddish base, fading to dull yellow and brown in dried skins; chest vinous buff; upper tail-coverts brown, the longest ones tipped with black.....*T. afer*.

Turtur afer kilimensis (Mearns)

Chalcopelia afra kilimensis MEARNs, 1915, Proc. U. S. Nat. Mus., XLVIII, p. 383 (type locality: Kilimanjaro, 5000 ft.).—*Chalcopelia afra* JOHNSTON, 1884, 'River Congo,' p. 368 (Congo R. up to Bolobo).—*Chalcopelia afra* DUBOIS, 1886, Bull. Mus. Roy. Hist. Nat. Belg., IV, p. 149 (L. Tanganyika); 1905, Ann. Mus. Congo, Zool., I, f. 1, p. 27 (Lower Congo; Umani; Karema). SHELLEY, 1890, Ibis, p. 169 (Yambuya), SHARPE, 1890, in Jameson, 'Story of Rear Column,' p. 421. OUSTALET, 1893, Naturaliste, VII, p. 128. EMIN, 1894, J. f. O., p. 165 (old Irumu); 1919, in Stuhlmann, 'Tageb. Emin Pascha,' II, p. 495 (Tomaya). REICHENOW, 1901, 'Vög. Afr.,' I, p. 426 (in part. "Ubangi"; N. W. of L. Edward; Irumu); 1911, 'Wiss. Ergeb. D. Z.-Afr. Exp.,' III, p. 256 (Mugarura Is. in L. Kivu; Beni; Lenda R.; Kisenyi; L. Kivu; Ruzizi Plain); 1923, Mitt. Zool. Mus. Hamburg, XL, p. 63 (Lupungu, in Lomami distr.). LÖNNBERG, 1907, Arkiv f. Zool., III, No. 21, p. 4 (Mukimbungu); 1917, idem, X, No. 24, p. 11 (Rutshuru). O.-GRANT, 1910, Tr. Z. S. Lond., XIX, p. 450 (Mubuku Valley, 5000 ft.). NEAVE, 1910, Ibis, p. 88 (Dikulwe R.). SASSI, 1912, Ann. Naturh. Hofmus. Wien, XXVI, p. 354 (Urundi; Usumbura; Rutshuru Plain; Kasindi). SCHOUTEDEN, 1914, Rev. Z. A., III, p. 262. (Kilo); 1918, idem, V, p. 228 (Zambo; Katalanga; Rutshuru; confluence of the Talia and Semliki; Baraka); 1933, Bull. C. Z. C., X, p. 42. SCHUBOTZ, 1921, 'Tageb. Emin Pascha,' VI, p. 69 (Tingasi; Mbiambana; Tomaya). GROMIER, 1936, 'Vie Animaux Sauvages Afr.,' p. 289.—*Calcopelia afra* SALVADORI, 1907, Boll. Mus. Zool. Anat. Torino, XXII, No. 570, p. 8 (near Lukonzolwa).—*Turtur afer sclateri* ROTHSCILD, 1917, B. B. O. C., XXXVIII, p. 25 (type locality: Entebbe, Uganda). GYLDENSTOLPE, 1924, K. Svenska Vet. Akad. Handl., (3) I, No. 3, p. 312 (Goma).—*Turtur afra* subsp. ? SCLATER AND M.-PRAED, 1920, Ibis, p. 836 (Meridi).—*Chalcopeleia afra* SCHUBOTZ, 1921, 'Tageb. Emin Pascha,' VI, p. 256 (Mbiambana).—*Turtur afra sclateri* BANNERMAN, 1922, Rev. Z. A., X, p. 197 (N. Belgian Congo). SCHOUTEDEN, 1926, Rev. Z. A., XIII, p. 188, (Moanda; Kifuku on Banana Bay).—*Turtur afer kilimensis* W. L. SCLATER, 1922, B. B. O. C., XLII, p. 118 (Angola E. to Uganda). FRIEDMANN, 1930, Bull. 153, U. S. Nat. Mus., p. 239 (E. Belgian Congo). BANNERMAN, 1931, 'Birds Trop. W. Afr.,' II, p. 361, Fig. 106 (N. and S. E. Belgian Congo; Ruwenzori). SCHOUTEDEN, 1932, Rev. Z. A., XXII, p. 130 (Lulenga); 1936, Ann. Mus. Congo, Zool., I, f. 2, p. 77 (Mahagi Port; Faradje; Buta; Panga; Poko; Koteli; Medje). STONE, 1936, Proc. Acad. Nat. Sci. Phila., LXXXVIII, p. 558 (Ekibondo).—*Turtur afra kilimensis* SCHOUTEDEN, 1923, Rev. Z. A., XI, pp. 318, 390 (Tshisika; Tshikapa; Kamaiembi; Luebo; Kwamouth); 1924, idem, XII, pp. 263, 411 (Cata-racts distr.; Eala); 1925, idem, XIII, p. 7 (Kunungu); 1926, idem, XIII, p. 188 (Mayombe; Makaia-Ntete).—*Turtur afer afer* BATES, 1928, B. B. O. C., XLIX, p. 35.

SPECIMENS.—Leopoldville, ♀, July 2; ♀ im., July 10. Kwamouth, ♂, July 14. Ikengo, ♂, July 20. Banalia, ♂, Sept. 20. Avakubi, 2 ♂, Nov. 17, 23. Bafwabaka, ♂, Jan. 3. Medje, ♂, May 22. Faradje, ♂, May 14; ♀, Mar. 11.

ADULTS.—Iris dark brown, eyelids dark purplish gray; bill dark purplish red at base, pink or orange-red toward tip; feet purplish red, claws dusky.

DISTRIBUTION OF THE SPECIES.—Senegal to southern Abyssinia, Angola, Southern Rhodesia, Pemba Island and Zanzibar. *T. a. afer* (Linnæus) is found from Senegal to Sierra Leone. The more deeply colored *kilimensis* occupies the remainder of the range except the Abyssinian highland, where there is another pale race, *T. a. mearnsi* Sclater and M.-Praed.

In the humid area of western and central Africa *Turtur afer* is the common species of the genus, though its range overlaps that of *T. chalcospilos* in eastern Africa, the Katanga, and Angola. *T. a. kilimensis* is found throughout the Belgian Congo, except on the high mountains. I did not notice it above 5000 feet on Ruwenzori, but in the Kivu district and Marungu it ascends to 6000 feet.

Clearings are inhabited by it in heavy forest country, while *Tympanistria* favors the denser second growth. In the savanna districts *Turtur afer* frequents the more open brush, *Tympanistria* the patches of woods. The cooing of the blue-spotted dove is a most familiar sound, the syllables numbering fourteen to sixteen or more. The first coo is rather loud, the next four very low, the sixth and seventh doubled. Those following are regularly spaced, dying gradually away. There may be some variation in these details, but the faint coos followed by doubled ones are characteristic.

The food, consisting mainly of seeds, is sought on the ground; and these doves are often flushed along roads. Nesting seems to be carried on mainly during the dry season; and the nests are rather small and flat, placed in bushes or low trees. One was found at Faradje on January 26, in a bush; another at Lukolela on March 1, on a small tree leaning over the river bank. The two eggs are decidedly buffy, and measure 22–25.1 mm. \times 17–18.3.¹

[*Turtur abyssinicus* (Sharpe)]

Chalcopelia abyssinica SHARPE, 1902, B. B. O. C. XII, p. 83 (type locality: Kokai, Bogosland).

The blue-spotted dove with blackish bill, and plumage much lighter and grayer than *T. afer*, ranges across the drier parts of the Sudan from

¹ Pitman, 1930, Ool. Rec., X, p. 17.

Senegal to the White Nile, northern Abyssinia, and Eritrea. In a way, it represents geographically the green-spotted *T. chalcospilos* of eastern and southern Africa. The race *delicatulus* Sharpe,¹ to which specimens from the White Nile westward have usually been referred, is probably not valid.²

There are no Congo records of *abyssinicus*, but it has been taken on the Shari River, at Wau in the Bahr-el-Ghazal, and at Gondokoro, so it should be looked for along the northeastern Congo border and especially at the north end of Lake Albert.

Turtur chalcospilos chalcospilos (Wagler)

Columba chalcospilos WAGLER, 1827, 'Syst. Av.,' *Columba*, species 83, p. 258 (type locality: "Terra Caffrorum," i.e., eastern Cape Province).—*Chalcopelia chalcospilos* DUBOIS, 1886, Bull. Mus. Roy. Hist. Nat. Belg., IV, p. 149 (L. Tanganyika). NEAVE, 1910, Ibis, p. 88 (Dikulwe R.; Bunkeya R.). PAGET-WILKES, 1926, S. Afr. Journ. Nat. Hist., VI, p. 69 (Upper Kafue R. near Ndola).—? *Chalcopelia afra* MATSCHIE, 1887, J. f. O., p. 147 (Mpala). SCHALOW, 1887, J. f. O., p. 228 (W. of L. Tanganyika). REICHENOW, 1901 'Vög. Afr.,' I, p. 426 (in part. Mpala).—*Chalcopelia afra* var. *chalcospilos* DUBOIS, 1905, Ann. Mus. Congo, Zool., I, f. 1, p. 27 (Mpala).—*Chalcopelia chalcospila chalcospila* OBERHOLSER, 1905, Proc. U. S. Nat. Mus., XXVIII, p. 846 (Landana; Massabe).—*Chalcopelia chalcospilus* SALVADORI, 1907, Boll. Mus. Zool. Anat. Torino, XXII, No. 570, p. 8 (near Lukonzolwa).—*Chalcopelia afer* MOURITZ, 1914, Ibis, p. 36 (Musoshi).—*Turtur chalcospilos chalcospilos* W. L. SCLATER, 1924, 'Syst. Av. Æth.,' pt. 1, p. 172. SCHOUTEDEN, 1932, Rev. Z. A., XXII, p. 130 (Ngoma).—*Chalcopelia afra chalcospilos* DE RIEMAECKER, 1927, Rev. Z. A., XIV, p. 268 (between Elisabethville and Kafubu R.).—*Turtur chalcospilos* SCHOUTEDEN, 1930, Rev. Z. A., XVIII, p. 281 (Kafubu R.).

ADULTS.—Iris dark brown; bill dark purplish, blackish toward tip; feet dark purplish red.

DISTRIBUTION OF THE SPECIES.—Cape Province north to the Gaboon coast, Angola, Katanga, Kenya Colony, Somaliland, and Abyssinia. Of the many races proposed, only the pale *T. c. volkmanni* (Reichenow) of dry Southwest Africa is readily separable from the typical form. Angolan specimens, however, are slightly lighter in color than a skin from Natal; and if *T. c. erlangeri* (Reichenow)³ is valid, this is the form occurring in the southern Congo.

The green-spotted dove must be found near the coast at the Congo mouth, but no specimen is yet known from the Kasai district. Near Elisabethville *chalcospilos* and *afer* both occur; and we have skins of *chalcospilos* from Kasoko and Lake Suse in Marungu, as well as *afer* from

¹ 1902, B. P. O. C., XII, p. 84 (Goz-Abu-Gumar, White Nile).

² Bates, 1934, Ibis, p. 220.

³ 1902, J. f. O., p. 134 (Angola).

Moba and Ketendwe. Both species are found on the north shore of Lake Kivu, but it is very doubtful whether *chalcospilos* reaches Lake Albert.¹

The voice of the green-spotted dove is exceedingly similar to that of *T. afer*, but in Kenya Colony I noted that *chalcospilos* gave first two soft coos. After a slight pause came a third and a fourth, nearly double, uttered slowly, as was the fifth. The sixth to eighth became louder and more confluent, then followed another pause. The ninth and tenth are almost run together, and the final series of about fifteen coos dies gradually away.

It seems probable that the dry season is preferred for nesting. The two eggs are creamy white or ivory-color, 21-25 mm. \times 16.5-19. The nest is placed in a bush or low tree, often no higher than two yards.

***Tympanistria tympanistria fraseri* Bonaparte**

Tympanistria fraseri BONAPARTE, 1854, 'Consp. Genera Av.,' II, p. 67 (type locality: Fernando Po).—*Tympanistria virgo* HARTLAUB, 1886, Ibis, p. 2 (type locality: Djanda, Lado distr.). 1887, Zool. Jahrb., II, p. 331.—*Peristera tympanistria* MATSCHIE, 1887, J. f. O., p. 147 (Mpala).—*Tympanistria tympanistria* EMIN, 1894, J. f. O., p. 165 (old Irumu). FLOWER, 1894, P. Z. S. Lond., p. 602 (Ituri near Urumbi). REICHENOW, 1901, 'Vög. Afr.,' I, p. 424 (Nyangabo); 1911, 'Wiss. Ergeb. D. Z.-Afr. Exp.,' III, p. 255 (Kisenyi). LÖNNBERG, 1907, Arkiv f. Zool., III, No. 21, p. 4 (Mukimbungu); 1917, idem, X, No. 24, p. 11 (Rutshuru). O.-GRANT, 1910, Tr. Z. S. Lond., XIX, p. 450 (Mubuku Valley, Ruwenzori, to 7000 ft.). SASSI, 1912, Ann. Naturh. Hofmus. Wien, XXVI, p. 353 (forest W. of Tanganyika; Rutshuru Plain; Beni; Mawambi; Ukaika). SCHOUTEDEN, 1914, Rev. Z. A., III, p. 262 (Kilo); 1918, idem, V, p. 227 (S. E. Ruwenzori; Bobandana); 1920, idem, VII, p. 189 (Temvo, in Mayombe).—*Tympanistria bicolor* DUBOIS, 1905, Ann. Mus. Congo, Zool., I, f. 1, p. 27 (Kisantu).—*Tympanistria tympanistria fraseri* HARTERT, 1918, Nov. Zool., XXV, p. 435 (Baraka; Ituri forest). BANNERMAN, 1922, Rev. Z. A., X, p. 195 (N. Belgian Congo); 1931, 'Birds Trop. W. Afr.,' II, p. 357 Fig. 105. SCHOUTEDEN, 1923, Rev. Z. A., XI, p. 319 (Macaco; Ngombe in Kasai); 1926, idem, XIII, p. 188 (Makaia-Ntete in Mayombe); 1932, idem, XXII, p. 130 (Bobandana); 1933, idem, XXII, p. 380 (Nyundo); 1936, Ann. Mus. Congo, Zool., I, f. 2, p. 77 (Buta; Poko). GYLDENSTOLPE, 1924, K. Svenska Vet. Akad. Handl., (3) I, No. 3, p. 313 (Kartushi; Kampi near Mambuti). FRIEDMANN, 1930, 'Afr. Rep. Liberia Belg. Congo,' II, p. 753 (Kibati); 1930, Bull. 153, U. S. Nat. Mus., p. 237 (Congo forest).

SPECIMENS.—Stanleyville, ♀, Aug. 11. Avakubi, 2 ♂, Aug. 18, Sept. 30; ♀, Oct. 17; ♂ juv., Nov. 25. Gamangui, 2 ♂, Feb. 13, 19; ♀, Feb. 19. Babonde, ♂, July 16. Medje, 2 ♂, Apr. 5, May 15; ♀, Aug. 31.

ADULTS OF BOTH SEXES.—Iris dark brown, eyelids dark purplish gray; bill dark brown, tinged with red toward base; feet dark purplish red, claws dark brown.

¹ See, however, Schubotz, 1921, Tageb. Emin Pascha, VI, p. 70.

DISTRIBUTION OF THE SPECIES.—Nearly all Africa south of the Sahara, from Sierra Leone, Lake Chad, and Abyssinia south to eastern Cape Province. Apparently it is lacking in the eastern Sudan, and in dry Southwest Africa. *T. t. tympanistria* (Temminck and Knip) of South Africa is usually stated to be replaced north of the Zambesi by *T. t. fraseri*.

The whole of the Belgian Congo is thus included in its range, but in savanna country like that about Faradje the bird is comparatively scarce. It ascends the forested mountains of the eastern border to about 7000 feet, yet there are no records from the more open highlands of Marungu and Upper Katanga.

To me the difference between *tympanistria* and *fraseri* seems very slight. *T. virgo* Hartlaub was based on a specimen without wing-spots. These are lacking in the barred juvenal plumage, which is so characteristic of *Æna*, *Turtur*, *Tympanistria*, and *Calopelia*.

In savanna country the tambourine dove is restricted to patches of forest; in forest country it keeps very much to dense second growth. In the morning and late afternoon its soft cooing notes are frequently heard. One to which I listened carefully began with four or five short coos, repeated slowly, and followed by a noticeable pause. Next came three rather rapid ones, another short stop, and then a triple "c - c - coo" which was followed by a declining series of fifteen to twenty short notes, increasing in rapidity almost to a trill.

Breeding must go on, in the forest area, at all seasons, even in the drier periods. A nest at Avakubi, August 18, was in a small tree at the edge of the forest, eleven feet up. Sets are of two eggs, ivory-white to light brownish-cream, 22.7-25.3 mm. \times 17.3-19.4.

In the crops of three birds I found rice, small fruits, and hard black seeds. On west Ruwenzori they were eating castor-oil seeds, as Ayres also noted in South Africa.

***Calopelia brehmeri brehmeri* (Hartlaub)**

Chalopelia brehmeri HARTLAUB, 1865, J. f. O., p. 97; 1865, Ibis, p. 236 (type locality: Gaboon). OUSTALET, 1893, Naturaliste, VII, p. 128.—*Chaleopelia puella* JOHNSTON, 1884, 'River Congo,' p. 368 (Congo R. below Bolobo).—*Calopelia brehmeri* REICHENOW, 1901, 'Vög. Afr.,' I, p. 424 (Landana; "Ubangi R.'). SASSI, 1912, Ann. Naturh. Hofmus. Wien, XXVI, p. 354 (Beni-Mawambi; Mawambi; Ukaika; Mawambi-Irumu). SCHOUTEDEN, 1918, Rev. Z. A., V, p. 228.—*Calopelia puella brehmeri* BANNERMAN, 1922, Rev. Z. A., X, p. 197 (Uelle distr.); 1931, 'Birds Trop. W. Afr.,' II, p. 369 (Poko). W. L. SCLATER, 1924, 'Syst. Av. Æth.,' pt. 1, p. 173 (Uelle R.). SCHOUTEDEN, 1925, Rev. Z. A., XIII, p. 7 (Kunungu); 1926, idem,

XIII, p. 189 (Lundu in Upper Mayombe); 1936 Ann. Mus. Congo, Zool., I, f.2, p. 77 (Buta; Medje; Bondo Mabe; Kotili; Nava R.; Poko). CHAPIN, 1927, Bull. A. M. N. H., LIII, p. 477. BOWEN, 1933, Ecology, XIV, p. 249, Fig. 2C (Congo forest).—STONE, 1936, Proc. Acad. Nat. Sci. Phila., LXXXVIII, p. 558 (Saidi in Ituri).—*Calopelia puella* SCHOUTEDEN, 1935, Bull. C. Z. C., XII, p. 35 (Lukolela).

SPECIMENS.—Avakubi, ♂, Aug. 5; ♀, Apr. 4; ♂ im., Aug. 26; ♀ im., Aug. 13. Bafwabaka, ♂, July 26. Gamangui, 3 ♂, Feb. 8, 12, 21; 5 ♀, Feb. 2, 6, 7, 13, 16. Medje, ♀, Sept. 1; ♂ juv., ♀ juv., Aug. 30.

ADULTS OF BOTH SEXES.—Iris dark brown, eyelids very dark gray; basal half of bill dark purplish red, distal half greenish; feet purplish red, claws brownish gray.

All the adult specimens have the wing-spots of a coppery lustre, except a female from Medje, which shows spots of that color on the left wing, but much greener ones on the right wing. In one young male the spots are brassy-green.

Remnants of the juvenal plumage show that it is largely bright rufous, even on crown and cheeks, the body barred with blackish, the remiges with rufous tips, and dusky subterminal bars on secondaries. There are no metallic wing-spots, and the inner rectrices show blackish markings.

DISTRIBUTION OF THE SPECIES.—Forests from Sierra Leone to the Lower Congo and the eastern border of the Congo forest. Never in mountain forests. *C. b. infelix* (Peters)¹ has metallic green spots on the wings, and occupies Upper Guinea, extending to the coast of Cameroon. In the interior of Cameroon and in the Gaboon it is replaced by *C. b. brehmeri*, with coppery wing-spots. Where the races meet there seems to be an indication of intergradation in the color of these spots.² *C. b. brehmeri* has been found from the coast of the Gaboon and Portuguese Congo, as well as the River Ja in the Cameroon, eastward across the Congo forest to the Bomokandi River and the Semliki Valley. On the south it has been collected in the Mayombe forest and at Kunungu near Bolobo. It must reach the Sankuru River, at least, and the forest of the Manyema district.

A true forest dove, *Calopelia brehmeri* is never seen in clearings, and is only seldom found in tall second growth. Even in the Ituri forest it would be considered rare if it were not for its distinctive cooing. This cannot be confused with the voices of *Turtur* or *Tympanistria*, for the series of coos is so much louder and more abrupt that they may better be written "coop!" They have something liquid in their quality, suggesting the reiterated "ploop!" of water being poured from some gigantic carafe. The opening syllables are slowly uttered and loud, the others gradually die away, and there is little irregularity in their spacing.

¹ *Turtur brehmeri infelix* PETERS, 1937, 'Check-List,' III, p. 113, new name for *Columba (Perisera) puella* SCHLEGEL, 1848, nec *Columba puella* Lesson, 1827.

² See Bates, 1911, Ibis, p. 489; 1930, 'Handbook Birds W. Afr.,' p. 19.

These calls are always given from a tree; on the ground the birds are silent and difficult to see.

The nest may be placed relatively near the ground, for one near Avakubi (September 27) was only ten feet up in a small tree. It was flat-tish, built of dry twigs and rootlets, containing a single young squab. At Medje (August 30) a brood of two was brought in by natives. In the northern Ituri forest breeding seems to go on from July to October, at least. Likewise at Lukolela, the season of reproduction seemed to be the rainy part of the year, and little cooing was heard in the dry period. A female taken there on January 15, was about to lay an egg with rather soft shell, already slightly buff-colored, measuring 27×19.6 mm. Bates gave the dimensions of an egg as 27.5×21 mm. One which I found at Angumu on July 15, 1937, was olive-buff, 27.9×21.2 mm.

While many of these doves were snared on the ground near broken pieces of termite nest, no insects were found in seven examinations of crops and stomachs. All the birds had swallowed seeds of varying size, some quite hard. Two had also eaten slugs, three in all; and small stones or sand were found in two gizzards.

Stigmatopelia senegalensis æquatorialis (Erlanger)

Turtur senegalensis æquatorialis ERLANGER, 1905, O. Mb., p. 98 (type locality: Menaballa and Harar, Abyssinia).—*Columba* LEACH, 1818, in Tuckey, 'Narr. Exp. R. Zaire,' p. 408 (Lower Congo?).—*Turtur senegalensis* HARTLAUB, 1857, 'Syst. Orn. Westafr.,' p. 195 ("Congo"). DUBOIS, 1886, Bull. Mus. Roy. Hist. Nat. Belg., IV, p. 149 (L. Tanganyika); 1905, Ann. Mus. Congo, Zool., I, f. 1, p. 27 (Tanganyika). EMIN, 1888, 'Emin Pasha in Centr. Afr.,' p. 174 (Kibiro); 1919, in Stuhlmann, 'Tageb. Emin Pascha,' II, p. 490 (Tomaya). REICHENOW, 1901, 'Vög. Afr.,' I, p. 406 ("Congo"); 1911, 'Wiss. Ergeb. D. Z.-Afr. Exp.,' III, p. 254 (N. E. Ruanda; Mpororo; L. Edward; Usumbura). O.-GRANT, 1908, Ibis, p. 316 (N. W. of L. Tanganyika); 1910, Tr. Z. S. Lond., XIX, p. 449 (Mokia). NEAVE, 1910, Ibis, p. 87 (Bunkeya R.). SASSI, 1912, Ann. Naturh. Hofmus. Wien, XXVI, p. 353 (Uvira; Rutshuru Plain; Kasindi; Beni). MOURITZ, 1914, Ibis, p. 35 (Mokambo Hills in S. E. Katanga). SALVADORI, 1914, Ann. Mus. Zool. Napoli, IV, No. 10, p. 11 (Bategatta in Kagera Valley). LÖNNBERG, 1917, Arkiv f. Zool., X, No. 24, p. 11 (Rutshuru?). SCHOUTEDEN, 1918, Rev. Z. A., V, p. 227 (near Beni; Baraka; Molekera; Talia-Semliki confluence).—*Stigmatopelia senegalensis senegalensis* C. GRANT, 1915, Ibis, p. 44. M.-PRAED and Grant, 1936, Ibis, p. 604.—*Stigmatopelia senegalensis æquatorialis* SCLATER and M.-PRAED, 1920, Ibis, p. 832 (Tembura). SCHOUTEDEN, 1932, Rev. Z. A., XXII, p. 130 (Ngoma); 1933, idem, XXII, p. 380 (Kisenyi); 1936, Ann. Mus. Congo, Zool., I, f. 2, p. 79 (Faradje; Mahagi Port; Djalasinda; Abimva). STONE, 1936, Proc. Acad. Nat. Sci. Phila., LXXXVIII, p. 557 (Eki-bondo).—*Streptopelia senegalensis senegalensis* GYLDENSTOLPE, 1924, K. Svenska Vet.-Akad. Handl., (3) I, No. 3, p. 311 (plain N. of Mt. Muhavura; Kasenyi).

SPECIMENS.—Faradje, 9 ♂, Mar. 8, 30, Apr. 1, July 29, Aug. 12, Sept. 3, Oct. 9, 19; 4 ♀, Feb. 15, Mar. 1, 19, Oct. 8; 2 ♀ juv., Oct. 19, Nov. 24.

ADULTS OF BOTH SEXES.—Iris dark brown, eyelids gray; bill blackish, feet purplish red, with dusky brownish claws.

DISTRIBUTION OF THE SPECIES.—From Senegal and southern Morocco eastward to Persia, Turkestan, India, and south through the eastern half of Africa to the Cape Province; also to Angola and the island of São Tomé. Not in the forested areas of West Africa and the Congo.

S. s. senegalensis (Linnaeus) extends from Senegal to the northern Cameroon; *S. s. æquatorialis* from Southern Nigeria across the eastern Sudan and the open country north of the Congo forest to Abyssinia, southern Arabia, and south through eastern Africa to the Cape Province, Southwest Africa, and Angola. *S. s. thomé* Bannerman¹ of São Tomé is at best closely allied. The validity of *æquatorialis* seems none too sure. The amount of rufous on back and scapulars is variable, but several of our adult males are very reddish there and on the breast.

North of the Sahara live *phænicophila* and *ægyptiaca*; on the island of Socotra, *sokotræ*; in tropical India, *cambayensis*; and from Muscat and Persia to Turkestan, *ermanni*.

Over most of the Congo basin the species is absent, and the old Lower Congo record is very questionable. None has recently been taken in that region. *S. s. æquatorialis* is supposed to reach Malanje in northern Angola, but I know of no specimen from the Kasai district.

During my first stay in the Congo I saw this dove only in the north-eastern corner of the colony, from Niangara to the Sudan border. Beyond Dungu they were common and, unlike *Streptopelia vinacea*, were found throughout the whole year.

In 1926–27, I found this dove very common on the west shore of Lake Albert, but near Ruwenzori it lived only in the dry foothills at the southern end, below 5000 feet. It frequents likewise the shores of Lake Edward, the Ruindi Plain, the shores of Lake Kivu, and dry areas of the Kivu district, up to 6000 feet. In the Ruzizi Plain I met with it again, and there are specimens from around Lake Tanganyika, Mlonde in Marungu, and the Bunkeya valley in the Katanga.

Because of its notes which somewhat resemble human laughter, the species has been called the laughing dove. The male utters a series of five or six short, low cooing notes, of which the next-to-last is highest pitched, the final coo descending abruptly. These may be given from a perch or as he courts a female on the ground. In the Uelle district their

¹ 1931, B. B. O. C. LI, p. 115 (Zalma, São Tomé).

cooing was almost never heard in the dry season. They were especially common about villages. At Faradje, in the rainy season they used to assemble in large flocks to eat earth on a spot where a magazine for the storage of salt was said to have stood.

In the Uelle breeding may have begun about July, but only in October did we find definite proof of it. A nest (October 19) was placed on a forking bough of a small tree, twenty feet up. It contained two white eggs, 24.4×19.5 mm. and 25.5×19.3 . In South Africa nests have been reported in "summer," November to January.

Aside from numerous specimens which had been eating salty earth, we examined the crops of five others. There were always seeds of several varieties, including durra (*Sorghum*), small beans, and *Celosia* seeds. Two individuals had eaten termites: a dozen winged examples and two workers.

KEY TO THE SPECIES OF *STREPTOPELIA* FOUND IN THE CONGO

- 1.—Black or black-and-white collar interrupted in middle of hind-neck.....2.
 Black collar on hind-neck not interrupted in mid-line.....3.
- 2.—General color dark grayish, with but little pale rufous, at most, on middle of breast; a few conspicuous rufous margins on innermost secondaries and some of their coverts; feathers of black collar not tipped with whitish.....
 *S. lugens*.
- General color much lighter, more varied with brown and pale vinaceous; most of the wing-coverts, as well as innermost secondaries and most of the scapulars, margined with light rufous; black feathers of collar tipped with pale gray and white.....*S. turtur*.¹
- 3.—Inner margin of outermost primary with a fine but sharp notch a little less than half-way from tip (usually wanting, however, in juvenal quills); malar region and forehead either vinaceous or pale gray.....4.
 Inner margin of outermost primary without notch; malar region and forehead always pale gray or bluish gray; black basal area of outermost tail-feather always extending over on outer web, leaving at most only a narrow outer margin of whitish.....*S. decipiens*.
- 4.—Under tail-coverts wholly deep gray; malar region light vinaceous, forehead grayer; wing at least 168 mm. long.....*S. semitorquata*.
 Under tail-coverts light gray with whitish borders, or white throughout; wing-length does not exceed 160 mm.....5
- 5.—Whole forehead and crown light vinaceous like sides of head and malar region, or hind-crown at most somewhat washed with gray; black basal area of outermost tail-feather usually extends to outer web, leaving only a narrow whitish outer margin.....*S. vinacea*.
 Crown distinctly grayish, forehead pale gray, and malar region gray, with at most a faint vinaceous wash; black basal area of outermost tail-feather does not extend to outer web.....*S. capicola*.

¹ Apparently only of accidental occurrence in the Congo.

[*Streptopelia turtur arenicola* (Hartert)]

Turtur turtur arenicola HARTERT, 1894, Nov. Zool., I, p. 42 (type locality: Fao on Persian Gulf).

SPECIMEN.—Avakubi, ♀ im., Oct. 28.

This is a young turtle-dove apparently of the race which breeds from Turkestan to Persia, Palestine, Morocco, and the oases of the north-western Sahara. Its head and body are still clad in the grayish juvenal plumage, and the feathers of the neck show no black anywhere. Among the scapulars and wing-coverts, however, a number of new feathers have appeared, with the black-centered, rufous-edged feathers which characterize the species *turtur*. These feathers are lighter-colored than in the young of *S. t. turtur* of the same age, so the identification as *arenicola* may be correct.

The winter wanderings of *arenicola* are known to extend to north-west India and the Anglo-Egyptian Sudan, south perhaps to Renk on the White Nile. This single bird was shot by Dr. Rosati, in my presence, as it flew over the parade ground at Avakubi; and during my whole stay in the northeastern Congo I never saw another. It must have an accidental occurrence, but could not have been an escaped cage-bird.

***Streptopelia lugens lugens* (Rüppell)**

Columba lugens RÜPPEL, 1837, 'Neue Wirbelth. Fauna Abyss.,' Vög., p. 64, Pl. xxii, fig. 2 (type locality: northern Abyssinian highlands).—*Turtur lugens* SASSI, 1912, Ann. Naturh. Hofmus. Wien, XXVI, p. 352 (Kisenyi).—*Streptopelia lugens funebra* GYLDENSTOLPE, 1924, K. Svenska Vet. Akad. Handl., (3) I, No. 3, p. 307 (Chuya in Kigezi distr.; Mt. Muhavura, 3300 m.; Mt. Sabinyo, 3000 m.; Mt. Miken, 3700 m.).—*Streptopelia lugens* FRIEDMANN, 1930, Bull. 153, U. S. Nat. Mus., p. 213 (Ruanda; eastern Congo).—*Streptopelia lugens funebrea* SCHOUTEDEN 1933, Rev. Z. A., XXII, p. 380.

DISTRIBUTION OF THE SPECIES.—In highlands from southwestern Arabia, Abyssinia, and Somaliland to Kenya Colony, the Kivu district, Tanganyika Territory, and northern Nyasaland; also in Cameroon highlands and Northern Nigeria. According to van Someren, it is represented by a smaller and darker race, *S. l. funebrea*,¹ from Mt. Elgon and Kenya Colony southward, but I cannot see that skins from Kenya Colony and west of the Ruzizi Valley are perceptibly darker than those from Abyssinia.²

¹ 1919, B. B. O. C., XI, p. 21 (Mt. Elgon).

² Admirai Lynes, 1934, J. f. O., Sonderheft, p. 52, finds that specimens from Nyasaland and Njombe, Tanganyika Territory, are darker and smaller than those from Kenya Colony and Abyssinia.

S. l. hypopyrrha (Reichenow), on the other hand, is more rufous beneath, and lives isolated in the highlands of the Cameroon and near Jos in Northern Nigeria.

A note by Emin¹ that he found "*Turtur lugens*" at Kibiro on the east shore of Lake Albert was probably based on a misidentification. *S. l. lugens* is for the most part a dove of mountains, and often of mountain forests. Count Gyldenstolpe found it fairly abundant in the higher forest regions of the Kivu Volcanoes. It occurred either in pairs or in small flocks of four to six individuals. To me it seemed less common there, though it was seen as high as 11,000 feet. On Ruwenzori and the highland west of Lake Edward we have not found it; but I did secure one in the mountains west of the Ruzizi Valley at 8150 feet.

In Kenya Colony I noted that this dove gave a rather lengthy coo, deep-toned and hoarse, which was repeated many times. Dr. van Someren² reported that eggs were there found during the rains: from March to June and in November. The nest is a loose structure of twigs on a horizontal fork or at the crossing of two or three branches. The two eggs are pure white.

***Streptopelia decipiens logonensis* (Reichenow)**

Turtur logonensis REICHENOW, 1921, J. f. O., p. 263 (type locality: Bekaba on E. Logone R., French Equatorial Africa).—*Streptopelia decipiens* nr. *permista* SCLATER AND M.-PRAED, 1920, Ibis, p. 830 (southern Sudan).—*Streptopelia decipiens griseiventris* GYLDENSTOLPE, 1924, K. Svenska Vet. Akad. Handl., (3) I, No. 3, p. 310 (Mongalla province).—*Streptopelia decipiens shelleyi* FRIEDMANN, 1930, Bull. 153, U. S. Nat. Mus., p. 220 (shores of L. Albert).

ADULTS.—Iris dull orange, orbit dark gray, sometimes varied with a little red, bill grayish black; feet light purplish red, claws dusky.

DISTRIBUTION OF THE SPECIES.—From the Red Sea coast, Somaliland, and Abyssinia, west to the Niger River and Senegal, as well as south through eastern Africa and the Albertine Rift to the Zambesi, Lake Ngami, and Angola.

Seven races were recognized by Friedmann,³ and it now appears that an additional form, *logonensis*, may be admitted. *S. d. elegans* (Zedlitz) of Southern Somaliland and northern Kenya Colony is the palest race, with wings very short. *S. d. perspicillata* (Fischer and Reichenow) of arid parts of Tanganyika and the adjacent section of Kenya Colony is nearly as pale, but larger. Of about the same size but somewhat

¹ See Stuhlmann, 1922, 'Tageb. Emin Pascha,' III, p. 370.

² 1916, Ibis, p. 212; 1928, Journ. E. Afr. Ug. N. H. Soc., VIII, No. 30, p. 82.

³ 1930, Bull. 153, U. S. Nat. Mus., pp. 219-224. Grant and M.-Praed, 1937, B. B. O. C., LVII, pp. 102, 103, would admit only four races.

darker is *S. d. permista* (Reichenow), ranging from Nyasaland and western Tanganyika Territory to southwestern Abyssinia. Still a little darker, at least on the underparts, is *S. d. ambigua* (Bocage) of southern Angola, Katanga, and the upper Zambesi basin. Surprisingly similar to *ambigua* in size and coloration is *S. d. decipiens* (Finsch and Hartlaub) of the northern Anglo-Egyptian Sudan and countries west to Lake Chad. *S. d. griseiventris* (Erlanger) of Northern Somaliland and adjacent districts of Eritrea and Abyssinia is supposedly darker brown on the back, and more strongly washed with gray below.

Doves of this species likewise inhabit the southern Sudan and the shores of Lake Albert. They are slightly deeper in color, above and below, than typical *decipiens*; and for the present the most suitable name seems to be *S. d. logonensis* (Reichenow). They are not *S. d. shelleyi* (Salvadori), for that is a large race with light gray alula and primary-coverts, ranging from Nigeria to Senegal. It bears a most deceptive resemblance to *S. semitorquata*.

S. d. logonensis was named by Reichenow because like all the races of *decipiens*, save *shelleyi*, it has blackish alula and primary-coverts. Salvadori mentioned these feathers as "black," but Hartert,¹ as well as Bannerman and Bates,² was positive that *shelleyi* has gray primary-coverts. This is illustrated by a specimen from Daker in the American Museum, and *logonensis* is smaller. The wings of our six specimens from Lake Albert and Lake Edward measure 157–164 mm., whereas the West African *shelleyi*, according to Bannerman, has wings 167–188 mm.

On the other hand, *logonensis* is only slightly darker than *permista* and *decipiens*. It probably ranges from French Equatorial Africa to the Bahr-el-Jebel and Lake Edward, at levels below 4000 feet. For many years it eluded collectors in the northeastern Congo, though it is partial to lakes and rivers and has a distinctive voice. In life the orange iris and dark orbit will differentiate it from *S. capicola*.

At Kasenyi on Lake Albert, on the north shore of Lake Edward, and on the lower Rutshuru Plain it proved to be common. These doves would perch on a euphorbia or a leafy tree, repeating a double "cu-hoo" or "cuk-hoo" from six to ten times. These double coos were often introduced by a short "c-coo," followed by a single rolling "c-c-c-oo," and then came the series of double notes mentioned above. Or the rolling "c-c-c-oo" might be given alone.

From what is known of the nesting of allied races, *S. d. logonensis* is

¹ 1921, Nov. Zool., XXVIII, p. 90.

² 1924, Ibis, p. 207.

likely to build in trees or bushes not far from water, laying two white eggs about 30.5×22.8 mm. I took specimens in breeding condition at Kasenyi in early September and near Katwe in January. The dry periods are probably preferred for reproduction.

[*Streptopelia decipiens permista* (Reichenow)]

Turtur ambiguus permistus REICHENOW, 1905, 'Vög. Afr.,' III, p. 808 (type locality: Maliwungu, Tanganyika Terr.).

This race, somewhat lighter in color than *logonensis*, extends from Nyasaland north to Lake Victoria and the Abaya Lakes district in Abyssinia. It has been reported from Lake Rukwa and the southwestern shore of Lake Victoria, so it may well occur in Belgian territory about Lake Tanganyika, or in Urundi or Ruanda.

Streptopelia decipiens ambigua (Bocage)

Turtur ambiguus BOCAGE, 1881, 'Orn. Angola,' pt. 2, p. 386 (type locality: Dombe, S. Angola). NEAVE, 1910, Ibis, p. 87 (Bunkeya R.).—*Streptopelia decipiens ambigua* W. L. SCLATER, 1924, 'Syst. Av. Æth.,' pt. 1, p. 167. FRIEDMANN, 1930, Bull. 153, U. S. Nat. Mus., p. 219 (Katanga).—*Streptopelia decipiens ambiguus* GRANT AND M.-PRAED, 1937, B. B. O. C., LVII, p. 103.

DISTRIBUTION.—Southern Angola, eastward to the Katanga district, the upper Zambesi Valley, and southward to the vicinity of Lake Ngami. *S. d. ambigua* appears to have less white on the underparts than *permista*, only the middle of the abdomen white, and the under tail-coverts deeper gray, though still edged with whitish. Its back is not quite so grayish brown as in *permista*. The wing-length of Angola specimens has been given as 152 and 164 mm., but a male from Maun, northeast of Lake Ngami, has wings measuring 175 mm.¹

There seem to be no records from northern Angola or the Kasai district of the Congo. In the Katanga, Neave obtained three specimens on the Bunkeya River in July and August, and observed that it is distinctly local, frequenting the banks of rivers on low ground. In 1937 one adult was collected for the Congo Museum by Professor Brien at Kadia near Lake Kisale. Its wing measures 162 mm.

Streptopelia capicola tropica (Reichenow)

Turtur capicola tropica REICHENOW, 1902, O. Mb., p. 139 (East Africa; type from Songea, Tanganyika Terr.).—*Turtur capicola* SHARPE AND BOUVIER, 1876, Bull. Soc. Zool. France, I, p. 312 (Banana). SCHALOW, 1887, J. f. O., p. 228 (W. of L. Tanganyika).—*Turtur vinaceus* SHELLEY, 1883, Ibis, p. 311 ("Congo").—*Turtur*

¹ *Turtur kafuensis* Reichenow, 1921, J. f. O., p. 264 (Namwala, S. of middle Kafue R.) is of doubtful status.

vinacea JOHNSTON, 1884, 'River Congo,' p. 368 (Congo R. up to Bolobo). DUBOIS, 1886, Bull. Mus. Roy. Hist. Nat. Belg., IV, p. 149 (L. Tanganyika); 1905, Ann. Mus. Congo, Zool., I, f. 1, p. 27 (Lower Congo; Tanganyika).—? *Turtur albiventris* OUSTALET, 1893, Naturaliste, VII, p. 128 (no exact locality).—*Turtur capicola damarensis* REICHENOW, 1901, 'Vög. Afr.,' I, p. 414 (Chinchoxo; Landana; Banana; Marungu; Luapula; Nyangabo). NEAVE, 1910, Ibis, p. 87 (Busanga on Lualaba R.; Upper Lufira R.).—*Turtur capicola tropicus* REICHENOW, 1905, 'Vög. Afr.,' III, p. 808 (Ndussuma); 1911, 'Wiss. Ergeb. D. Z.-Afr. Exp.,' III, p. 255 (N. E. Ruanda; Kisenyi). SCHOUTEDEN, 1918, Rev. Z. A., V, p. 227 (Kalembé; Masidongo; Uvira). DE RIEMAECKER, 1927, Rev. Z. A., XIV, p. 267 (Elisabethville; Makobo plain on Luiswishi R.).—*Turtur damarensis* NEAVE, 1907, Mem. Proc. Manchester Lit. Phil. Soc., LI, No. 10, p. 9 (near Kapopo, Alala Plateau). O.-GRANT, 1910, Tr. Z. S. Lond. XIX, p. 449 (Mokia, S. W. Uganda). SALVADORI, 1914, Ann. Mus. Zool. Napoli, IV, No. 10, p. 11 (Batengatta in Kagera Valley).—*Turtur (Streptopelia) capicola tropicus* SASSI, 1912, Ann. Naturh. Hofmus. Wien, XXVI, p. 353 (Urundi).—*Streptopelia capicola tropica* SCHOUTEDEN, 1923, Rev. Z. A., XI, pp. 319, 390 (Macaco?; Kisantu; Kwamouth); 1924, idem, XII, p. 263 (Kidada); 1930, idem, XVIII, p. 282; 1935, idem, XXVII, p. 401 (Gabirol). GYLDENSTOLPE, 1924, K. Svenska Vet. Akad. Handl., (3) I, No. 3, p. 311 (Sidabo). W. L. SCLATER, 1930, 'Syst. Av. Æth.,' App., p. 849 (Kisenyi; Ruwenzori). FRIEDMANN, 1930, Bull. 153, U. S. Nat. Mus., p. 226. BOWEN, 1933, Ecology, XIV, p. 268, Fig. 11B (highlands of S. E. Congo—on map). M.-PRAED AND GRANT, 1936, Ibis, p. 603.—*Streptopelia vinacea dryas* GROTE, 1927, Verh. Orn. Ges. Bayern, XVII, p. 205 (type locality: Kisenyi on L. Kivu; also from Ruanda and Chinchoxo).—*Streptopelia capicola dryas* FRIEDMANN, 1930, Bull. 153, U. S. Nat. Mus., p. 226, Fig. 5. BOWEN, 1933, Ecology, XIV, p. 268, Fig. 11B (Kivu distr.—on map).—*Streptopelia capicola damarensis* BOWEN, 1933, Ecology, XIV, p. 268, Fig. 11B (Lower Congo—on map).

SPECIMEN.—Boma, ♂, Dec. 31.

ADULT MALE.—Iris dark brown, eyelids gray; bill black; feet reddish purple.

DISTRIBUTION OF THE SPECIES.—Cape Province north to the Portuguese Congo, the southern and eastern Congo, Uganda, Abyssinia, and northern Somaliland. Of the six or seven races currently recognized, *S. c. capicola* (Sundevall) is restricted to the region from the Cape to the southern Transvaal. The pale *S. c. damarensis* (Finsch and Hartlaub) occupies Southwest Africa, and five other races are perhaps to be recognized over the remainder of the range.

Of these, only *tropica* and *dryas*, if indeed the latter is valid, are found within our limits. *S. c. tropica*, moderately pale in color, occupies the area from northern Transvaal to the Portuguese Congo, Kasai, Lake Albert, Mt. Elgon, and Tanganyika Territory. *S. c. dryas* was described as intermediate in coloration between *S. capicola* and *S. vinacea*. I have examined the type, which shows some approach toward *vinacea*, but has the tail pattern of *capicola*. If *dryas* is separable, it must be restricted to the Kivu district.

Specimens from Lake Albert are *tropica*, and my male from Boma has been compared with the type of that race. In the Lower Congo these ring-doves are common, in the Kasai and Katanga less so; but they are numerous again in the eastern Congo, near Lake Tanganyika, in the Ruzizi Valley, near Lake Kivu, in the Rutshuru Plain, the northern shore of Lake Edward, and the western shore of Lake Albert. They were even seen at Bogoro on the escarpment above Kasenyi, but do not occur on forested mountains, or much above 5500 feet anywhere in the Congo.

In the Lower Congo I have listened to their cooing in January, April, and July. These notes are of at least two kinds: a shorter "cuk-coodle" or "kū- kkkoo," the first syllable sometimes doubled; and a more continuous "k-k-k-kah." Both are repeated monotonously, and resemble the notes of *S. vinacea*.

Nests of this dove in Uganda have been described as built of twigs and roots in a bush or tree, sometimes even in papyrus or amid creepers against a house. The two white eggs measure 25.5–28 mm. \times 20–23. The nesting season is very long, but dry periods may be favored.

Streptopelia vinacea barbaru Antinori

Streptopelia barbaru ANTINORI, 1864, 'Cat. Coll. Uccelli Int. Afr. Centr.,' p. 89 (type locality: Sennar and Kordofan).—*Turtur vinaceus* HARTLAUB, 1887, Zool. Jahrb., II, p. 331 (Djanda). DYBOWSKI, 1893, 'La Route du Tchad,' p. 320 (upper Kemo R.). REICHENOW, 1901, 'Vög. Afr.,' I, p. 412.—*Turtur albiventris* SCHWEINFURTH AND RATZEL, 1888, 'Emin Pascha,' German Ed., p. 384 (Moggu, Bahr-el-Ghazal). EMIN, 1888, 'Emin Pasha Centr. Afr.,' p. 385.—*Streptopelia vinacea barbaru* SCLATER AND M.-PRAED, 1920, Ibis, p. 820 (Khor Gitti and Wau, Bahr-el-Ghazal). GYLDENSTOLPE, 1924, K. Svenska Vet. Akad. Handl., (3) I, No. 3, p. 311 (Mongalla province). SCHOUTEDEN, 1936, Ann. Mus. Congo, Zool., I, f. 2, p. 78 (Mahagi Port; Oka; Dika; Mauda; Faradje).

SPECIMENS.—Niagara, 2 ♂, Nov. 7, Dec. 10. Faradje, 4 ♂, Feb. 15, Mar. 16, Nov. 20; 2 ♀, Oct. 2, 5; 2 ♂ juv., Oct. 19.

ADULTS.—Iris dark brown, eyelids gray with rim slightly yellowish or greenish; bill black, corners of mouth dark purplish red; feet purplish red, claws dusky.

DISTRIBUTION OF THE SPECIES.—Savannas from Senegal to the Bahr-el-Jebel, Shoa, and Eritrea. The range, as Grote pointed out, is complementary to that of *S. capicola*, and it is possible that the two groups may intergrade in the region between Lake Albert and Mt. Elgon. *S. v. vinacea* extends from Senegal to Nigeria in the dry northern areas. The other races are: *S. v. grotei* Reichenow, upper Benue R. and L. Chad; *S. v. savannæ* Bates¹ from Sierra Leone to Cameroon and possibly

¹ 1926, B. B. O. C., XLVI, p. 124 (Babungo, upper Nun R.).

the Ubangi River; *S. v. barbaru*, usually said to range from Sennar to the Bahr-el-Ghazal and Lado district; *S. v. schoana* (Neumann), of southern Abyssinia; and *S. v. erythreæ* (Neumann) of Eritrea.

Our specimens from the Uelle district may be as near to the deeper-colored *savannæ* as they are to *barbaru*, and specimens from the Ubangi district may well prove to be *savannæ*. In the northern Congo savannas the vinaceous ring-dove is present only from August or September to the latter part of April. It is common during the dry season, but arrives in the rainiest part of the year. The birds can come only from the north, but not from afar, as Lynes did not find the species in Darfur.

At the proper time of year in the northern Uelle this is a tame, familiar bird, feeding about farms and villages, or perching in trees and giving its incessant cooing. The notes are of two sorts: a "coo-coodle" or "cudle-coodle" repeated without pause; or a protracted, vibrant "k-k-k-k-koo," similarly reiterated. It is looked upon by natives as a harbinger of the drought.

Breeding begins in early October, but probably continues until February. A nest found at Faradje on October 19, containing two very young squabs, was placed on a bough with radiating twigs, eighteen feet up. The white eggs should be similar to those of *S. v. vinacea*, dimensions of which were given by Bannerman as 24.9–26 mm. \times 18.6–20.

Crops and stomachs of seven birds contained *Eleusine* millet, small amounts of durra (*Sorghum*), quantities of small wild seeds, a few grains of maize, two beans, and in one case thirty-five winged termites and two ticks.

***Streptopelia semitorquata semitorquata* (Rüppell)**

Columba semitorquata RÜPPELL, 1837, 'Neue Wirbelth. Fauna Abyss.,' Vög., p. 66, Pl. xxiii, fig. 2 (type locality: Taranta Mts., Abyssinia).—*Turtur semitorquatus* JOHNSTON, 1884, 'River Congo,' p. 368 (Congo R. up to Bolobo). DUBOIS, 1886, Bull. Mus. Roy. Hist. Nat. Belg., IV, p. 149 (L. Tanganyika); 1905, Ann. Mus. Congo, Zool., I, f. 1, p. 27 (Lower Congo; Umangi; Prov. Orientale). EMIN, 1888, 'Emin Pasha Centr. Afr.,' p. 385 (near Meridi). OUSTALET, 1893, Naturaliste, VII, p. 128. SALVADORI, 1893, 'Cat. Birds Brit. Mus.,' XXI, p. 416 (Tingasi); 1914, Ann. Mus. Zool. Napoli, IV, No. 10, p. 11 (L. Bangweolo). REICHENOW, 1901, 'Vög. Afr.,' I, p. 409 ('Ubangi R.'). 1911, 'Wiss. Ergeb. D. Z.-Afr. Exp.,' III, p. 254 (N. E. Ruanda; Mboga; Kisenyi; Usumbura; Uvira). LÖNNBERG, 1907, Arkiv f. Zool., III, No. 21, p. 4 (Kingoyi); 1917, idem, X, No. 24, p. 11 (Rutshuru). NEAVE, 1907, Mem. Proc. Manchester Lit. Phil. Soc., LI, No. 10, p. 8 (Ndola); 1910, Ibis, p. 86 (Dikulwe R.; Lubudi R.). O.-GRANT, 1910, Tr. Z. S. Lond., XIX, p. 450 (Mubuku Valley, 6000 ft.). RODHAIN ET AL., 1913, 'Rapp. Miss. Sci. Katanga,' p. 150. MOURITZ, 1914, Ibis, p. 35 (Mokambo Hills). SCHOUTEDEN, 1920, Rev. Z. A., VII, p. 189

(Temvo in Mayombe). SCHUBOTZ, 1921, 'Tageb. Emin Pascha,' VI, p. 67 (Mangbetu country). DE RIEMAECKER, 1927, Rev. Z. A., XIV, p. 267 (Lubumbashi R.).—*Streptopelia semitorquata* JACKSON, 1906, Ibis, p. 508 (Ruwenzori). SCHOUTEDEN, 1923, Rev. Z. A., XI, pp. 319, 390 (Macaco; Ngombe in Kasai; Basongo; Luebo; Kamaiembi; Dumbi; Kabambaie; Tshikapa; Kwamouth); 1924, idem, XII, pp. 263, 411 (Kidada; Leopoldville; Eala; Tondou; Ikengo); 1925, idem, XIII, p. 7 (Kunungu; Bolobo); 1926, idem, XIII, p. 189 (Banana; Moanda; Vista). CHAPIN 1927, Bull. A. M. N. H., LIII, p. 477.—*Turtur (Streptopelia) semitorquatus intermedius* SASSI, 1912, Ann. Naturh. Hofmus. Wien, XXVI, p. 353 (Urundi; Uvira; N. W. of L. Tanganyika; Kisenyi; Rutshuru Plain; Moera).—*Streptopelia semitorquata semitorquata* GRANT, 1915, Ibis, p. 42 (Upper Congo). FRIEDMANN, 1930, 'Afr. Rep. Liberia Belg. Congo,' II, p. 753 (Burunga); 1930, Bull. 153, U. S. Nat. Mus., p. 216 (eastern Belgian Congo). SCHOUTEDEN, 1932, Rev. Z. A. XXII, p. 130 (Ngoma; Lulenga); 1933, idem, XXII, p. 380; 1935, idem, XXVII, p. 401 (Luvungi).—*Turtur semitorquatus intermedius* SCHOUTEDEN, 1918, Rev. Z. A., V, p. 227 (Mutiba; Boga; Bulaimu; Kirungu; Kinabe).—*Streptopelia semitorquata erythrophrys* BANERMAN, 1922, Rev. Z. A., X, p. 194 (Belgian Congo); 1923, Ibis, p. 746; 1931, 'Birds Trop. W. Afr.,' II, p. 338, Figs. 97, 98 (Senegal to Quanza R.). GYLDENSTOLPE, 1924, K. Svenska Vet. Akad. Handl., (3) I, No. 3, p. 308 (Malabo; Sidabo). SCHOUTEDEN, 1936, Ann. Mus. Congo, Zool., I, f. 2, p. 78 (Buta; Mauda; Dramba; Niarembe; Rungu; Kotili). STONE, 1936, Proc. Acad. Nat. Sci. Phila., LXXXVIII, p. 557 (Ekibondo).

SPECIMENS.—Boma, ♂, Jan. 11. Leopoldville, ♂, July 3; ♀, July 6. Bumba, ♂, July 29. Avakubi, ♀, Oct. 24. Gamangui, 2 ♂, Jan. 28, Feb. 9. Medje, ♂, July 29; ♂ juv., Oct. 12. Niangara, ♀, Nov. 11; ♀ im., Dec. 1. Faradje, 2 ♂, Aug. 27, 28; ♀, Oct. 27.

ADULTS.—Iris orange-red, skin around eye dark red; bill grayish black; front of metatarsus and upper sides of toes purplish red, rest of foot light gray.

DISTRIBUTION OF THE SPECIES.—Senegal, northern Abyssinia, and southwest Arabia to eastern Cape Province, including Pemba I., Zanzibar, and Fernando Po. Absent only on the highest mountains and in desert areas.

Over most of this range it is difficult to recognize any races, because of the gradual change in size. The largest specimens come from Abyssinia, southern Angola, and southeastern Africa. Attempts have been made to separate a small West African race, *S. s. erythrophrys* (Swainson).¹ and two very large South African forms, *S. s. maxima* Roberts² and *S. s. australis* Roberts.³ But no definite limits can be drawn for them. West African specimens have wings 168–186 mm.; Congo birds, 172–192; Abyssinian, 175–195; those of southern Angola, 181–196; and South African, 185–212. Only in Southern Somaliland and on the East

¹ 1837, 'Birds W. Afr.,' II, p. 207, Pl. xxxi (Senegal).

² 1932, Ann. Transvaal Mus., XV, p. 24 (Toten-Maun road, Ngamiland).

³ 1932, idem, XV, p. 25 (Sekororo, Leydsdorp distr., Transvaal).

African coast to Zanzibar is there a good pale race of small size, *S. s. minor* (Erlanger), with wings 160–175 mm.

In the Belgian Congo the wings of *semitorquata* vary between 172 and 183 mm., except in the southeast, from Luluabourg to Marungu, where they are longer, 176 to 192 mm., including both sexes.

This large ring-dove is to be seen almost everywhere in the Congo, and it even ascends in forested highlands to 7000 feet. In the forest belt it lives principally about the clearings and river-banks; in more open country it is abundant, especially where there are many trees. No other member of the genus invades the lowland forest.

Its voice is very distinctive, consisting of notes of four different types:

(1) The most characteristic, of six syllables, the first two loudest, "COO COO, cu-cu coo coo."

(2) Shorter, somewhat like a brief reversal of the preceding, "c-c-c-coo, COO COO."

(3) A prolonged cooing, low and hoarse, probably associated with courtship.

(4) A hoarse "kaaaaaa."

The first two types of notes are repeated over and over. At times these doves make a steeply rising flight, then suddenly halt, and come sailing down at an angle of 40 degrees.

At Medje in the forest this dove nests in September, January, and February, if not indeed throughout the year. At Faradje in the northern savanna three nests were found, on October 26 and December 3, built in the usual dove fashion, all within eight feet of the ground amid thick foliage. The full set of eggs is always two, pure white, and my measurements are 28.7–30.6 mm. \times 23.2–24.¹

Crops and stomachs were examined in six cases, and the food found to consist mainly of seeds, fruits, and starchy plant-material. It included gourd-seeds, large grass-seeds, small red peppers, plant tubers, and once, 30 winged termites. Occasionally earth is eaten, as we found near Mount Gaima, in the Uelle. A hole in the side of a wooded gully attracted numbers of colies to eat the red clay, as well as an occasional dove. Another cavity, higher up the mountain, was reported to be much more frequented by these doves.

***Aplopelia simplex jacksoni* Sharpe**

Haplopelia jacksoni SHARPE, 1904, B. B. O. C., XIV, p. 93 (type locality: Ruwenzori). O.-GRANT, 1910, Tr. Z. S. Lond., XIX, p. 447 (Mubuku Valley, 6500–9000 ft.).—*Aplopelia jacksoni* REICHENOW, 1905, 'Vög. Afr.', III, p. 811; 1911, 'Wiss. Ergeb. D. Z.-Afr. Exp.', III, p. 255. SCHOUTEDEN, 1914, Rev. Z. A., III, p. 262

¹ Jackson, 1926, 'Game Birds Kenya Uganda,' p. 148, gave 28–32 mm. \times 22.5–25.

(Kilo); 1918, idem, V, p. 227.—*Haplopelia simplex jacksoni* BANNERMAN, 1916, Ibis, p. 14.—*Aplopelia simplex jacksoni* W. L. SCLATER, 1924, 'Syst. Av. Æth.,' pt. 1, p. 174. CHAPIN, 1927, Ibis, p. 359 (W. slope Ruwenzori). VAN SOMEREN, 1928, Journ. E. Afr. Ug. N. H. Soc., VIII, No. 32, p. 171 (Ruwenzori to Mabira Forest). BOWEN, 1933, Ecology, XIV, p. 249, Fig. 2 D (map).

ADULT MALE.—Iris dull mauve on inner part, light rose-madder on outer, all around; bare orbit dull dark gray, with eyelids dark red; bill grayish black; scales on feet purplish red, softer skin lavender-gray.

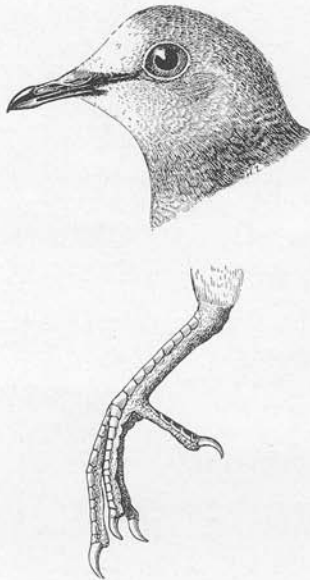


Fig. 11. Head and foot of *Aplopelia s. jacksoni*. $\times 2/3$.

DISTRIBUTION OF THE SPECIES.—Annobon, São Tomé, Princes Island, Fernando Po, forested Liberia and Cameroon, eastern Congo highlands, and forests in Uganda. Not known from lowland Congo forest.

Six or seven races are known, of which the males differ but slightly. They are usually grayish, with green or lilac reflections on hind-neck. The subspecies are better distinguished by the browner females.¹ *A. s. forbesi* Salvadori may be the lowland form of Upper Guinea, for Dr. G. M. Allen² obtained a male in Liberia which resembles *A. s. plumescens*

¹ See Bannerman, 1916, Ibis, pp. 1-16; 1921, idem, p. 121; 1931, 'Birds Trop. W. Afr.,' II, pp. 370-375.

² 1930, 'Afr. Rep. Liberia Belg. Congo.' II, p. 672.

Sharpe of Southern Cameroon. The latter race may perhaps extend to the forest of the Ubangi, but has not been collected there.

Aplopelia s. jacksoni is found above 5000 feet in the eastern Congo, also in the Budongo, Bugoma, and Mabira forests of Uganda, little above 4000 feet. It must occur in mountain forests west of Lake Albert, in view of Thélie's specimen labeled "Kilo"; it has been collected on Ruwenzori between 6500 and 9000 feet; and I have seen it in the mountains west of Lake Albert at 7300 feet. No specimen has yet been taken on the Kivu Volcanoes.

Jackson's ground-dove lives in the undergrowth of the heavy forest, feeding no doubt on the ground. It is seldom seen on west Ruwenzori, where I obtained two males; and I did not hear it call. The crop of one specimen contained round orange-red berries, hard brown seeds, 2 small snails, a bit of a millipede, and 3 small green caterpillars.

The nest is known to be built in a bush in the forest undergrowth, holding two eggs.¹ The eggs of *plumbescens* in lowland Cameroon were described by Bates as cream-colored, 26.5–28.5 mm. × 20–22. The nesting season of *jacksoni* may occupy the larger part of the year.

Turturæna iriditorques (Cassin)

Columba iriditorques CASSIN, 1856, Proc. Acad. Nat. Sci. Phila., VIII, p. 254 (type locality: St. Paul's R., Liberia).—*Turturæna iriditorques* DUBOIS, 1905, Ann. Mus. Congo, Zool., I, f. 1, p. 27 (Kisantu). SASSI, 1912, Ann. Naturh. Hofmus. Wien, XXVI, p. 352 (Ukaika). SCHOUTEDEN, 1914, Rev. Z. A., III, p. 262 (Kilo); 1918, idem, V, p. 227; 1936, Ann. Mus. Congo, Zool., I, f. 2, p. 78 (Panga; Buta). W. L. SCLATER, 1924, 'Syst. Av. Æth.', pt. 1, p. 163 (Ituri distr.). STONE, 1936, Proc. Acad. Nat. Sci. Phila., LXXXVIII, p. 558 (Saidi in Ituri).—*Turturæna iriditorques rothschildi* NEUMANN, 1908, B. B. O. C. XXI, p. 42 (type locality: Ituri forest). REICHENOW, 1911, 'Wiss. Ergeb. D. Z.-Afr. Exp.', III, p. 255. GYLDENSTOLPE, 1924, K. Svenska Vet. Akad. Handl., (3) I, No. 3, p. 306 (Kampi na Mambuti). HARTERT, 1927, Nov. Zool., XXXIV, p. 9.—? *Aplopeleia bronzina* EMIN, 1919, in Stuhlmann, 'Tageb. Emin Pascha,' II, pp. 463, 476 (Tingasi; Bellima).—*Aplopeleia* near *bronzina* SCHUBOTZ, 1921, 'Tageb. Emin Pascha,' VI, p. 254.—*Aplopelia* near *bronzina* SCHUBOTZ, 1921, 'Tageb. Emin Pascha,' VI, pp. 265, 278 (Mangbetu country).—*Turturæna iriditorques iriditorques* SCHOUTEDEN, 1923, Rev. Z. A., XI, p. 319 (Kamaiambi; Luebo); 1925, idem, XIII, p. 7 (Kunungu). BANNERMAN, 1931, 'Birds Trop. W. Afr.', II, p. 330, Fig. 94 (Lulunga R.).

SPECIMENS.—Stanleyville, ♀, Nov. 15. Avakubi, ♂, Aug. 8; 2 ♀ juv., Aug. 21. Ngayu, 2 ♂, Dec. 14, 21. Medje, 3 ♂, Jan. 15, May 23, July 23; ♀, July 19; ♂ juv., July 21; ♀ juv., Sept. 22. Niangara 2 ♂, June 1, Nov. 17.

ADULT MALE.—Iris light red; skin around eye dark red; basal half of beak dark gray, remainder light bluish; feet light rose-red with dusky claws.

¹ Jackson, 1926, 'Game Birds Kenya Uganda,' p. 177.

ADULT FEMALE.—Iris red with inner rim grayish; bill bluish gray; feet pink with front of metatarsi red, and claws blackish.

DISTRIBUTION.—Sierra Leone eastward to the Cameroon, Gaboon, northern Angola, and Congo to the Semliki Valley and the forest along the eastern edge of the Rutshuru Plain. It seems not to occur above 5000 feet.¹ No races can be distinguished, for recent material from the region of Irumu does not bear out the difference attributed to *T. i. rothschildi* Neumann.

Adult males vary especially in the amount of chestnut on the outer rectrices, and females may differ markedly in the amount of rufous on the breast. A few very grayish specimens are known from the Cameroon.² The young lack the brown collar on hind-neck, but have metallic reflections there.

The bronze-naped pigeon is common throughout the lowland Congo forest and larger gallery forests, extending north to the Uelle River, and south at least to Luluabourg. I have heard its unmistakable voice at Ganda Sundi in the Mayombe. It is arboreal, frequenting both virgin forest and second-growth woods, usually keeping well hidden in the foliage, and never in parties.

It begins its cooing with two to four notes audible at no great distance, continues with four or five very loud coos of uniform tone, then suddenly lowers its voice and finishes with three to five notes a little louder than those at the start.

The breeding season appears to be during the rains: in the north-eastern Congo from June to September, if not to December. The nest is probably built in old second growth, at a height of fifteen or twenty feet. Bates found one in the Cameroon, but did not secure eggs.

In the crops and stomachs of six individuals we found only fruit, usually small berries, and soft seeds. Small bits of stone were noted twice.

KEY TO THE CONGO SPECIES OF *COLUMBA*

- 1.—White spots on upper wing-coverts. 2.
- No white spots on upper wing-coverts. 3.
- 2.—Breast uniform light gray; feathers all around neck hackle-like, with forked tips; tail-feathers gray with broad dusky tips and outer margin of outermost feather whitish basally. *C. guinea*.
- Lower breast dusky vinaceous spotted with white; feathers of hind-neck somewhat pointed but not forked at tip; tail feathers entirely blackish. *C. arquatrix*.

¹ *Turturana incerta* Salvadori, from an unknown locality, is regarded by Bannerman as possibly a race but more probably a sport of *T. iriditorques*. Its blackish tail, however, suggests affinity to *Turturana delegorguei* (Delegorgue), of East and South Africa.

² One immature male from Cameroon in the Carnegie Museum resembles closely *T. malherbii* Verreaux of São Tomé and Princes Island.

- 3.—Coloration largely bluish gray, darkest on wings and scapulars; breast with a pale vinaceous wash; abdomen white; rectrices dark gray at bases and tips, crossed by a single pale bar (looking white from below) on the distal half of the feather. *C. uncinata*.
 Coloration darker; back deep maroon or rarely blackish; feathers of lower breast maroon, deep vinaceous, or slate-color, bordered with lavender or whitish; tail-feathers slate-gray on basal half, lighter gray on distal half. *C. albinucha*.

Columba uncinata Cassin

Columba uncinata CASSIN, 1860, Proc. Acad. Nat. Sci. Phila., XI, p. 143 (type locality: River Ogobai, i.e., Ogowé R., Gaboon). HARTERT, 1900, Nov. Zool., VII, p. 29 (Diapanda in Ituri, N. W. of Beni). REICHENOW, 1901, 'Vög. Afr.,' I, p. 401. DUBOIS, 1905, Ann. Mus. Congo, Zool., I, f. 1, p. 27 (Nouvelle Anvers: Ituri; Kisantu). O.-GRANT, 1910, Tr. Z. S. Lond., XIX, p. 449 (Mpanga forest, Uganda). SASSI, 1912, Ann. Naturh. Hofmus. Wien, XXVI, p. 350 (N. W. of L. Tanganyika; Moera; Beni; Ukaika). SCHOUTEDEN, 1914, Rev. Z. A., III, p. 261 (Kilo); 1918, idem, V, p. 226 (Beni; Zambo); 1923, idem, XI, pp. 319, 390 (Basongo; Luebo; Kwamouth); 1924, idem, XII, pp. 263, 411 (Kisantu; Bikoro; Eala); 1936, Ann. Mus. Congo, Zool., I, f. 2, p. 78 (Buta; Djamba; Poko; Mauda; Dramba; Bondo Mabe). W. L. SCLATER, 1924, 'Syst. Av. Æth.,' pt. 1, p. 162. BANNERMAN, 1931, 'Birds Trop. W. Afr.,' II, p. 327, Fig. 93. BERLIOZ, 1935, Bull. Mus. Hist. Nat. Paris, VII, p. 160 (Mbwahi in Kivu distr.). STONE, 1936, Proc. Acad. Nat. Sci. Phila., LXXXVIII, p. 557 (Saidi in Ituri).

SPECIMENS.—Avakubi, ♀, Apr. 3. Bafwabaka, ♂, Jan. 6; ♀, Dec. 29. Medje, ♂, July 23; 2 ♀, Jan. 14, July 23. Niangara, 4 ♂, Mar. 16, May 18, June 1; ♀, Mar. 16.

ADULTS.—Iris orange-red to crimson, naked skin around eye carmine; bill bluish gray, light toward tip, dark at base; feet light blue or bluish gray.

DISTRIBUTION.—Western Liberia to the Ubangi River and the forests of Uganda, south to the central Kasai district and Manyema. In the heavy forest of the Congo it is generally distributed from Kwamouth to the Semliki forest, but not known thus far from the Mayombe. It does not ascend much above 5000 feet.

It perches in the tallest tree, often on leafless boughs, so high that it is difficult to shoot. No more than two or three are seen together. Throughout the year it betrays its presence by a series of seven to twelve deep coos, delivered rather slowly. Its voice is resonant, far-reaching, and rather labored, as if each coo were drawn out until it is all but double.

Near Medje, on July 23, 1910, I saw a nest near the top of a tall tree, in a fork of a rather small branch. As it was seventy feet up, I could only secure the female, which had a pure white egg in its oviduct. Other females with ovaries enlarged were taken in January, March, and late

December, so breeding may go on throughout the year, or it may coincide with the two drier periods.

A young male from Lukolela, November, 1930, shows remnants of the juvenal plumage, which was first described by D. Seth-Smith.¹ At this stage the feathers are barred with blackish and tipped with rufous brown or whitish over most of the crown and back, being barred or fringed elsewhere with buff or whitish.

Examination of nine individuals showed that seven had eaten fruits, usually rather small; one, some green seed-capsules; and one, hard black seeds as well as many small winged termites.

Columba guinea guinea Linnæus

Columba guinea LINNÆUS, 1758, 'Syst. Nat.,' 10th Ed., p. 163 (type locality: Guinea). SALVADORI, 1893, 'Cat. Birds Brit. Mus.,' XXI, p. 266 (Niam-Niam country). DUBOIS, 1905, Ann. Mus. Congo, Zool., I, f. 1, p. 27 (Karema). HARTERT AND GOODSON, 1918, Nov. Zool., XXV, p. 356 (between Kagera R. and L. Kivu). BERLIOZ, 1921, Rev. Fr. O., VII, p. 7 (Kivu distr.).—*Columba guineensis* HARTLAUB, 1882, Abhandl. Naturwiss. Verein Bremen, VIII, p. 216 (Wandi in Lado distr.).—*Stictoenas guinea* DUBOIS, 1886, Bull. Mus. Roy. Hist. Nat. Belg., IV, p. 149 (L. Tanganyika).—*Columba guinea longipennis* REICHENOW, 1911, 'Wiss. Ergeb. D. Z.-Afr. Exp.,' III, p. 254 (L. Mohasi; Kisenyi). SASSI, 1912, Ann. Naturh. Hofmus. Wien, XXVI, p. 350 (Kisenyi). SCHOUTEDEN, 1918, Rev. Z. A., V, p. 226 (plain of Uvira; Kamabo; Lulindi; Kisenyi).—*Columba guinea guinea* FRIEDMANN, 1930, Bull. 153, U. S. Nat. Mus., p. 207. SCHOUTEDEN, 1932, Rev. Z. A., XXII, p. 130 (S. E. base of Mt. Karisimbi).—*Columba longipennis* SCHOUTEDEN, 1935, Bull. C. Z. C., XII, p. 9 (Gabirol in Ruanda).

DISTRIBUTION OF THE SPECIES.—From Senegal across the Sudan to Eritrea and Abyssinia; south through the drier parts of East Africa, Uganda, and the eastern Congo border to southern Tanganyika Territory; also from the Transvaal and Mossamedes to Cape Province.

The typical form, with wings 216–240 mm. and rump very pale gray, ranges from Senegal to Abyssinia and southern Tanganyika Territory. In Eritrea it is replaced by *C. g. dilloni* (Bonaparte), with slightly longer wings: 236–245 mm.² *C. g. phæonota* Gray, of South Africa north to the Transvaal and Mossamedes, has not only darker gray underparts, but the rump also nearly as dark as the breast. According to Austin Roberts³ specimens from Waterberg, Southwest Africa, are paler and should be separated as *C. g. bradfieldi*. No representative of the species is known from the Katanga district, Nyasaland, or Rhodesia.

¹ 1907, Ibis, p. 466.

² *C. g. longipennis* Reichenow of East Africa has proved untenable; and *C. g. uhehensis* Reichenow was based upon an abnormally dark individual from Iringa, Tanganyika Territory, according to Lynes, 1934, J. f. O., Sonderheft, pp. 51, 136.

³ 1931, Ann. Transvaal Mus., XIV, p. 239.

Within our limits the Guinea pigeon seems to occur only in rather dry areas near lakes Tanganyika, Kivu, and Edward. Dr. Schouteden tells me that it was particularly numerous in the small dry area near the southeast base of Mt. Karisimbi. I have seen them near the Lubilia River, north of Lake Edward; and on the northern shore of this same lake Dr. J. C. Phillips obtained a specimen. Possibly it may be looked for near Lake Albert, and Emin secured it at Wandí within forty-five miles of the Upper Uelle border.

The Guinea pigeon shows resemblances to the domestic pigeon, with which it has been known to hybridize; but it is less sociable, usually seen in pairs or parties of six to eight. In the Sudan its distribution is said to follow that of the *Borassus* palms; in other regions, cliffs or buildings are attractive. Large trees near villages are often their resting places, and they feed on grain on the ground. The voice is low and muffled, four to six deep coos being repeated in a guttural tone.

In Abyssinia and East Africa they have been reported to nest on buildings and beneath bridges, as well as on cliff-sides. In the Sudan they also build in the leaf-bases of *doleib* palms, baobabs, or other large trees. In Nigeria, Hartert reported them as nesting in pots fastened in trees by natives.

The dry season may be preferred for breeding in the Sudanese belt, where they seem to nest from January to May; but in eastern equatorial Africa there may be greater irregularity.¹ The two white eggs measure approximately 36–37 mm. \times 27–28.

Columba arquatrix arquatrix Temminck

Columba arquatrix TEMMINCK, in Temminck and Knip, 1809, 'Pigeons,' *Colombes*, p. 11, Pl. v (type locality: Anteniquoi, i.e., Knysna, Cape Province). O.-GRANT, 1910, *Tr. Z. S. Lond.*, XIX, p. 448 (Mubuku Valley). REICHENOW, 1911, 'Wiss. Ergeb. D. Z.-Afr. Exp.,' III, p. 254 (Tshingogo forest). SASSI, 1912, *Ann. Naturh. Hofmus. Wien*, XXVI, p. 351 (N. W. of Tanganyika; E. of Rutshuru Plain). SCHOUTEDEN, 1918, *Rev. Z. A.*, V, p. 226 (Beni; Baraka; Sibatwa forest; Kivu; Karisimbi; Kibati); 1935, *idem*, XXVII, p. 401 (Kansenze near Mt. Nyam-lagira).—*Columba arquatrix arquatrix* GYLDENSTOLPE, 1924, *K. Svenska Vet. Akad. Handl.*, (3) I, No. 3, p. 304 (Lulenga; Mt. Karisimbi, 3700 m.). SCHOUTEDEN 1932, *Rev. Z. A.*, XXII, p. 131 (Burunga; Nya-Muzinga).

DISTRIBUTION OF THE SPECIES.—From Cape Province north to Angola, Nyasaland, the highlands of eastern Africa and the eastern Congo border, the mountains of Cameroon, and the island of Fernando Po. The whole area is occupied by the typical race, except for the highlands

¹ See van Someren, 1928, *Journ. E. Afr. Ug. N. H. Soc.*, VIII, No. 30, p. 76.

of Cameroon and Fernando Po, where it is replaced by *C. a. sjöstedti* Reichenow.¹

The forehead, cheeks, and fore-crown in *C. a. arquatrix* are deep grayish purple; hind-crown and nape gray, varying from slate-gray to very pale ashy gray, apparently without reference to sex; rectrices entirely blackish. Wings of six males from the eastern Congo, 228–238 mm., of four females, 223–232; tails of males 136–145 mm., of females 135–140. *C. a. sjöstedti* is very distinct, with smaller bill, darker gray head, and more lengthened whitish markings on chest.

Columba thomensis Bocage of the island of São Tomé is an allied species, less spotted beneath and with a much longer tail.² *C. albinucha* Sassi of the eastern Congo and *C. hodgsonii* Vigors of the highlands of Asia are other members of the same group.

While it may descend to sea-level in South Africa, the olive pigeon in Angola, the eastern Congo, and East Africa is mainly a bird of forested highlands. Sometimes it comes down to levels of 3500 to 4000 feet about the bases of the mountains, but then is apt to be in flocks, and not breeding. The accuracy of records from Beni and Baraka seems doubtful, and in all the central Congo forest it is unknown. Its true home is in the mountain forests, between 5000 and 10,000 feet, and the species has not yet been found in the Upper Katanga or Marungu. The southernmost records from Congo territory are in the mountains northwest of Tanganyika. We may also expect it on the high mountains west of Lake Albert.

On the western slopes of Ruwenzori it is one of the characteristic birds, a large dark pigeon with yellow bill, very swift and strong in flight. They sometimes flocked into a single tree to feed on a favorite fruit or seed. Along the mountain ridges west of Lake Edward and the Ruindi Plain I noted flocks going by at Mulu and Upper Kabasha. On March 27, at the northern end of the Kasali Mountains near the Rutshuru River I was surprised to find several flocks feeding as low as 3700 feet. Again in the forests on the eastern side of the Rutshuru Plain some were seen at only 4300 to 5000 feet on April 30, and in early May.

On the higher Kivu Volcanoes they ascend to 11,000 or 12,000 feet, but I did not find them very numerous. West of the Ruzizi Valley, on Mt. Kandashomwa, they live at 7500 to 9000 feet, and small flocks were twice noticed flying across the Ruzizi Plain.

The cooing of *arquatrix* is low and hoarse, with a tremor or quaver, so

¹ 1898, J. f. O., p. 138 (Mt. Cameroon).

² See Bannerman, 1931, *Ibis*, pp. 652–654, Pl. xx.

that it may even break into two or three syllables. Its carrying power is not great, not at all like that of *Columba uncinata*. Count Gyldenstolpe found a nest high on Mt. Karisimbi on March 24, placed about ten feet from the ground in a low tree. The single hard-set egg was pure white, 41×28 mm. In other parts of eastern Africa the nest has been found from six to twenty feet up, the dimensions of eggs being $37\text{--}41$ mm. \times $27\text{--}30$. A single egg often constitutes the full set, but others of two have been noted.

On Ruwenzori Woosnam found that in February and March these pigeons were feeding on berries of the African yew (*Podocarpus*). I noticed also that they are very fond of the hard seeds of *Croton macrostachys*, which resemble small castor-oil seeds. A variety of other fruits and seeds are consumed, wild olives, wild figs, and fruits of *Toddalia*, *Teclea*, and *Trema*. Whether it was because of the food or not, the flesh of these pigeons seemed always dark-colored and bitter. In their gizzards we sometimes found a single large piece of white quartz, one measuring 14 mm. in length.

***Columba albinucha* Sassi**

Columba albinucha SASSI, 1911, O. Mb., p. 68 (type locality: Moera, 30 km. N. of Beni, E. Belg. Congo); 1912, Ann. Naturh. Hofmus. Wien, XXVI, p. 351, Pl. v; 1916, idem, XXX, p. 239. SCHOUTEDEN, 1913, Rev. Z. A., III, p. 64 (Beni); 1914, idem, III, p. 262 (Kilo); 1918, idem, V, p. 227 (Makojoba; Nkinzi; Mutiba; Lesse). LÖNNBERG, 1917, Arkiv f. Zool., X, No. 24, p. 10. GYLDENSTOLPE, 1924, K. Svenska Vet. Akad. Handl., (3) I, No. 3, p. 306 (Simbo).—*Columba arquatrix albinucha* W. L. SCLATER, 1924, 'Syst. Av. Æth.,' pt. 1, p. 162.

DISTRIBUTION.—Eastern border of the Ituri forest, from the vicinity of Kilo south at least to Beni. It may be expected to range somewhat farther southward, but cannot be widely distributed in the eastern Congo forest, for we never saw it during our long stay about Avakubi and Medje. The localities where it has been taken are mostly at altitudes between 3000 and 4000 feet, thickly forested.

While bearing a certain resemblance to *C. arquatrix*, the present species is without light spots on the upper wing-coverts, distinctly smaller (wing 196–200 mm.; tail 125–130); and the rectrices light gray, still paler on the outer half. The light patch on the hind-crown is not always white, but in some specimens bluish gray. The latter color may distinguish the females and young. The bill is red, darker basally, whereas that of *arquatrix* is yellow.

It seems probable that the white-naped pigeon is not so rare as the scanty museum material might indicate. Yet Gyldenstolpe obtained

only one female specimen, and my own efforts in 1926 and 1927 were totally unsuccessful. In a forest patch just west of Irumu I did hear an unfamiliar, hoarse coo, rather like that of *arquatrix*, and saw three or four pigeons feeding in the trees. These were so shy that I could not shoot one, and I believe they may well have been *albinucha*. In view of the known distribution of *albinucha*, it is surprising that it has not been found in the forests of Uganda.

Subfamily **Treroninae**

KEY TO THE SPECIES OF *VINAGO* IN AND NEAR THE CONGO

- 1.—Chest and flanks gray, often with a wash of green; but a sharply defined area of bright yellow occupies middle of breast and abdomen. *V. waalia*.
Fore-neck, chest, and breast nearly uniform in color, yellowish green to gray washed with green, changing usually to yellow on abdomen. 2.
- 2.—Fore-neck and breast greenish gray, or gray washed with green; all the rectrices (seen from above) are largely greenish, the median pair wholly green, lateral ones with whitish terminal areas washed with green. . . . *V. delalandii*.
Fore-neck and breast green or yellowish green, feathers gray only at base; rectrices (seen from above) either clear gray, the lateral ones with lighter terminal areas, or the rectrices may be somewhat washed with green above. *V. calva*.

***Vinago waalia* (Meyer)**

Columba waalia F. A. A. MEYER, 1793, 'Syst.-summ. Uebers. neu. zool. Entdeck. Neuhol. Afr.,' p. 128 (type locality: Tcherkin, near Lake Tsana, Abyssinia¹).—*Vinago waalia* SALVADORI, 1893, 'Cat. Birds Brit. Mus.,' XXI, p. 15 (Lado). SCHUBOTZ, 1921, 'Tageb. Emin Pascha,' VI, p. 65. SCHOUTEDEN, 1930, Bull. C. Z. C., VII, p. 60 (L. Albert); 1936, Ann. Mus. Congo, Zool., I, f. 2, p. 78 (Mahagi Port). BANNERMAN, 1931, 'Birds Trop. W. Afr.,' II, p. 376, Pl. XIII.

DISTRIBUTION.—From Senegal and the Casamance River east through Northern Nigeria to the Egyptian Sudan, Abyssinia, Somaliland, the island of Socotra, Aden Protectorate, and Yemen. The southern limit of the species scarcely touches the northern Congo, save in the vicinity of Lake Albert and perhaps in the northeastern Uelle. It was known from Lado, Gondokoro, and Wadelai on the Bahr-el-Jebel, and Dr. Schouteden has collected three specimens at Mahagi Port, at the northern end of Lake Albert.

On May 2, 1912, between Faradje and Garamba, I saw a couple of fruit-pigeons which I believed to be the yellow-bellied *V. waalia*; but all the others I observed in this region were plainly *calva*. Boyd Alexander² wrote of finding *waalia* in numbers near Mt. Gaima, but this was surely an error.

¹ See W. L. Sclater, 1922, B. B. O. C., XLII, p. 117.

² 1907, 'From the Niger to the Nile,' II, p. 308.

In the Lado district, according to Emin, Bruce's green pigeon is found in small parties, frequenting patches of thick-foliaged trees in the plain, especially where wild figs and berries are to be had. As one approaches, the green pigeons fly out of the opposite side of the trees with a swift but noisy flight.

The voice is like that of *Vinago calva*; and according to Hutson it commences with a "gurrh," followed by a series of yap-yap-yaps and rattling parrrh-parrrh-parrrhs. In West Africa the breeding season is from December to May, and in Darfur Lynes¹ collected a very young bird on April 1. The flimsy nest of twigs and rootlets is commonly placed far out on a leafy bough. Dimensions of the white eggs are given by Nehrkorn as 30–31 mm. \times 22–23.

Vinago calva calva (Temminck)

Columba calva TEMMINCK, in Temminck and Knip, 1809, 'Pigeons,' Columbars, I, p. 35, Pl. VII (coasts of Loango and Angola; restricted type locality: Loango²).—*Treron calva* HARTLAUB, 1857, 'Syst. Orn. Westafr.,' opp. p. lix (Congo). JOHNSTON, 1884, 'River Congo,' pp. 104, 360, 368 (Congo R.). REICHENOW, 1887, J. f. O., p. 302 (Leopoldville). OUSTALET, 1893, Naturaliste, VII, p. 128. FLOWER, 1894, P. Z. S. Lond., p. 602 (Ituri R. near Urumbi).—*Treron calvus* EMIN, 1894, J. f. O., p. 165 (old Irumu).—*Vinago calva* REICHENOW, 1901, 'Vög. Afr.,' I, p. 394 (in part. Manyanga; Ngombe on lower Congo; "Ubangi R."; Kwango). DUBOIS, 1905, Ann. Mus. Congo, Zool., I, f. 1, p. 27 (Lower Congo; Mayombe; L. Leopold II; Banalia; Prov. Orientale). LÖNNBERG, 1907, Arkiv f. Zool., III, No. 21, p. 4 (Kinyoi). O-GRANT, 1908, Ibis, p. 316 (below Kasongo); 1910, Tr. Z. S. Lond., XIX, p. 447 (40 miles W. of Beni). MENEGAUX, 1918, Rev. Fr. O., V, p. 252 (Zambi). SCHOUTEDEN, 1920, Rev. Z. A., VII, p. 189 (Temvo).—*Vinago calva nudirostris* REICHENOW, 1901, 'Vög. Afr.,' I, p. 396 (in part. Kwango R.).—*Vinago calva* var. *nudirostris* DUBOIS, 1905, Ann. Mus. Congo, Zool., I, f. 1, p. 27 (in part. Mayombe).—*Vinago calva salvadorii* REICHENOW, 1911, 'Wiss. Ergeb. D. Z.-Afr. Exp.,' III, p. 253 (Beni).—*Vinago nudirostris calva* SASSI, 1912, Ann. Naturh. Hofmus. Wien, XXVI, p. 350 (N. W. of Tanganyika; Mawambi; Ukaika). NEUMANN, 1904, J. f. O., p. 343 (in part. Congo; Ruwenzori).—*Vinago calva calva* C. GRANT, 1915, Ibis, p. 37 (Uelle R. and Upper Congo). SCHOUTEDEN, 1923, Rev. Z. A., XI, pp. 319, 390 (Manghai on Kasai R.; Ngombe in Kasai; Kwamouth); 1924, idem, XII, pp. 264, 411 (Leopoldville; Eala; Ikengo; Tondou); 1925, idem, XIII, p. 7 (Bolo region); 1926, idem, XIII, p. 189 (Lukula; Tshela; Ganda Sundi). GYLDENSTOLPE, 1924, K. Svenska Vet. Akad. Handl., (3) I, No. 3, p. 304 (Kitsumuro; Simbo; Kampi na Mambuti). W. L. SCLATER, 1924, 'Syst. Av. Æth.,' pt. 1, p. 175. BANNERMAN, 1931, 'Birds Trop. W. Afr.,' II, p. 380. STONE, 1936, Proc. Acad. Nat. Sci. Phila., LXXXVIII, p. 558 (Saidi; Nepoko ferry). *Vinago* CHAPIN, 1915, A. M. Journ., p. 281.—*Treron calva calva* HARTERT and GOODSON, 1918, Nov. Zool., XXV, p. 349

¹ 1925, Ibis, p. 579.

² Hartert and Goodson, 1918, Nov. Zool., XXV, p. 349. These authors referred all the African fruit-pigeons to the genus *Treron* Vieillot, and it must be admitted that the supposed generic characters of *Vinago* Cuvier are of little importance.

(Kindu: 340 miles W. of Baraka). GROTE, 1924, J. f. O., p. 101.—*Treron australis calva* GROTE, 1931, Anz. Orn. Ges. Bayern, II, p. 140.—*Vinago calva uellensis* SCHOUTEDEN, 1936, Ann. Mus. Congo, Zool., I, f. 2, p. 78 (in part. Buta; Panga; Medje).—*Vinago calva* subsp.? BERLIOZ, 1936, Bull. Mus. Paris, (2) VIII, p. 327 (? Mwahi).

SPECIMENS.—Boma, ♀, Jan. 12. Lié, ♂, July 27. Kamunionge, ♂, Sept. 21. Avakubi, 3 ♂, Oct. 9, 20; ♀, Oct. 6. Bafwabaka, 4 ♂, Jan. 3, Dec. 30; 2 ♀, Dec. 29, 31. Medje, 3 ♂, Jan. 18, July 27, Sept. 28; 3 ♀, July 25, Sept. 5; 4 ♀ juv., Aug. 5, 6, Sept. 18, 28.

ADULTS.—Iris light blue; basal half of bill and swollen skin of forehead bright scarlet, distal half of bill pale bluish gray; feet yellow with claws light gray.

DISTRIBUTION OF THE SPECIES.—From the Gambia, the Shari River, the Bahr-el-Ghazal Province, and southwestern Abyssinia, south through almost the entire width of the continent to Great Namaqualand and Griqualand West. Also on Fernando Po and Princes Island. If *V. delalandii* (Bonaparte), with greenish-gray breast, is also to be regarded as a race of *calva*—and this seems possible—then the range of the species extends south through Portuguese East Africa to the coast of Natal and eastern Cape Province. Grote (1931) argued that all these forms are subspecies of *Treron australis* (Linnæus); but I am still convinced that the Madagascan green fruit-pigeon is specifically distinct.

Vinago calva is a lowland bird, inhabiting forest and savannas, ascending but little beyond 6000 feet. It is divisible into approximately fourteen races. In the northern and western forms the upper surface of the tail is gray, but it becomes washed with green in the southeastern representatives. Other subspecific characters include the relative yellowness of head and breast, the distinctness of the gray collar on hind-neck, and the fleshy frontal cere, which when highly developed is generally larger in the male sex.

The races of the West African forests have the deepest green coloration and largest red cere. Forested Upper Guinea has *V. c. sharpei* Reichenow; the drier area of Portuguese Guinea and Gambia, *nudirostris* Swainson; Fernando Po, *poensis* (Hartert and Goodson).

V. c. calva is a deep green forest race, with very large red cere, 11–17 mm. long, and with very little gray on hind-neck. Wings 150–164 mm. It ranges from the Cameroon-Gaboon coast, Lower Congo, and northern Angola across the Congo basin to the eastern Ituri and the Manyema district. In the savannas just to the north lives *uellensis* Reichenow, differing but slightly in its more yellowish-green head and breast. To the east of the Congo forest lives *salvadorii* Dubois, still more yellowish

green on head and breast, with more distinct gray collar, wings about 160–170 mm., fairly well-developed cere (9–13 mm. long), but feet red in life. In all the races previously mentioned the feet are yellow. The only other race known from the Congo is *chobiensis* Roberts, like *salvadorii*, but with wings 171–180 mm., tail more greenish, red cere 8–9 mm. It is found from Marungu and Katanga to the middle Zambesi.

The remaining races are *granviki* (Grote), from the southeastern shores of Lake Victoria to central Tanganyika Territory, doubtfully valid; *brevicera* (Hartert and Goodson), of East Africa east of the Rift Valley; *ansorgei* (Hartert and Goodson), of Angola south of the Kwanza Valley; *vylderi* (Gyldenstolpe), of Southwest Africa; *wakefieldi* (Sharpe), coastlands of East Africa; *schalowi* (Reichenow), supposedly from Kimberley; and *damarensis* Reichenow, from the Okavango River. The last three are green-tailed, but *wakefieldi* is not a distinct species, as is evident from the transition seen in *salvadorii* and *chobiensis*.

Three additional forms often segregated under *V. delalandii* (Bonaparte) are also probably races of *V. calva*.

The range of *V. c. calva* in the Congo includes the whole of the equatorial forest and extends southward through the Kasai district and Lower Congo to northern Angola. It is difficult to draw a line, on the northern border of the forest, between *calva* and *uellensis*. In habits they are so alike that they may best be considered together.

In the forest, flocks of twenty to forty green fruit-pigeons are frequently seen flying swiftly overhead. They alight in the high trees of virgin forest, but seem far more fond of the second growth where the parasol tree (*Musanga*) is so common, furnishing abundant food.

The tall trees and strips of woods along streams are their favorite haunts in the savannas. Far overhead these fruit-pigeons may look surprisingly small, till the field glass suddenly reveals their identity. As a flock leaves a tree their flight is very noisy. Their undove-like voice is readily remembered with the aid of the following sentence:

“OH WELL, VERY WELL; GETTING RICH, GETTING RICH;
(soft, low, musical) (harsh, quick)
THAT’S SO, THAT’S SO.”
(fainter, slower)

This may be followed by a few additional clucks; or the series is sometimes abbreviated and stops after the first “getting rich.”

Never have I known green pigeons to come to the ground except in bare spots of ground in the forest, swampy during the rains, known lo-

cally as "èdo's." They seem to come in parties to eat earth, and are trapped there by natives.

Every one of our adult specimens had gonads more or less enlarged. In the Ituri, nests or young were found from July to December, and breeding may go on through the whole year. In the savannas of the Uelle nesting takes place at least from August to December, but may be interrupted in the dry season.

The nests of *V. c. calva* and *uellensis* are frail structures of dry sticks, generally in a fork of a small tree in second growth. I have never seen more than a single white egg or nestling. Bates gave measurements of eggs of *calva* as 28–33 mm. \times 22–25. My own measurements for *calva* and *uellensis* fall within these limits.

Except for earth, probably eaten at times, these pigeons restrict their diet to fruit: wild figs, the fruit of the parasol tree, and various berries and other fruits.

Vinago calva uellensis Reichenow

Vinago calva uellensis REICHENOW, 1912, J. f. O., p. 320 (type locality: Yakoma on the Uelle R. Also from Koloka). BANNERMAN, 1922, Rev. Z. A., X, p. 198; 1931, 'Birds Trop. W. Afr.,' II, p. 381, foot-note. W. L. SCLATER, 1924, 'Syst. Av. Æth.,' pt. 1, p. 175. BOWEN, 1932, Ibis, p. 598 (Rangu in S. Bahr-el-Ghazal). SCHOUTEDEN, 1936, Ann. Mus. Congo, Zool., I, f. 2, p. 78 (in part. Rungu; Mauda; Dika; Abimva; Djalasinda; Mahagi-Niarembe).—*Treron calva* SHARPE, 1884, Journ. Linn. Soc. Lond., Zool., XVII, p. 436 (Semio). HARTLAUB, 1887, Zool. Jahrb., II, p. 329 (Tomaya). EMIN, 1919, in Stuhlmann 'Tageb. Emin Pascha,' II, p. 495.—*Treron calvus* SHELLEY, 1888, P. Z. S. Lond., p. 45.—*Vinago calva* SALVADORI, 1893, 'Cat. Birds Brit. Mus.,' XXI, p. 20. SCHUBOTZ, 1921, 'Tageb. Emin Pascha,' VI, p. 242 (Mundu).—*Vinago calva nudirostris* HARTERT, 1899, in Ansorge, 'Under the African Sun,' App., p. 329 (Fajao on Victoria Nile). REICHENOW, 1901, 'Vög. Afr.,' I, p. 396 (in part. Sassa; Langomeri).—*Vinago nudirostris calva* NEUMANN, 1904, J. f. O., p. 343 (in part. Niam-Niam).—? *Vinago waalia* ALEXANDER, 1907, 'From the Niger to the Nile,' II, p. 308 (Kodja hill near Mt. Gaima).—*Treron calva uellensis* HARTERT AND GOODSON, 1918, Nov. Zool., XXV, p. 350 (Businde on Victoria Nile). GROTE, 1925, J. f. O., p. 96.—*Treron australis uellensis* GROTE, 1931, Anz. Orn. Ges. Bayern, II, p. 140.

SPECIMENS.—Niangara, 3 ♂, Nov. 16, 17, Dec. 6; ♀, Nov. 27; ♀ juv., Nov. 16. Faradje, ♂, Nov. 2; 3 ♀, Mar. 2, Aug. 11, Nov. 21; ♀ juv., Aug. 23.

Colors of soft parts exactly as in *V. c. calva*, feet likewise yellow.

DISTRIBUTION.—Savannas north to the Cameroon-Congo forest belt, from French Equatorial Africa eastward to the southern Bahr-el-Ghazal, the Uelle district, to the Victoria Nile and perhaps S. W. Abyssinia.¹

¹ See Grant and M.-Praed, 1937, B. B. O. C., LVII, p. 115.

It also seems to extend southward along the eastern edge of the Ituri forest, to judge from a pair collected at Bogoro, on the top of the escarpment west of Lake Albert, which have yellow feet. A male from the new post of Beni, west of the Semliki River, is perhaps closer to *V. c. calva*.

Common in the Uelle district and on the Lendu Plateau, but extending only a little way north into the Sudan, and perhaps replaced on the low western shore of Lake Albert by *V. c. salvadorii*. Its behavior has already been described under *V. c. calva*.

Vinago calva salvadorii Dubois

Vinago salvadorii DUBOIS, 1897, P. Z. S. Lond., p. 784 (eastern and central tropical Africa; restricted type locality: Lake Tanganyika).—*Treron nudirostris* HARTLAUB, 1881, Abhandl. Naturwiss. Verein Bremen, VII, pp. 85, 117 (Mahagi). SCHWEINFURTH AND RATZEL, 1888, 'Emin-Pascha,' German Ed., p. 159 (N. W. shore L. Albert). EMIN, 1888, 'Emin Pasha Centr. Afr.,' p. 159; 1919, in Stuhlmann, 'Tageb. Emin Pascha,' II, p. 79; 1922, idem, III, p. 374 (Mswa).—*Treron crassirostris* DUBOIS, 1886, Bull. Mus. Roy. Hist. Nat. Belg., IV, p. 149 (L. Tanganyika).—*Vinago calva nudirostris* REICHENOW, 1901, 'Vög. Afr.,' I, p. 396 (in part. Mahagi; Urundi).—*Vinago nudirostris* SHARPE, 1902, Ibis, p. 98 (E. Ruwenzori, 6000 ft.). SALVADORI, 1914, Ann. Mus. Zool. Napoli, IV, No. 10, p. 11 (in part. Ruanda; Batengatta in Kagera Valley).—*Vinago nudirostris salvadorii* NEUMANN, 1904, J. f. O., p. 343. SASSI, 1912, Ann. Naturh. Hofmus. Wien, XXVI, p. 349 (Baraka; N. W. of L. Tanganyika; Rutshuru Plain).—*Vinago calva* var. *nudirostris* DUBOIS, 1905, Ann. Mus. Congo, Zool., I, f. 1, p. 27 (in part. Tanganyika).—*Vinago nudirostris* between *salvadorii* and *calva* SASSI, 1912, Ann. Naturh. Hofmus. Wien, XXVI, p. 350 (Rutshuru Plain).—*Vinago calva salvadorii* SCHOUTEDEN, 1914, Rev. Z. A., III, p. 261 (Kilo); 1918, idem, V, p. 226 (Beni; Zambo; Mutiba; Bigoisagua; upper Semliki R.; Kibati; Baraka); 1932, idem, XXII, p. 130 (Lulenga; Ngoma; Usumbura); 1933, idem, XXII, p. 379 (Rugobagoba). C. GRANT, 1915, Ibis, p. 37. LÖNNBERG, 1917, Arkiv f. Zool., X, No. 24, p. 10 (Kasindi; Rutshuru). SCHUBOTZ, 1921, 'Tageb. Emin Pascha,' VI, p. 66. MENEGAUX, 1923, 'Voyage Babault Afr. Orient.,' Ois., p. 17. W. L. SCLATER, 1924, 'Syst. Av. Æth.,' pt. 1, p. 175.—*Treron calva salvadorii* HARTERT AND GOODSON, 1918, Nov. Zool., XXV, p. 351 (W. of L. Tanganyika; Ruzizi R.; Kwidjwi I.). GROTE, 1924, J. f. O., p. 102.—*Treron australis salvadorii* GROTE, 1931, Anz. Orn. Ges. Bayern, II, p. 140.

ADULT MALE.—Iris light blue, becoming pale gray on outer rim; horny sheath of bill pale bluish gray, soft cere light scarlet (not swollen as in *V. c. calva*); feet deep scarlet, claws bluish gray.

DISTRIBUTION.—Countries east of the Congo forest, from Unyoro and Mount Elgon south to the shores of Lake Tanganyika. It is not quite certain that *salvadorii* inhabits the western shore of Lake Albert north to Mahagi. Specimens from Kilo should certainly be closer to

uellensis, and in the Semliki Valley I should expect *salvadorii* to live only in the grasslands.

At Kitehe in the Rutshuru Plain and at Lulenga near Mt. Mikenso, I have collected undoubted examples of this race. From the highland northwest of Lake Tanganyika, *salvadorii* and *calva* are both reported; and while *salvadorii* may inhabit the lowlands west of that lake, a female from the Marungu highland at 6000 feet is *chobiensis*. I doubt the validity of *V. c. granviki* (Grote), since Dubois's type of *salvadorii* probably came from the southern shores of Lake Tanganyika near Karema or Mpala.

In voice and habits *salvadorii* is like *calva*, but usually found in smaller parties. Small wild figs are a favorite food, but other fruits are undoubtedly eaten. According to Jackson its nest is the usual frail platform of twigs, usually containing a single white egg, about 31.5×23 mm. A second egg may occasionally be laid.

Vinago calva chobiensis Roberts

Vinago schalowi chobiensis A. ROBERTS, 1932, Ann. Transvaal Mus., XV, p. 25 (type locality: Kasane, Chobe R., northern Bechuanaland).—*Treron nudirostris* SCHALOW, 1886, J. f. O., pp. 416, 420 (Masembe in Marungu; Lukumbi R.); 1887, idem, p. 228. MATSCHIE, 1887, J. f. O., p. 146 (Lufuku R.; L. Itambe; Lufua R.; Likulwe R.).—*Vinago calva* REICHENOW, 1901, 'Vög. Afr.,' I, p. 394 (in part. Marungu; Katanga).—*Vinago schalowi* NEAVE, 1910, Ibis, p. 86 (S. Kalule R.; Lualaba R.; Kambove; Lufupa R.). MOURITZ, 1914, Ibis, p. 34 (Mokambo Hills).—*Vinago nudirostris* SALVADORI, 1914, Ann. Mus. Zool. Napoli, IV, No. 10, p. 11 (in part. Near L. Bangweolo).—*Vinago wakefieldi schalowi* W. L. SCLATER, 1924, 'Syst. Av. Æth.,' pt. 1, p. 176 (Katanga). SCHOUTEDEN, 1930, Rev. Z. A., XVIII, p. 281 (Elisabethville).—*Vinago ? schalowi* DE RIEMAECKER, 1927, Rev. Z. A., XIV, p. 267 (Elisabethville; Kasepa R.; Lubumbashi R.).

DISTRIBUTION.—From northern Bechuanaland and Victoria Falls to Marungu, the Upper Katanga, and southern Lulua district. Specimens from the Katanga have usually been referred to *schalowi* Reichenow, from the "Diamond Fields," presumably near Kimberley. Roberts has shown that birds from near Lake Ngami are yellower than his *chobiensis*,¹ and it seems to me that the name *schalowi* should be used for Lake Ngami birds.² A specimen from Kasane agrees closely with ours from the Katanga. The Congo Museum has twenty skins from Lukafu, Kansenia, Kanzenze, and Dilolo.

V. c. chobiensis is a perfect intermediate between *wakefieldi* and *ansorgei*, differing mainly from *salvadorii* by its lighter, greener tail,

¹ See also A. Roberts, 1935, Ann. Transvaal Mus., XVI, p. 86.

² See, however, Grant and M.-Praed, 1937, B. B. O. C., LVII, pp. 74-77.

with paler tips on median rectrices, longer wings and shorter cere. Feet usually red. Needless to say, in behavior it is exactly like *salvadorii*, common in the Katanga, especially in gallery forests, and met with in flocks up to fifteen. They feed particularly on small wild figs.

[*Vinago delalandii orientalis* Gunning and Roberts]

Vinago orientalis GUNNING AND ROBERTS, 1911, Ann. Transvaal Mus., III, p. 109 (type locality: Boror, Portuguese East Africa).—*Vinago delalandei* NEAVE, 1907, Mem. Proc. Manchester Lit. Phil. Soc., LI, No. 10, p. 8 (Mbala country; E. bank of Loangwa R.).—*Vinago delalandii orientalis* W. L. SCLATER, 1930, 'Syst. Av. Æth.,' pt. 2, App., p. 849 (Zambesi Valley).

The fruit-pigeons grouped under *delalandii*, only races perhaps of *calva*¹ with green tails and grayish breasts, range from eastern Cape Province and Natal to eastern Rhodesia, Nyasaland, and the coast of East Africa in the vicinity of Mombasa. Three races of *delalandii* were recognized by Sclater, of which only one, *orientalis*, approaches the borders of the Congo in the lowlands of Northeastern Rhodesia. It is readily distinguished from *V. c. chobiensis* by its dull gray-green breast and head, more conspicuous bluish-gray collar, and brighter yellowish-green back. Probably it does not reach our limits.

ORDER CUCULIFORMES

FAMILY Cuculidæ. CUCKOOS, COUCALS

KEY TO THE AFRICAN GENERA

- 1.—Claw of the inner hind toe longer than any of the others, straight; size rather large, wing always exceeding 140 mm. CENTROPUS, p. 206.
Claw of inner hind toe curved, not longer than that of outer front toe. 2.
- 2.—Head with a conspicuous crest, wing always exceeding 140 mm.
Head without crest. CLAMATOR, p. 181.
- 3.—Nostrils slit-like or oval. 4.
Nostrils round, enclosed in a short soft tube. 5.
- 4.—Bill almost wholly yellowish; tail not barred or spotted, much longer than wing. CEUTHMOCHARES, p. 203.
Maxilla almost entirely blackish; tail conspicuously barred underneath, not longer than wing. PACHYCOCCYX, p. 184.
- 5.—Plumage of upperparts conspicuously glossed with green, coppery, or lilac; size small, wing never exceeding 130 mm. CHRYSOCOCCYX, p. 197.
Plumage of upperparts mainly gray, brownish, or black, with at most slight luster; size larger, wing never less than 130 mm. 6.

¹ Vincent, 1934, Ibis, p. 526, states that his specimens from northern Portuguese East Africa show "absolute intergradation" between *delalandii* and *wakefieldi*.

- 6.—Tail longer than the wing.....CERCOCOCYX, p. 193.
 Tail shorter than the wing.....CUCULUS, p. 186.

Subfamily Cuculinæ

KEY TO THE CONGO SPECIES OF CLAMATOR

- 1.—Wing-coverts grayish brown, spotted with white; wing over 180 mm. *C. glandarius*.
 Wing-coverts uniformly dusky or black, though there is a white patch at the base of primaries; wing not exceeding 180 mm.....2.
 2.—Wing over 165 mm.; throat and fore-neck heavily streaked with black, posterior underparts whitish.....*C. cafer*.
 Wing not exceeding 165 mm.; underparts white or gray, uniform or with very fine streaking on fore-neck, rarely the whole underparts black. . *C. jacobinus*.

Clamator cafer (Lichtenstein)

Cuculus cafer A. LICHTENSTEIN, 1793, 'Cat. Rer. Rar. Hamburg,' p. 14 (type locality: Kaffirland, i.e., eastern Cape Province).—*Coccyzus cafer* SHARPE, 1884, Journ. Linn. Soc. Lond., Zoöl., XVII, p. 433 (Semio). REICHENOW, 1887, J. f. O., pp. 299, 308 (Manyanga; Kasongo); 1902, 'Vög. Afr.,' II, p. 76. SHELLEY, 1891, 'Cat. Birds Brit. Mus.,' XIX, p. 221. FLOWER, 1894, P. Z. S. Lond., p. 600 (Ipoto). DUBOIS, 1905, Ann. Mus. Congo, Zool., I, f. 1, p. 36 (Tanganyika; Prov. Orientale; Ituri; Umangi; Kisantu; L. Leopold II). LÖNNBERG, 1907, Arkiv f. Zool., III, No. 21, p. 6 (Kingoyi). SALVADORI, 1907, Boll. Mus. Zool. Anat. Torino, XXII, No. 570, p. 2 (Lukonzolwa); 1911, Ann. Mus. Civ. Stor. Nat. Genova, (3) V, p. 444 (Uelle). MENEGAUX, 1918, Rev. F. O., V, p. 258 (Lower Congo). DE RIEMAECKER, 1927, Rev. Z. A., XIV, p. 274 (Shindaika).—*Oxylophus afer* DUBOIS, 1886, Bull. Mus. Roy. Hist. Nat. Belgique, IV, p. 147 (L. Tanganyika). SCHALOW, 1886, J. f. O., pp. 417, 426, 430 (Kaue R.; Lugoma R.; Lufua R.). MATSCHIE, 1887, J. f. O., p. 149 (Lufuku R.; Likulwe R.).—*Coccyzus afer* HARTERT, 1900, Nov. Zool., VII, p. 31 (Karimia).—*Clamator cafer* REICHENOW, 1911, 'Wiss. Ergeb. D. Z.-Afr. Exp.,' III, p. 273 (S. slope Mt. Karisimbi). SASSI, 1912, Ann. Naturh. Hofmus., Wien, XXVI, p. 376 (Urundi; N. W. of L. Tanganyika; Kisenyi; Kasindi; Beni; Moera). SCHOUTEDEN, 1914, Rev. Z. A., III, p. 263 (Kilo); 1923, Rev. Z. A., XI, p. 319 (Belenge; Basongo; Luebo; Makumbi); 1932, Rev. Z. A., XXII, p. 129 (Burunga; Ngoma; L. Gando; Usumbura); 1936, Ann. Mus. Congo, Zool., I, f. 2, p. 80 (Buta; Panga; Poko; Mauda; Mahagi Port). LÖNNBERG, 1917, Arkiv f. Zool., X, No. 24, p. 16. BANNERMAN, 1922, Rev. Z. A., X, p. 122; 1933, 'Birds Trop. W. Afr.,' III, p. 108, Fig. 35. GLYDENSTOLPE, 1924, K. Svenska Vet. Akad. Handl., (3) I, No. 3, p. 246 (Burunga; Masidongo; Kartushi).—*Clamator caffer* SCHOUTEDEN, 1918, Rev. Z. A., V, p. 239 (Semliki Valley; Kibati; Ruzizi Valley; Baraka); 1923, Rev. Z. A., XI, p. 391 (Kwamouth); 1924, idem, XII, pp. 264, 411 (Kisantu; Eala); 1925, idem, XIII, p. 7 (Bolobo); 1933, idem, XXII, p. 379 (Mutura). STONE, 1936, Proc. Acad. Nat. Sci. Phila., LXXXVIII, p. 560 (Ekibondo).

SPECIMENS.—Gamangui, ♂, ♀, June 19. Medje, ♂, Sept. 7; 2 ♀, Sept. 5, Oct. 3. Pawa, 2 ♂, July 12, 14; ♀, July 11. Aba, ♂, Dec. 12.

ADULTS.—Iris very dark brown; bill black; feet bluish or bluish gray, with black claws and yellowish-gray soles.

DISTRIBUTION.—Senegal and Abyssinia south to the Cape Province, but virtually absent from many forested sections in the Congo. Along the coast of East Africa black-breasted examples occur, known as *albonotatus* Shelley, but apparently mutants. The type of *caroli* (Norman) from the Gaboon seems to be an individual lacking chest-streaks.¹

At Avakubi I saw but one example, collected by Dr. Rosati; but near the northern border of the Ituri forest they became more frequent. The species occurs commonly in the Uelle, and in most other lowland savannas of the Congo. The call, heard frequently in the rainy season, commences with a hollow-toned "kur, kur, kur—," the syllables repeated about a dozen times. Then the bird hesitates a moment, and changes abruptly to a rapid series of short notes like "kwī," about twenty in all, dying away at the end.

From the eastern Congo border I have seen nestlings taken in May and October. The eggs are known to be uniform greenish blue, 25–26 mm. × 20.5–21, and in South Africa they are laid in nests of *Turdoides jardinae*, the eggs of which are similarly colored. At Beni on October 10, 1927, a native hunter brought me a young *C. cafer*, just able to fly, which he had found in company with an adult male forest babbler, *Phyllanthus atripennis bohndorffi*. The young cuckoo was so rufous that he took it for the young of the babbler.² Other specimens of *C. cafer* in juvenal dress are far less rufous, and all lack the distinct light tips on rectrices.

The stomachs of nine specimens of this cuckoo contained caterpillars in every case, while one had eaten two grasshoppers, and another a winged ant.

***Clamator jacobinus jacobinus* (Boddaert)**

Cuculus jacobinus BODDAERT, 1783, 'Tabl. Planches Enluminées,' p. 53 (type locality: Coromandel coast of India, ex Daubenton).—*Coccystes jacobinus* SHARPE AND BOUVIER, 1878, Bull. Soc. Zool. France, III, p. 74 (San Antonio). REICHENOW, 1902, 'Vög. Afr.,' II, p. 78 (Kasongo). DUBOIS, 1905, Ann. Mus. Congo, Zool., I, f. 1, p. 36.—*Oxylophus jacobinus* DUBOIS, 1886, Bull. Mus. Roy. Hist. Nat. Belg., IV, p. 147 (L. Tanganyika).—*Coccystes pica* REICHENOW, 1887, J. f. O., p. 308.—*Clamator jacobinus* LÖNNBERG, 1917, Arkiv f. Zool., X, No. 24, p. 16 (Kasindi; Beni). SCHOUTEDEN, 1918, Rev. Z. A., V, p. 239 (Bulaimu; Sanghé-Ruzizi).—*Clamator jacobinus jacobinus* SCLATER AND M.-PRAED, 1919, Ibis, p. 641 (Tembura). BANNERMAN, 1933, 'Birds Trop. W. Afr.,' III, p. 105, Fig. 34 (Landana). *Clamator jacobinus pica* STRESEMANN, 1924, J. f. O., pp. 80, 83.

¹ See Stresemann, 1924, J. f. O., pp. 79–83; Grant and M.-Praed, 1936, B. B. O. C., LVI, pp. 124–126.

² See Jourdain, 1925, P. Z. S. London, pp. 639–667.

DISTRIBUTION OF THE SPECIES.—Ceylon, India, and Africa from Senegal to Eritrea, south through eastern Africa to the Cape, also to Angola, the Gaboon coast, and São Tomé. Not found in the Congo forest, nor on high mountains.

The white-breasted birds of Africa can scarcely be distinguished from typical *jacobinus* of India, although Hartert¹ separated them as *C. j. pica* Hemprich and Ehrenberg. South of the Zambesi many individuals are grayer below, more streaked on throat and fore-neck. These are *C. j. hypopinarus*, found sparingly north to the northeastern Congo and even southern Abyssinia, perhaps as migrants. The black-breasted *serratus* (Sparrman) of extreme South Africa is perhaps a color-phase rather than a true race,² and examples with this coloration have been reported from southern Abyssinia, French Equatorial Africa, and the Gold Coast.

In the Congo *jacobinus* is limited mainly to the eastern and southern savannas, not yet known from the Uelle district. Our nine skins from the Kasai were all taken between November and April, and among them is a young bird with remiges and rectrices not fully grown, taken at Luluabourg on January 15. Eggs laid by *jacobinus* in Northeast Africa are greenish, as they are in India. Erlanger³ found them in nests of *Argya rubiginosa* and *Pycnonotus* and gave measurements as 22.1–25 mm. \times 19.2–21. It has been suggested that white-breasted Indian birds may winter in East Africa, but some certainly breed in the western Sudan.⁴ White eggs reported from South Africa may be those of *hypopinarus*.

***Clamator jacobinus hypopinarus* (Cabanis and Heine)**

Coccystes hypopinarus CABANIS AND HEINE, 1862, 'Mus. Hein.,' IV, p. 47 (Cape of Good Hope; restricted type locality: Rondebosch).—*Coccystes jacobinus* O.-GRANT, 1910, Tr. Z. S. Lond., XIX, p. 423 (Mokia, S. E. of Ruwenzori).—*Clamator hypopinarus* W. L. SCLATER, 1924, 'Syst. Av. Æth.,' pt. 1, p. 181 ("Ruwenzori").—*Clamator jacobinus hypopinarus* FRIEDMANN, 1930, Bull. 153, U. S. Nat. Mus., p. 271. SCHOUTEDEN, 1936, Ann. Mus. Congo, Zool., I, f. 2, p. 80 (Mahagi Port; Aru).—*Clamator jacobinus serratus* M.-PRAED AND GRANT, 1937, Ibis, p. 405.

DISTRIBUTION.—Breeds in Cape Province, Natal, and perhaps adjacent districts of South Africa, migrating northward in February and March, returning in September and October. It is found in Southern Rhodesia and Nyasaland during part of the year, and specimens

¹ 1915, Nov. Zool., XXII, p. 254.

² See Stresemann, 1924, J. f. O., pp. 79–83; and Godfrey, 1934, Ool. Rec., XIV, pp. 67–69.

³ 1905, J. f. O., p. 483.

⁴ See Paludan, 1936, Vidensk. Medd. Dansk naturh. Foren., C, p. 92; also Moreau, 1937 Tang. Notes and Records, pp. 5–7.

are known from the base of Ruwenzori (May), Kenya Colony, and southern Abyssinia (April). Dr. Schouteden's specimens, taken in late April and May, seem to be correctly identified; and there is another skin like them in the Congo Museum from the Katanga.

This race must therefore migrate to the savannas of the eastern Congo, and possibly occasional specimens of the black-breasted phase "*serratus*," will also be found to occur there.

In South Africa cuckoos of this species are known to lay white eggs, measuring about $25-27.5 \times 20-23$ mm., which are placed in nests of *Stigmatopelia senegalensis*, *Urocolius indicus*, *Fiscus collaris*, *Pycnonotus capensis*, *P. barbatus*, *P. nigricans*, *Andropadus importunus*, *Campephaga flava*, and *Sigelus silens*.

Clamator glandarius (Linnæus)

Cuculus glandarius LINNÆUS, 1758, 'Syst. Nat.,' 10th Ed., p. 111 (type locality: N. Africa and S. Europe).—*Coccystes glandarius* SHARPE, 1884, Journ. Linn. Soc. Lond., Zool., XVII, p. 432 (Semio). EMIN, 1892, Zool. Jahrb., VI, p. 149 (Njanda). OUSTALET, 1893, Naturaliste, VII, p. 61; 1904, Bull. Mus. Paris, p. 433 (Krebedje). SHELLEY, 1901, Ibis, p. 166 (E. shore of L. Moero). REICHENOW, 1902, 'Vög. Afr.,' II, p. 81 ("Ubangi"; Loango). MENEGAUX, 1918, Rev. Fr. O., V, p. 259 (Lower Congo). SCHUBOTZ, 1921, 'Tageb. Emin Pascha,' VI, p. 94 (Magungo).—*Clamator glandarius* GRANT, 1915, Ibis, p. 416 ("Upper Congo"). SCHOUTEDEN, 1936, Ann. Mus. Congo, Zool., I, f. 2, p. 80 (Buta).

DISTRIBUTION.—Spain to the Persian Gulf, south through Africa to Cape Province, but rare or absent in heavy forests of western and central Africa. Many of those found in Africa may be migrants from the north, yet some are known to breed even as far north as Sierra Leone, Darfur, and Somaliland.

At Landana, Petit believed the majority to be migrants; and this may be true for the Congo, where the great spotted cuckoo is rare. In the Congo Museum there are skins from Blukwa, west of Lake Albert, and Buta in the Lower Uelle. South African birds may also migrate toward the equator.

In Somaliland, Lort Phillips found this cuckoo's eggs in the nest of *Rhinocorax rhipidurus*; in South Africa it lays bluish eggs, speckled with reddish brown or blackish, $32-34$ mm. \times $24.5-26.5$, in nests of *Corvus albus*, *Corvus capensis*, *Onychognathus morio*, *Lamprocolius nitens*, and *Spreo bicolor*.

Pachycoccyx audeberti validus (Reichenow)

Cuculus validus REICHENOW, 1879, Orn. Centralbl., p. 139 (type locality: Muniuni, lower Tana R., E. Africa).—*Pachycoccyx validus* SHELLEY, 1891, 'Cat.

Birds Brit. Mus.,' XIX, p. 225 (Tingasi). REICHENOW, 1902, 'Vög. Afr.,' II, p. 83. DUBOIS, 1905, Ann. Mus. Congo, Zool., I, f. 1, pp. 1, 35, Pl. I, fig. 2 (Banalia). NEAVE, 1910, Ibis, p. 116 (Mpandi R.). SLATER AND M.-PRAED, 1919, Ibis, p. 642 (Mt. Baginze). BANNERMAN, 1921, Ibis, p. 96. SCHOUTEDEN, 1936, Ann. Mus. Congo, Zool., I, f. 2, p. 80.—*Coccystes brazzae* OUSTALET, 1886, Naturaliste, III, p. 229 (type locality: Diele, French Congo). REICHENOW, 1902, 'Vög. Afr.,' II, p. 80.—*Pachycoccyx validus validus* BANNERMAN, 1933, 'Birds Trop. W. Afr.,' III, p. 99, Fig. 32.

SPECIMENS.—Babeyru, ♀ im., July 29. Niangara, ♂, Dec. 4.

ADULT MALE.—Iris dark brown, eyelids yellow; maxilla black, mandible yellow with dusky tip; feet bright yellow with claws black.

IMMATURE FEMALE.—Iris dark brown, rim of eyelids chrome-yellow; maxilla blackish, mandible grayish green, corners of mouth lemon-yellow; feet cadmium-yellow, claws black.



Fig. 12. *Pachycoccyx a. validus*. $\times 2/3$.

DISTRIBUTION OF THE SPECIES.—Madagascar, and Africa from Togoland to the southern Bahr-el-Ghazal, Tana River, and south to southern Angola and the eastern Transvaal. The typical race is restricted to Madagascar; *validus* occupies most of the African range; and *canescens* Vincent, slightly paler than *validus*, is a southern race which extends to Nyasaland and perhaps to southern Angola.¹ *P. brazzae* is a synonym of *validus*.

P. a. validus is always a rare bird, though occurring perhaps throughout the Congo lowlands; and probably a bird of gallery forests more often than of heavy forest. I have seen it three times in the Uelle. A pair near Niangara was flying high in the air with shrill whistled calls, alighting in the tops of tall trees. Their appearance was strangely hawk-like.

¹ Grant and M.-Praed, 1937, B. B. O. C., LVII, p. 104, reject *canescens*; and I myself am in doubt.

Fischer's specimen from the lower Tana River, September 25, had an egg in the oviduct, pale greenish blue with small scattered spots of brown and gray-brown.

Bates found no caterpillars in the stomachs of two specimens, nor did we. One of ours had eaten a large green orthopter, the other a mantis. Fischer, however, reported caterpillars in the stomach of the type.

KEY TO THE CONGO SPECIES OF *CUCULUS*

- 1.—Upperparts light rufous barred with blackish. *C. canorus*, reddish phase.
Upperparts gray or blackish. 2.
- 2.—Upperparts gray. 3.
Upperparts blackish, generally glossy. 6.
- 3.—Chest reddish brown, throat light gray. *C. solitarius*.
Throat and chest gray, or whiter barred with dusky. 4.
- 4.—Wing less than 180 mm. *C. poliocephalus*.
Wing exceeding 180 mm. 5.
- 5.—Base of maxilla blackish. *C. canorus*.
Base of maxilla and skin about nostrils yellow. *C. gularis*.
- 6.—Chest black, with narrow borders at most of rufous. *C. c. clamosus*.
Chest largely rufous, sometimes indistinctly barred. 7.
- 7.—Dark barring of lower breast and flanks very heavy, wider than the intermediate light bars; chin sometimes dark gray. *C. c. jacksoni*.
Lower breast with narrower dark bars. 8.
- 8.—Forehead almost as dark as the back, under tail-coverts regularly barred with black. *C. c. gabonensis*.
Forehead distinctly lighter gray than back, under tail-coverts whitish, washed with buff, nearly or entirely without black markings. *C. c. mabiræ*.

Cuculus canorus canorus Linnæus

Cuculus canorus LINNÆUS, 1758, 'Syst. Nat.,' 10th Ed., p. 110 (type locality: Sweden). EMIN, 1892, Zool. Jahrb., VI, p. 149 (L. Albert). REICHENOW, 1902, 'Vög. Afr.,' II, p. 89; 1911, 'Wiss. Ergeb. D. Z.-Afr. Exp.,' III, p. 274. NEAVE, 1907, Mem. Proc. Manchester Lit. Phil. Soc., LI, No. 10, p. 45 (Kafue R.). SALVADORI, 1907, Boll. Mus. Zool. Anat. Torino, XXII, p. 2 (near Lukonzolwa). SASSI, 1912, Ann. Naturh. Hofmus. Wien, XXVI, p. 376 (N. W. of L. Tanganyika; Beni). SCHOUTEDEN, 1918, Rev. Z. A., V, p. 240 (Baraka; Kasindi; old Mission St. Gustave); 1932, idem, XXII, p. 129 (Ngoma); 1933, idem, XXII, p. 379 (Nyundo); 1936, Ann. Mus. Congo, Zool., I, f. 2, p. 79 (Mauda; Buta). SCLATER AND M.-PRAED, 1919, Ibis, p. 642 (Mt. Baginzi). SCHUBOTZ, 1921, 'Tageb. Emin Pascha,' VI, p. 95 (Tunguru). DE RIEMAECKER, 1927, Rev. Z. A., XIV, p. 273 (Elisabethville; Lubumbashi R.).—*Cuculus canorus*? EMIN, 1894, J. f. O., p. 166 (old Irumu).—*Cuculus canorus canorus* SCHOUTEDEN, 1923, Rev. Z. A., XI, p. 320 (Macaco). GROTE, 1930, Mitt. Zool. Mus. Berlin, XVI, p. 60. BANNERMAN, 1933, 'Birds Trop. W. Afr.,' p. 83.

¹ Immature specimens are dull brown above, feathers sometimes tipped with whitish, or with indistinct bars of buff; below barred with dusky, from throat to under tail-coverts, on whitish ground.

SPECIMENS.—Avakubi, ♀, Apr. 17. Dungu, ♀, Feb. 22.

DISTRIBUTION.—*Cuculus c. canorus* breeds from Europe to the Caucasus and Asia Minor, migrating southward into Africa as far as the Transvaal. While found more commonly in eastern Africa, it also visits West Africa, and some of the migrants must cross the Congo forest. One of our specimens was taken in the Ituri forest, and I believe I saw one at Lukolela. Otherwise all the Congo records are from the savanna districts.

Both our specimens are in the rufous phase, but gray birds are far more common. The racial status of many Congo specimens is still doubtful, and the two reported from the old Mission St. Gustave and Ngoma may well be *telephonus*. European cuckoos seem to reach the Congo in September, some wintering even in the Uelle; and a few remain until April.

***Cuculus canorus telephonus* Heine**

Cuculus telephonus HEINE, 1863, J. f. O., p. 352 (type locality: Japan).—*Cuculus canorus telephonus* GYLDENSTOLPE, 1924, K. Svenska Vet. Akad. Handl., (3) I, No. 3, p. 247 (Masidongo). GROTE, 1930, Mitt. Zool. Mus. Berlin, XVI, p. 62. FRIEDMANN, 1930, Bull. 153, U. S. Nat. Mus., p. 259.

DISTRIBUTION.—From Asia—Himalayas and western Siberia to Japan and Kamchatka—migrating southward to the Moluccas and New Guinea, as well as to eastern Africa, as far as the Zambesi Valley. Gyldestolpe obtained two males and a female at Masidongo in the upper Semliki Valley on April 22 and 23, while I have since collected an adult male at Luofu, southeast of Lake Edward, on March 25.

This is a pale race, narrowly barred beneath. It seems probable that other specimens have been taken in the eastern Congo and confused with typical *canorus*.

***Cuculus canorus bangsi* Oberholser**

Cuculus canorus bangsi OBERHOLSER, 1919, Proc. Biol. Soc. Wash., XXXII, p. 22 (type locality: Spain). STRESEMANN, 1928, O. Mb., p. 19 (Karema; S. Ufipa). GROTE, 1930, Mitt. Zool. Mus. Berlin, XVI, p. 62. SCLATER, 1930, 'Syst. Av. Æth.,' App., p. 850.

DISTRIBUTION.—Breeding in Spain and North Africa, migrating in small numbers as far as the southern end of Lake Tanganyika.

This small race was first reported by Stresemann from the southeast shore of Lake Tanganyika. Two immature females from Karema and South Ufipa had wings only 192 and 197 mm. long. An adult female in the Congo Museum, from Tembwe on the west shore, with

wing only 209 mm., seems also to be *bangsi*. The races of *Cuculus canorus* are difficult to distinguish. Meinertzhagen¹ has reported *C. c. subtelephonus* Zarudny from Kenya Colony, while Grant and M.-Praed² claim that only *C. c. canorus* visits eastern Africa.

Cuculus gularis Stephens

Cuculus gularis STEPHENS, 1815, in Shaw, 'Gen. Zool.,' IX, p. 83, Pl. xvii (type locality: Camdeboo, Cape Colony). SHELLEY, 1891, 'Cat. Birds Brit. Mus.,' XIX, p. 244 (Lado; Sassa). REICHENOW, 1902, 'Vög. Afr.,' II, p. 91. SASSI, 1912, Ann. Naturh. Hofmus. Wien, XXVI, p. 376 (Baraka). LÖNNBERG, 1917, Arkiv f. Zool., X, No. 24, p. 17 (Kasindi). SCHOUTEDEN, 1918, Rev. Z. A., V, p. 240 (Beni; Moera; old Mission St. Gustave); 1923, idem, XI, p. 391 (Kwamouth); 1926, idem, XIII, p. 189 (Lundu in Upper Mayombe); 1930, idem, XVIII, p. 282 (Elisabethville).—*Cuculus canorus* NEAVE, 1910, Ibis, p. 116 (Upper Lualaba R.).—*Cuculus canorus gularis* BANNERMAN, 1922, Rev. Z. A., X, p. 118.

SPECIMENS.—Niangara, ♂, Jan. 22; 2 ♀, Dec. 16, May 2. Dungu, ♂, ♀, Feb. 28. Faradje, ♂, Apr. 25. Garamba, ♀, June 15.

ADULTS.—Iris yellow (male) or light brown (female), rim of eyelids yellow; outer part of bill blackish, base orange-yellow, corners of mouth and whole interior of mouth reddish orange; feet yellow.

DISTRIBUTION.—From Natal and Great Namaqualand northward to Abyssinia, the Anglo-Egyptian Sudan, the vicinity of Lake Chad, and the Gambia River. But it does not enter the equatorial forests, and I have seen no specimen from the Kasai district.

C. gularis is closely allied to *canorus*, but its juvenal plumage seems much grayer and its voice distinctly different. The soft unaccented "coo - coo" of the male *gularis* is very similar to the call of a hoopoe. Once I heard a female give a ringing "kip-ip-p-p-p!" Our seven specimens had eaten nothing but caterpillars.

In the Upper Uelle the gray African cuckoo is common in the savannas during the dry season, and seems to breed there. Arriving toward December, and regarded by natives as the harbinger of drought, it usually leaves in early May, no doubt going northward.³ In South Africa the species is found only from October to March, and probably migrates toward the equator.

Cuculus poliocephalus rochii Hartlaub

Cuculus rochii HARTLAUB, 1862, P. Z. S. Lond., p. 224 (type locality: Madagascar).—*Cuculus leptodetus* DUBOIS, 1886, Bull. Mus. Roy. Hist. Nat. Belg., IV, p. 147 (L. Tanganyika).—*Cuculus stormsi* DUBOIS, 1887, Bull. Mus. Roy. Hist.

¹ 1937, Ibis, pp. 755, 756.

² 1937, B. B. O. C., LVII, p. 89.

³ See Lynes, 1925, Ibis, p. 355, for occurrence in Darfur.

Nat. Belg., V, p. 3, Pl. II (type locality: L. Tanganyika); 1905, Ann. Mus. Congo, Zool., I, f. 1, p. 35.—*Cuculus poliocephalus* REICHENOW, 1902, 'Vög. Afr.,' II, p. 92; 1911, 'Wiss. Ergeb. D. Z.-Afr. Exp.,' III, p. 274 (Kisenyi). SASSI, 1912, Ann. Naturh. Hofmus. Wien, XXVI, p. 376. LÖNNBERG, 1917, Arkiv f. Zool., X, No. 24, p. 16 (Kasindi). SCHOUTEDEN, 1918, Rev. Z. A., V, p. 240 (Bulaimu).

SPECIMEN.—Avakubi, ♀ im., July 4.

DISTRIBUTION OF THE SPECIES.—Japan, China, and the Himalayas are the breeding range of *C. p. poliocephalus* Latham, which winters in the Greater Sunda Islands, India, and apparently the coastlands of East Africa.¹ Madagascar is the home of *C. p. rochii*, which migrates to eastern Africa, inland to Uganda and the eastern Congo.

The dates of occurrence of *rochii* in Africa fall between June and September. This Madagascan race is distinguished merely by its slightly longer wings, and it alone seems to reach the Congo. Pilette's specimen from Bulaimu is not quite adult, Stegmann's from Kisenyi is a brownish young bird like ours from Avakubi.

Cuculus solitarius Stephens

Cuculus solitarius STEPHENS, 1815, in Shaw, 'Gen. Zool.,' IX, p. 84 (type locality: Caffraria, i.e., eastern Cape Province, ex Levaillant). SHARPE, 1884, Journ. Linn. Soc. Lond., Zool., XVII, p. 432 (Semio). SHELLEY, 1891, 'Cat. Birds Brit. Mus.,' XIX, p. 258 (Lado). EMIN, 1894, J. f. O., p. 166 (old Irumu). FLOWER, 1894, P. Z. S. Lond., p. 597 (Manyuema; Indekaru; Ipoto). REICHENOW, 1902, 'Vög. Afr.,' II, p. 87; 1911, 'Wiss. Ergeb. D. Z.-Afr. Exp.,' III, p. 274 (N. W. of Beni; L. Kivu). DUBOIS, 1905, Ann. Mus. Congo, Zool., I, f. 1, p. 35 (L. Leopold II). JACKSON, 1906, Ibis, p. 527 (Ruwenzori). NEAVE, 1907, Mem. Proc. Manchester Lit. Phil. Soc., LI, No. 10, p. 45 (Kafue R. near Ndola). SALVADORI, 1907, Boll. Mus. Zool. Anat. Torino, XXII, No. 570, p. 2 (near Lukonzolwa). O.-GRANT, 1908, Ibis, p. 312 (N. W. of L. Tanganyika). SASSI, 1912, Ann. Naturh. Hofmus. Wien, XXVI, p. 376 (Ishangi; Beni); 1924, idem, XXXVIII, p. 75 (Ruzizi Valley). SCHOUTEDEN, 1914, Rev. Z. A., III, p. 264 (Kilo); 1918, idem, V, p. 239 (Uvira; Baraka; Moganga forest near Lake Tanganyika; Sibatwa); 1923, idem, XI, p. 320 (Basongo; Luebo; Macaco; Kamaiembi); 1932, idem, XXII, p. 129 (Ngoma); 1936, Ann. Mus. Congo, Zool., I, f. 2, p. 79 (Buta). LÖNNBERG, 1917, Arkiv f. Zool., X, No. 24, p. 17 (Rutshuru). BANNERMAN, 1921, Ibis, p. 91; 1933, 'Birds Trop. W. Afr.,' III, p. 86. GYLDENSTOLPE, 1924, K. Svenska Vet. Akad. Handl., (3) I, No. 3, p. 247 (Kibati; Beni; Kampi na Mambuti). FRIEDMANN, 1930, Bull. 153, U. S. Nat. Mus., p. 260. STONE, 1936, Proc. Acad. Nat. Sci. Phila., LXXXVIII, p. 560 (Saidi in Ituri).—*Cuculus heuglinii* EMIN, in Stuhlmann, 1919, 'Tageb. Emin Pascha,' II, p. 427 (Kuterna); 1921, in Schubotz, 'Tageb. Emin Pascha,' VI, p. 239 (Kuterna).

¹ See Grant and M.-Praed, 1936, B. B. O. C., LVI, pp. 131-133; 1937, idem, LVII, pp. 77, 78; Moreau, 1937, Ibis, pp. 163, 164.

SPECIMENS.—Banalia, ♀ im., Sept. 26. Boma, ♂, Jan. 17. Avakubi, 2 ♀, May 13, 18; ♂ im., Oct. 31. Medje, 3 ♂, Mar. 13, Apr. 12, 16; ♀, Apr. 25; ♂ juv., Oct. 11. Pawa, 2 ♂, July 15. Nzoro, ♂, Apr. 9.

ADULTS.—Iris dark brown, rim of eyelids yellow; maxilla and tip of mandible blackish, remainder of mandible dull yellowish green, corners of mouth yellow to orange; feet yellow or orange-yellow.

DISTRIBUTION.—From Cape Town to Abyssinia and the Gambia, avoiding only the most arid parts of the continent and the tops of high mountains. In the Congo it is almost ubiquitous, in the savanna areas preferring gallery forests and ascending forested mountains to at least 8000 feet.

Although Professor Stresemann¹ at one time regarded *solitarius* as a mutant of the *clamosus* group, we now know it to be a species easily distinguished by its usual call of three whistled syllables descending the scale. This has won it the name of "Mak - bak - bo" among the Medje. Another note less often heard is a high-pitched "quick quick quick quick!" Noisy at the beginning of the rains and for about seven months thereafter, the red-chested cuckoo seems not to be migratory in the Congo, though it is known to visit South Africa only in the southern summer.

Eggs are laid in the northeastern Congo during the period when the birds call. One from the oviduct of a bird taken near Medje was pale greenish white, thickly spotted with browns of varying shades. From South Africa only chocolate-brown eggs are reported, but in East Africa some are said to be plain blue. In the Congo the birds victimized by *C. solitarius* are unknown; in Uganda Dr. van Someren listed *Motacilla a. vidua*, *Pycnonotus tricolor*, and *Atimastillas flavicollis*. Stoneham mentioned *Saxicola torquata*, and Jeffery, *Anthus leucophrys*.

The juvenal plumage of *C. solitarius* is always barred on the lower breast, blackish above, with a white patch on the nape. That of all races of *C. clamosus* is wholly black. Once these cuckoos leave their fosterers they feed mainly on caterpillars, but we found beetles and a winged ant as well in their stomachs.

Cuculus clamosus clamosus Latham

Cuculus clamosus LATHAM, 1801, 'Index Orn.,' II, Suppl., p. xxx (Cape of Good Hope; restricted type locality: Cradock Division). SCHOUTEDEN, 1930, Rev. Z. A., XVIII, p. 282 (near Elisabethville). VINCENT, 1934, Ibis, p. 759 (Elisabethville).—*Cuculus clamosus clamosus* BANNERMAN, 1933, 'Birds Trop. W. Afr.,' III, p. 89, Fig. 29 (Niam-Niam).

¹ 1924, J. f. O., pp. 73-77.

DISTRIBUTION OF THE SPECIES.—Eastern Cape Province to Abyssinia, the Sudan, and Gambia. *C. c. clamosus*, with males almost wholly black, occupies South Africa, extending north to Abyssinia, possibly as a migrant. Occasional specimens have been reported from the Sudanese belt, west to Sierra Leone; but young birds of other races have caused much confusion. Undoubted specimens of *clamosus* have been collected near Elisabethville and Kinda in the southeastern Congo. Others from Funda Biabo and Lukafu show the beginning of intergradation with the next race.

C. c. jacksoni has throat and chest more or less rufous, the lower breast barred. It occupies the savannas of the southern Congo, Uganda, and the southern Sudan. *C. c. gabonensis*, somewhat lighter below, occupies the forests of the Gaboon, Cameroon, and Congo; and *C. c. mabiræ* is a rather doubtful form with still paler underparts, occurring in Uganda and the Belgian Congo.

The habits and voice of typical *clamosus* are like those of *jacksoni*. In South Africa the former is said to lay white eggs, sometimes finely spotted with reddish brown and gray, in nests of *Andropadus importunus* and *Laniarius rufiventris*. Slater gave the measurements as 27–28 mm. \times 21.5–22. At Elisabethville, A. W. Vincent found a young *clamosus* being fed by *Dryoscopus cubla*.

***Cuculus clamosus jacksoni* Sharpe**

Cuculus jacksoni SHARPE, 1902, B. B. O. C., XIII, p. 7 (type locality: Toro, Uganda). ROTHSCHILD, 1910, B. B. O. C., XXVII, p. 14 (300 km. W. of Baraka). SASSI, 1912, Ann. Naturh. Hofmus. Wien, XXVI, p. 377 (Ruzizi). SCHOUTEDEN, 1918, Rev. Z. A., V, p. 240 (Baraka; Loashi). SLATER AND M.-PRAED, 1919, Ibis, p. 643 (Mt. Baginzi).—*Cuculus clamosus* SHARPE, 1884, Journ. Linn. Soc. Lond., Zoöl., XVII, p. 432 (Semio). SHELLEY, 1888, P. Z. S. Lond., p. 42 (Tomaya); 1891, 'Cat. Birds Brit. Mus.,' XIX, p. 260. EMIN, 1894, J. f. O., p. 166 (old Irumu); 1919, in Stuhlmann, 'Tageb. Emin Pascha,' II, pp. 492, 496. FLOWER, 1894, P. Z. S. Lond., p. 601 (Ipoto). REICHENOW, 1902, 'Vög. Afr.,' II, p. 86 (Lendu; Semio); 1911, 'Wiss. Ergeb. D. Z.-Afr. Exp.,' III, p. 273. SCHOUTEDEN, 1914, Rev. Z. A., III, p. 264 (Kilo); 1918, idem, V, p. 239 (Mutiba); 1923, idem, XI, p. 320 (Basongo). LÖNNBERG, 1917, Arkiv f. Zool., X, No. 24, p. 17 (Kasindi). BANNERMAN, 1921, Ibis, pp. 92, 93. SCHUBOTZ, 1921, 'Tageb. Emin Pascha,' VI, p. 259.—*Cuculus gabonensis* DUBOIS, 1905, Ann. Mus. Congo, Zool., I, f. 1, p. 35 (in part. Uelle).—*Cuculus clamosus chalybeus* FRIEDMANN, 1930, Bull. 153, U. S. Nat. Mus., p. 263.—*Cuculus clamosus jacksoni* SCHOUTEDEN, 1936, Ann. Mus. Congo, Zool., I, f. 2, p. 79 (Dika; Mauda).

SPECIMENS.—Dungu, ♀, June 29. Nzoro, 4 ♂, Apr. 22, 23, Aug. 9. Faradje, ♂, May 11, ♀, May 7.

ADULTS.—Iris dark brown, eyelids dusky (not yellow); bill blackish; feet pale flesh-color, with larger scales near tips of toes dark brownish, claws blackish.

DISTRIBUTION.—Northwest Cameroon to Uelle district, southern Bahr-el-Ghazal, and southern Abyssinia; also to Mt. Kenya, Uganda, and the savannas of the eastern and southern Congo to the northern Katanga and Ndala Tando, Angola. It is thus intermediate geographically and in coloration between *clamosus* and *gabonensis*. In the eastern Congo *jacksoni* does not ascend the forested mountain slopes above 5000 feet and seems to avoid the Kivu plateau.

Variation in color is pronounced, males being more apt than females to have a large patch of chestnut on throat and chest. Specimens from north and south of the Congo forest are very much alike. Jackson's cuckoo frequents gallery forests, but also perches in the larger savanna trees.

Its calls, heard frequently in the Uelle from April to June, the early rainy season, are exactly like those of *clamosus* and *gabonensis*. They are of two kinds: three slowly whistled syllables rising in pitch, like "kwa, kwa, KWA"; and a sort of hoarse whistling, paired syllables repeated about ten times, at first increasing in volume, then dying away, which Bates called the "hurry-hurry" call. The first-mentioned whistled call is repeated monotonously, the second less often heard.

The female taken at Faradje on May 7 had an uncalcified egg in her oviduct, and she had in the stomach pieces of the egg of some small bird. Otherwise the four stomachs examined held only caterpillars, most of them hairy.

Cuculus clamosus gabonensis Lafresnaye

Cuculus gabonensis LAFRESNAYE, 1853, Rev. Mag. Zool., Paris, p. 60 (type locality: Gaboon). SHELLEY, 1891, 'Cat. Birds Brit. Mus.,' XIX, p. 259 (Lan-dana). DUBOIS, 1905, Ann. Mus. Congo, Zool., I, f. 1, p. 35 (in part. Kisantu). SALVADORI, 1911, Ann. Mus. Civ. Stor. Nat. Genova, (3) V, p. 444 (Uelle). SASSI, 1912, Ann. Naturh. Hofmus. Wien, XXVI, p. 377 (Beni; Ukaika); 1924, idem, XXXVIII, p. 75. LÖNNBERG, 1917, Arkiv f. Zool., X, No. 24, p. 17 (Kasindi). SCHOUTEDEN, 1918, Rev. Z. A., V, p. 239 (in part. Moera; Kilo); 1936, Ann. Mus. Congo, Zool., I, f. 2, p. 79 (Poko; Medje; Abimva). GRANT AND M.-PRAED, 1936, B. B. O. C., LVI, p. 124.—*Cuculus gabonensis gabonensis* BANNERMAN, 1921, Ibis, pp. 88, 89 (Poko). SCHOUTEDEN, 1923, Rev. Z. A., XI, p. 320 (Basongo); 1924, idem, XII, p. 264; 1925, idem, XIII, p. 7 (Kunungu); 1926, idem, XIII, p. 189 (Ganda Sundi). W. L. SCLATER, 1924, 'Syst. Av. Æth.,' pt. 1, p. 179.—*Cuculus clamosus gabonensis* STRESEMANN, 1924, J. f. O., pp. 76, 77. BANNERMAN, 1933, 'Birds Trop. W. Afr.,' III, p. 92, Fig. 30; 1935, B. B. O. C., LV, p. 155.

SPECIMENS.—Avakubi, ♂, Mar. 21; ♀, Apr. 14. Medje, ♂, June 2. Niangara, ♂, May 8. Nzoro, ♂, Apr. 23.

ADULTS.—Iris dark brown; bill blackish; feet buffy on metatarsi, often shading gradually to dusky brown at tips of toes.

DISTRIBUTION.—Heavily forested regions from Togoland to the Cameroon, Mayombe, eastern Congo, and the Kasai district. Around the borders of the forest, specimens referable to *gabonensis* and to *jacksoni* may be found in the same locality. Intergradation is complete, but the white basal barring on the outer webs of some primaries, characteristic of *jacksoni* is usually wanting in *gabonensis*.

The Gaboon cuckoo lives in the tall forest trees, in the same places as *C. solitarius*, the latter being more common. The voice of *gabonensis* cannot be distinguished from that of *jacksoni*.

At Avakubi the breeding season seemed to coincide with the rains, and a female with ovary enlarged had eaten the light blue egg of some small bird. The eggs of *gabonensis* are known only from two taken by Bates from oviducts. They were creamy white, with spots and speckles of dull purplish or reddish brown and lilac-gray. One measured 23.5×17 mm.

The usual food is caterpillars, often hairy. They were found in all five stomachs examined, and only two birds had eaten other insects, in one case winged ants.

***Cuculus clamosus mabiræ* van Someren**

Cuculus mabiræ VAN SOMEREN, 1915, B. B. O. C., XXXV, p. 116 (type locality; Kasala Forest, Uganda).—*Cuculus gabonensis* SCHOUTEDEN, 1918, Rev. Z. A., V, p. 239 (in part. Baraka).

DISTRIBUTION.—Forests of Uganda, supposedly, where it has been said to live alongside *C. c. jacksoni*. I doubt if it is a valid race, for it is plainly allied to *gabonensis*, much less barred below, and I have seen specimens resembling *mabiræ* from Baraka on Lake Tanganyika and even from Lukolela on the Congo River. Many specimens of *gabonensis* from the Upper Congo are not so regularly and heavily barred beneath as those from the Cameroon. The cuckoo mentioned by Schouteden¹ as *mabiræ* from Mahagi Port appears really to have been a *C. solitarius* from Burunga in the Kivu.

KEY TO THE SPECIES OF *CERCOCOCCYX*

Adults

- 1.—Back more or less distinctly barred with rufous brown on dark olive-brown ground-color, upperparts with a faint greenish gloss; outer webs of remiges and

¹ 1936, Ann. Mus. Congo, Zool., I, f. 2, p. 79.

- greater wing-coverts always broadly barred with rufous brown; tail always exceeding 180 mm. in length, wing varying in length from 69 to 81 per cent of tail.....*C. montanus*.
- Back not barred, but plain dark gray or olive-brown, often with a faint gloss; outer webs of remiges may be barred or spotted with rufous brown, or uniformly dusky brown; tail 160 to 206 mm. long.....2.
- 2.—Outer webs of primaries, secondaries, and greater wing-coverts conspicuously barred or spotted with rufous-brown; crown, back, and rump distinctly dark grayish in color; wing usually less than 75 per cent as long as tail.....*C. mechow*.
- Outer webs of remiges faintly spotted, if at all, with rufous brown, the greater wing-coverts scarcely so marked; back and rump distinctly dark olive-brown in color, crown little if at all grayer; wing always more than 75 per cent as long as tail.....*C. olivinus*.

***Cercococcyx mechow* Cabanis**

Cercococcyx mechow CABANIS, 1882, J. f. O., p. 230 (type locality: Angola). REICHENOW, 1902, 'Vög. Afr.', II, p. 84 (Awamba); 1911, 'Wiss. Ergeb. D. Z.-Afr. Exp.', III, p. 273 (N. of Beni). O.-GRANT, 1910, Tr. Z. S. Lond., XIX, p. 423 (in part. Mpanga forest, Uganda). SASSI, 1912, Ann. Naturh. Hofmus. Wien, XXVI, p. 377 (in part. Beni-Mawambi; Ukaika). SCHOUTEDEN, 1918, Rev. Z. A., V, p. 239 (Bolovet); 1936, Ann. Mus. Congo, Zool., I, f. 2, p. 80 (Buta; Titule; Poko; Mauda; Bondo Mabe). W. L. SCLATER, 1924, 'Syst. Av. Æth.', pt. 1, p. 180. CHAPIN, 1927, Bull. A. M. N. H., LIII, p. 477; 1928, A. M. Nov., No. 313, p. 1 (Congo forest). BANNERMAN, 1933, 'Birds Trop. W. Afr.', III, p. 97, Fig. 31.—*Cercococcyx mechow wellsi* BANNERMAN, 1921, Ibis, pp. 96-99 (in part. Poko).

SPECIMENS.—Avakubi, 7 ♂, June 4, July 31, Aug. 6, 7, 28, Sept. 12, Nov. 1; 3 ♀, Apr. 10, May 27, Nov. 23; ♀ juv., July 10. Medje, ♂, May 25. Nala, ♂, July 2.

ADULTS.—Iris dark brown, rim of eyelids and corners of mouth lemon-yellow; maxilla black, mandible dull greenish with blackish tip; feet chrome-yellow.

DISTRIBUTION.—From Sierra Leone to Cameroon and northern Angola, eastward across the Congo to the forests of Uganda, and doubtless to the northern Manyema district. Primarily a bird of lowland forest, ranging out into gallery forests of the Uelle and doubtless also the Kasai. I have heard it at 5200 feet in forest east of the Rutshuru Plain, but it seldom goes higher.

Mechow's cuckoo is an elusive bird, not rare, frequenting the lower boughs of forest trees, often near watercourses, and sometimes in tall second growth. Its presence is usually made known by its whistled "wheet-wheet-wheet," with all three notes in the same high key. Occasionally, it gives a more protracted series of short silvery whistles, descending the scale slightly. Only the males seem to call. During the drier part of the year, at Avakubi and at Lukolela, they are seldom heard.

The breeding season comes in the first half of the rains, April to July in the Ituri. On July 10, my helper, Nekuma, shot a fully grown young bird¹ being fed by *Illadopsis fulvescens ugandæ*.

Nine out of ten stomachs examined held caterpillars, some of them hairy. Other insects were found twice, also one small snail with hard shell.

***Cercococcyx montanus montanus* Chapin**

Cercococcyx montanus CHAPIN, 1928, A. M. Nov., No. 313, p. 6 (type locality: Kalongi, 6800 ft., W. slope of Ruwenzori. Also from N. W. of L. Tanganyika; W. of Ruzizi Valley; and Wau I. in L. Kivu). MOREAU, 1933, Journ. Ecology, Cambridge, XXI, p. 416.—*Cercococcyx mechowii* O.-GRANT, 1910, Tr. Z. S. Lond., XIX, p. 423 (in part. Mubuku Valley, 7000 ft., E. Ruwenzori). SASSI, 1912, Ann. Naturh. Hofmus. Wien, XXVI, p. 377 (in part. N. W. of L. Tanganyika).—*Cercococcyx mechowii wellsi* BANNERMAN, 1921, Ibis, pp. 96-99 (in part. Ruwenzori).—*Cercococcyx montanus montanus* SCLATER, 1930, 'Syst. Av. Æth.,' App., p. 850.

DISTRIBUTION OF THE SPECIES.—Mountain forests above 5000 feet, from Ruwenzori south to Lake Tanganyika and the highlands southwest of Lake Nyasa, also the Uluguru and Usambara Mountains in eastern Tanganyika Territory. Typical *montanus* is found in the eastern Congo, while *C. m. patulus* Friedmann² is believed to extend from Usambara to South Angoniland. The latter race has the brownish markings of upper-parts more extensive, dark bars on breast more widely spaced, and the wing probably longer, 148, 149 mm. *C. m. montanus* has wings 134-145 mm., tail 182-201.

In forested highlands of the eastern Congo *montanus* is often a common cuckoo, to judge from what I feel sure are its notes. One recalls the triple whistle of *mechowii*, but it is usually of four syllables: "see which-fits-best." This phrase is reiterated without pause. Rarely it is shortened to three syllables, occasionally prolonged to five. At other times a call is given which suggests *C. olivinus*, a "whow, whow" that soon becomes doubled to "three-cow, three-cow—" and lasts ten or fifteen seconds. Or again, a leisurely "you-too" may be repeated indefinitely.

On Ruwenzori we heard these notes from 5300 to 9000 feet, in December and January; at Mulu, 8100-8300 feet, northwest of Lake Edward, the birds were calling in March. Among the Kivu Volcanoes and west of the Ruzizi, in June and July, none were heard. Yet Grauer collected nine specimens northwest of Lake Tanganyika and one on Wau

¹ At first believed to be *olivinus*, but certainly *mechowii*.

² 1928, Proc. New Eng. Zool. Cl., X, p. 84 (Bagilo, Uluguru Mts.).

Island, Lake Kivu, while the Congo Museum has one from Kigezi, British Ruanda, obtained by Jackson.

In juvenal plumage the three species of *Cercococcyx* are more different than when adult. *C. mehowi* is regularly barred below, *C. olivinus* streaked. *C. montanus* has very heavy streaks on the throat, but the dark markings of the breast are more lunulate.

Cercococcyx olivinus Sassi

Cercococcyx olivinus SASSI, 1912, Ann. Naturh. Hofmus. Wien, XXVI, pp. 341, 378 (type locality: Mountains E. of Rutshuru plain, 1600 m). SCHOUTEDEN, 1914, Rev. Z. A., III, p. 263 (Kilo); 1918, idem, V, p. 239; 1936, Ann. Mus. Congo, Zool., I, f. 2, p. 80 (Buta). W. L. SCLATER, 1924, 'Syst. Av. Æth.,' pt. 1, p. 180 (Ituri). CHAPIN, 1928, A. M. Nov., No. 313, p. 2 (Belgian Congo, to Katapena in Lower Katanga). BANNERMAN, 1933, 'Birds Trop. W. Afr.,' III, p. 96 (Semliki Valley).—*Cercococcyx mehowi mehowi* BANNERMAN, 1921, Ibis, p. 97 (Angola).—*Cercococcyx mehowi olivinus* GYLDENSTOLPE, 1924, K. Svenska Vet. Akad. Handl., (3) I, No. 3, p. 248 (Malisawa).

SPECIMENS.—Avakubi, 3 ♂, Aug. 6, 21, Sept. 6; ♀, Sept. 27. Babonde, ♂, July 20.

ADULTS.—Iris rather dark brown, rim of eyelids, corners of mouth, and skin about nostril pale greenish or greenish yellow; maxilla blackish, mandible pale greenish or grayish green with dusky tip; feet bright yellow.

DISTRIBUTION.—Gold Coast to southern Cameroon, Ndala Tando in northern Angola, east to the southern Uelle, Semliki Valley, forest east of the Rutshuru Plain, and Katapena in the Lower Katanga. A lowland bird, seldom found in places as high as the type locality, it has a range much like that of *C. mehowi*. Even near the type locality of *C. olivinus* I have heard both these species calling.

C. olivinus prefers virgin forest, perching high in the trees, and is usually found only after prolonged search. The male has two calls, a shorter one best compared with that of *Cuculus solitarius*, and a longer series of sounds like "how." The first kind is of three syllables, descending the scale, but the initial note is weak, so that often only the other two are heard. It is repeated again and again: "whĭ, whow, whow." The other call is a protracted series of uniform notes like "how," increasing in volume, and lasting ten or fifteen seconds.

These calls are heard in the rainy part of the year, and then occasionally at night. This must be the breeding season, for a female at Avakubi on September 27 had a pure white egg in its oviduct.

In three stomachs we found only hairy caterpillars.

KEY TO THE SPECIES OF *CHRYSOCOCCYX*

- 1.—Feathers of upperparts brilliant green, of scaly texture; lower breast and belly bright yellow, barred with green only in immature birds. *C. cupreus*, ♂.
Feathering of upperparts metallic green or bronze, but of smooth texture. 2.
- 2.—Throat white, whitish, or yellow, without streaks or bars. 3.
Throat with dark streaks or bars. 7.
- 3.—Throat with a median yellow stripe, remaining underparts whitish thickly barred with dark brown. *C. flavigularis*, ♂.
Throat white or whitish. 4.
- 4.—Throat pure white. 5.
Throat whitish, but washed with brown. 6.
- 5.—Upperparts glossy green, patches of same color at sides of chest; outer rectrices white, with a bronze or green subterminal spot on outer web and usually some narrow dark bars on inner web. *C. klaasi*, ♂.
Upperparts glossy green, often washed with bronze, white markings on some of the wing-coverts; outer tail-feathers blackish, with white spots.
 *C. caprius*, ♂.
- 6.—Back and wing-coverts glossy green or bronze, often narrowly barred with rufous; brownish patches at sides of chest, outer rectrices largely white.
 *C. klaasi*, ♀.
Back green or bronze, without bars; outer rectrices with rufous areas on inner web. *C. caprius*, ♀.
- 7.—Throat and fore-neck barred. 8.
Throat and fore-neck not regularly barred, but streaked or spotted; back not barred (though it may have slight rufous marbling or vermiculation).
 *C. caprius*, ♀ and imm.
- 8.—The barring of underparts brown, without metallic gloss. *C. flavigularis*, ♀.
Barring of underparts more or less glossy green. 9.
- 9.—Several outer upper tail-coverts with white outer webs. *C. klaasi*, imm.
Never more than a very narrow margin of white on outer upper tail-coverts.
 *C. cupreus*, ♀ and imm.

Chrysococcyx caprius (Boddaert)

Cuculus caprius BODDAERT, 1783, 'Tabl. Planches Enluminees,' p. 40 (type locality: Cape of Good Hope).—*Chrysococcyx cupreus* REICHENOW, 1887, J. f. O., p. 306 (Stanleyville); 1902, 'Vög. Afr.,' II, p. 94; 1911, 'Wiss. Ergeb. D. Z.-Afr. Exp.,' III, p. 274 (N. of L. Edward; L. Kivu); 1923, Mitt. Zool. Staatsinstitut Mus. Hamburg, XL, p. 63 (Lupungu). OUSTALET, 1893, Naturaliste, VII, p. 61. HARTERT, 1900, Nov. Zool., VII, p. 32 (W. of Fort Beni). DUBOIS, 1905, Ann. Mus. Congo, Zool., I, f. 1, p. 35 (Tanganyika; Prov. Orientale; Umangi; Ituri; L. Dilolo; L. Leopold II). NEAVE, 1907, Mem. Proc. Manchester Lit. Phil. Soc., LI, No. 10, p. 46 (Alala Plateau; Kafue R., near Ndola). LÖNNBERG, 1907, Arkiv f. Zool., III, No. 21, p. 7 (Mukimbungu); 1917, idem, X, No. 24, p. 17 (Rutshuru). SASSI, 1912, Ann. Naturh. Hofmus. Wien, XXVI, p. 380 (Usumbura; Ishangi; Kisenyi; Rutshuru Plain; Kasindi; Kasindi-Beni; Moera). SCHOUTEDEN, 1918, Rev. Z. A., V, p. 240 (Kaniki; Nya-Lukemba; Baraka; Beni; Bulaimu; Molekera; Lisasa; Kibati; old Mission St. Gustave). BERLIOZ, 1925, Bull. Mus. Hist. Nat. Paris, XXXI, p. 351 (Luluabourg).—*Lampromorpha caprius* BANNERMAN,

1922, Rev. Z. A., X, p. 120; 1933, 'Birds Trop. W. Afr.,' III, p. 114, Pl. v. Sassi, 1924, Ann. Naturh. Mus. Wien, XXXVIII, p. 76. FRIEDMANN, 1930, Bull. 153, U. S. Nat. Mus., p. 274. SCHOUTEDEN, 1935, Rev. Z. A., XXVII, p. 401 (Luvungi; "Katanga" = Katanda on L. Edward).—*Chrysococcyx caprius* SCHOUTEDEN, 1923, Rev. Z. A., XI, p. 391 (Kwamouth); 1924, idem, XII, p. 411 (Eala); 1925, idem, XII, p. 8 (Kunungu). CHAPIN, 1931, Natural History, p. 602 (Lukolela).—*Lampromorpha caprius caprius* GYLDENSTOLPE, 1924, K. Svenska Vet. Akad. Handl., (3) I, No. 3, p. 249 (Masidongo; Kartushi). SCHOUTEDEN, 1936, Ann. Mus. Congo, Zool., I, f. 2, p. 80 (Buta; Kotili; Panga; Poko; Medje; Rungu; Faradje; Abimva).—*Lampromorphus caprius* SCHOUTEDEN, 1932, Rev. Z. A., XXII, p. 129 (Ngoma); 1933, idem, XXII, p. 379 (Nyundo; Kibati; Kisenyi).

SPECIMENS.—Avakubi, ♂, Oct. 6; 3 ♀, Oct. 6, 30, Nov. 12. Gamangui, ♂, Feb. 20. Medje, 9 ♂, Mar. 1, 7, 21, 23, Apr. 5, May 13, 15, July 9; 9 ♀, Mar. 5, 23, May 11, June 5, 8, 26, July 7, 9; 2 ♂ juv., May 16, Sept. 10; 2 ♀ juv., Aug. 19, 28. Isoro, ♂, July 4. Niangara, 2 ♂, May 8, 11; ♀, May 28. Faradje, 3 ♂, Mar. 26, May 1, Oct. 20; ♂ juv., Dec. 1.

ADULT MALE.—Iris light red, becoming white on outer edge, borders of eyelids red; beak dark gray, lighter below; feet dark gray, soles yellowish.

ADULT FEMALE.—Iris light brown with outer edge often light yellow; borders of eyelids gray; bill grayish black, base of mandible light gray; feet dark gray, soles light yellowish gray.

DISTRIBUTION.—Senegal and Abyssinia to Cape Province, occurring in practically all parts of the Belgian Congo except the higher mountains above 6500 feet. In the Kivu district de Witte has recently found it near that level at Nyarusambo and Munagana. In the Upper Katanga it must be rather rare, but I have seen specimens from near Tenke, Lukafu, and Kakyelo on the Luombwa River.

According to Hartert,¹ *C. c. chrysochlorus* Heine is a small race from Senegal and Asben with wings 108–117 mm. South African specimens have wings 118–125 mm. The difficulty lies in the fact that intergradation is so gradual that we cannot draw any line between the alleged races. Congo specimens have wings 105–120 mm., so *chrysochlorus*, if separable, would extend to the Congo.

The didric cuckoo is the most readily observed of its genus, not a bird of heavy forest like *C. cupreus*, but found there rather in the clearings, two or three often flying about together. In the savannas it is likewise common. The male of *caprius* has a plaintive call of a half-dozen whistles, mounting the scale slightly. The Medje people phrase it "Papunzisodu," meaning "Father is dead, alas," and use this as the name of the bird. I found it easily remembered by the words "Oh dear, Dad did-id it." The syllables are sometimes fewer.

¹ 1921, Nov. Zool., XXVIII, p. 100; 1924, idem, XXXI, p. 19.

Weaver birds in particular are parasitized by the didric, and we found its young in nests of *Textor cucullatus*, *Melanopteryx nigerrimus*, and *Sitagra tænioptera*. Near Landana Petit seems to have taken its eggs from nests of *Textor collaris*; and in East and South Africa they are sometimes deposited in nests of sunbirds, wagtails, sparrows, and other species. In the Congo savannas these cuckoos breed during the rains, like most of the weavers, and are relatively silent at other times of year. Yet they seem non-migratory in our area.

An egg which we took from the oviduct was pale greenish blue, with minute dusky spots. The color is known to vary from greenish to white, usually with some spotting, even of brown. Bannerman gives measurements as 21-24.8 mm. \times 14.2-16.

The young didric is surprisingly rufous, especially about its head, with bill and inside of mouth dull orange-red. It is sometimes the only occupant of a nest, but we have found cases where one legitimate nestling survived. The old weavers often pursue didrics which approach their nests.

Of eighteen stomachs examined, none from nestlings, sixteen contained caterpillars, of which the minority were hairy. A few chrysalids, beetles, and other insects were likewise present.

***Chrysococcyx flavigularis* Shelley**

Chrysococcyx flavigularis SHELLEY, 1879, P. Z. S. Lond., p. 679, Pl. L (type locality: Elmina, Gold Coast). O.-GRANT, 1910, Tr. Z. S. Lond., XIX, p. 425 (Mawambi). SASSI, 1912, Ann. Naturh. Hofmus. Wien, XXVI, p. 379 (Ukaika). SCHOUTEDEN, 1923, Rev. Z. A., XI, p. 320 (Kamaiambi).—*Lampromorpha flavigularis* SASSI, 1924, Ann. Naturh. Mus. Wien, XXXVIII, p. 76. W. L. SCLATER, 1924, 'Syst. Av. Æth.', pt. 1, p. 183. BANNERMAN, 1933, 'Birds Trop. W. Afr.', III, p. 119, Pl. v. SCHOUTEDEN, 1936, Ann. Mus. Congo, Zool., I, f. 2, p. 81 (Mauda).

SPECIMEN.—Banalia, ♂, Sept. 25.

ADULT MALE.—Iris dull chrome-yellow, edge of eyelids light yellowish green; bill dull greenish yellow, base of maxilla blackish; feet dull yellowish green, claws black.

DISTRIBUTION.—Sierra Leone to Togo, from southern Cameroon eastward to the Uelle and Semliki Valley, and southward to the vicinity of Luebo, in the Kasai.

It is mainly a bird of the tall trees in virgin forest, but ranges out into heavy gallery forests in the Uelle and Kasai districts. In the Ituri forest it must be rather common, for its voice is not infrequently heard, usually a series of short sweet whistles, descending the scale slightly, and plainly audible for several hundred yards. Only once I heard one give two loud, less musical notes, not unlike the call of *Eurystomus gularis*.

The cuckoo itself is hard to see, and it took us seven months of persistent search to shoot a specimen, though the calls were heard many times near Penge, Avakubi, Ngayu, and Panga. I have since heard it near Beni. Near the equator they probably call throughout the year.

Our single specimen was obtained in a tree being devastated by caterpillars which it was eating, though its stomach contained some other insect-remains as well.

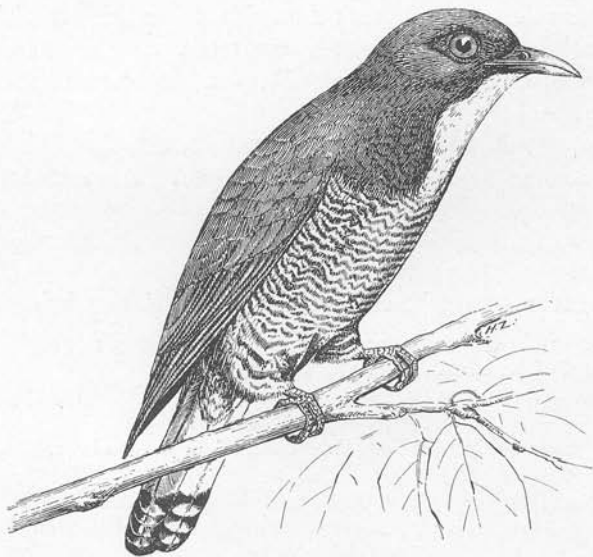


Fig. 13. *Chrysococcyx flavigularis*, male. $\times 2/3$.

Chrysococcyx klaasi (Stephens)

Cuculus klaasi STEPHENS, 1815, in Shaw, 'Gen. Zool.,' IX, p. 128 (type locality: Cape Colony). SHARPE, 1884, Journ. Linn. Soc. Lond., Zool., XVII, p. 433 (Semio).—*Chrysococcyx klaasi* DUBOIS, 1886, Bull. Mus. Roy. Hist. Nat. Belg., IV, p. 147 (L. Tanganyika); 1905, Ann. Mus. Congo, Zool., I, f. 1, p. 35 (Uelle; L. Leopold II). REICHENOW, 1887, J. f. O., p. 308 (Kasongo); 1902, 'Vög. Afr.,' II, p. 98 (Kwango; Nyangabo); 1911, 'Wiss. Ergeb. D. Z.-Afr. Exp.,' III, p. 275 (W. side of Ruwenzori, 1880 m.; L. Kivu). SHELLEY, 1890, Ibis, p. 168 (Yambuya); 1891, 'Cat. Birds Brit. Mus.,' XIX, p. 283; 1901, Ibis, p. 166 (Karungwesi R.). SHARPE, 1890, in Jameson, 'Story of Rear Column,' p. 412. (Yambuya). O.-GRANT, 1910, Tr. Z. S. Lond., XIX, p. 425 (Mubuku Valley, 6000 ft.). SALVADORI, 1911, Ann. Mus. Civ. Stor. Nat. Genova, (3) V, p. 445 (Uelle). SASSI, 1912, Ann. Naturh. Hofmus. Wien, XXVI, p. 379 (Baraka; Moera; Beni; Mawambi). SCHOUTEDEN, 1918, Rev. Z. A., V, p. 240 (Mboka; Marissagua; Dogodo; Zambo); 1923, idem, XI, pp. 320, 391

(Luebo; Belenge; Kamaiembi; Makumbi; Kwamouth); 1924, idem, XII, p. 411 (Eala; Ikengo; Bikoro); 1925, idem, XIII, p. 8 (Kunungu); 1926, idem, XIII, p. 189 (Makaia-Ntete; Temvo; Ganda Sundi); 1930, idem, XVIII, p. 282 (Kafubu R.). BERLIOZ, 1925, Bull. Mus. Hist. Nat. Paris, XXXI, p. 351 (Luluabourg). DE RIEMAECKER, 1927, Rev. Z. A., XIV, p. 273 (Elisabethville).—*Lampromorpha klaasi* BANNERMAN, 1923, Ibis, p. 728. SASSI, 1924, Ann. Naturh. Mus. Wien, XXXVIII, p. 76. SCHOUTEDEN, 1936, Ann. Mus. Congo, Zool., I, f. 2, p. 81 (Buta; Panga; Poko; Rungu; Niangara; Mauda; Mahagi Port). STONE, 1936, Proc. Acad. Nat. Sci. Phila., LXXXVIII, p. 560 (Ekibondo).

SPECIMENS.—Avakubi, ♀, Nov. 6. Medje, 3 ♂, May 18, July 29, Sept. 11; ♂ juv., Oct. 1. Niangara, ♂, May 18; ♀, May 4. Nzoro, ♂, Aug. 10; ♀, July 31. Faradje, 3 ♂, Apr. 11, Aug. 20; 2 ♀, Mar. 24, May 6.

ADULTS.—Iris dark brown (males), or light brownish gray (females), with blackish tip; feet dark green, claws black.

DISTRIBUTION.—From Cape Province to the Gambia, upper Nile districts, Abyssinia, and Asir in Arabia,¹ in both savanna and forested regions. It does not occur much above 6000 feet in the eastern Congo, but elsewhere is fairly common throughout our area.

In heavy equatorial forest it is found mainly on the edge of clearings, keeping fairly high in the trees. Gallery forests attract it in savanna districts, though it may also be found in large isolated trees. Its call is a familiar whistled "whee-hew," repeated monotonously by the male. This is heard mainly during the rainy months, or even at the end of the dry season, and marks the period of reproduction, which seems to extend over six or seven months.

An egg taken from the oviduct at Niangara, May 4, was pale greenish blue, with scattered blotches of light rufous, especially near the larger end. Lynes obtained an egg in Tanganyika Territory that was white, spotted with reddish. Friedmann found the average measurements to be 23×14.3 mm.

The fosterers of Klaas's cuckoo in the Congo are scarcely known. In eastern Africa they are reported to be *Othyphantes reichenowi*, *Pycnonotus tricolor*, *Tchitrea viridis*, *Cinnyris venustus*, and probably *Emberiza cabanisi*. On one occasion in the Uelle I saw a female *C. klaasi* being attacked savagely by a pair of blue fantail flycatchers (*Erannornis longicauda*).

From twelve stomach examinations we learned that Klaas's cuckoo varies its fare of caterpillars, mostly hairless, with small numbers of hemiptera, beetles, and other similar insects. One adult bird had even eaten a single small fruit.

¹ See *C. k. arabicus* BATES, 1937, B. B. O. C., LVII, p. 150 (Asar, 4500 ft.).

Chrysococcyx cupreus intermedius Hartlaub

Chrysococcyx intermedius HARTLAUB, 1857, 'Syst. Orn. Westafr.', p. 191 (type locality: Gaboon).—*Chrysococcyx smaragdineus* REICHENOW, 1887, J. f. O., pp. 302, 308 (Leopoldville; Kasongo). SHELLEY, 1890, Ibis, p. 169 (Yambuya). SHARPE, 1890, in Jameson, 'Story of Rear Column,' p. 415 (Yambuya). DUBOIS, 1905, Ann. Mus. Congo, Zool., I, f. 1, p. 35 (Kisantu; Umangi; L. Dilolo; L. Leopold II; Lower Congo). SCHUBOTZ, 1921, 'Tageb. Emin Pascha,' VI, p. 265 (Mangbetu country).—*Cuculus smaragdineus* EMIN, 1894, J. f. O., p. 167 (old Irumu).—*Metallo-coccyx smaragdineus* REICHENOW, 1902, 'Vög. Afr.,' II, p. 101 (in part); 1911, 'Wiss. Ergeb. D. Z.-Afr. Exp.,' III, p. 275 (Kilo). SASSI, 1912, Ann. Naturh. Hofmus. Wien, XXVI, p. 379 (Baraka; Moera; Mawambi; Ukaika). LÖNNBERG, 1917, Arkiv f. Zool., X, No. 24, p. 17 (Beni). SCHOUTEDEN, 1918, Rev. Z. A., V, p. 241 (Lesse; Marissagua; Kinabé; Bulaimu).—*Cuculus smaragdinus* THONNER, 1910, 'Vom Kongo zum Ubangi,' p. 47 (eastern Bangala distr.).—*Chrysococcyx cupreus intermedius* BANNERMAN, 1922, Rev. Z. A., X, p. 120; 1922, Nov. Zool., XXIX, pp. 418, 420; 1933, 'Birds Trop. W. Afr.,' III, p. 114. SCHOUTEDEN, 1923, Rev. Z. A., XI, p. 320 (Basongo; Kamaiembi; Macaco; Belenge; Luebo; Kabambaie; Makumbi; Djoko-Punda; Ngombe); 1924, idem, XII, pp. 264, 411 (Kisantu; Leopoldville; Ikengo); 1925, idem, XIII, p. 8 (Kunungu; Mongende); 1926, idem, XIII, p. 189 (Tshela; Kai Bumba); 1936, Ann. Mus. Congo, Zool., I, f. 2, p. 80 (Buta; Panga; Poko; Medje; Faradje; Arebi). SASSI, 1924, Ann. Naturh. Mus. Wien, XXXVIII, p. 76. STONE, 1936, Proc. Acad. Nat. Sci. Phila., LXXXVIII, p. 560 (Saidi in Ituri).—*Chrysococcyx cupreus* GYLDENSTOLPE, 1924, K. Svenska Vet. Akad. Handl., (3) I, No. 3, p. 250 (Musango; Kampi na Mambuti; Simbo).

SPECIMENS.—Avakubi, 5 ♂, Jan. 26, Feb. 25, Aug. 16, Nov. 16; 2 ♀, Apr. 13, Nov. 9; ♂ juv., Sept. 20 Panga on Aruwimi R., ♂ im., Sept. 16. Medje, 11 ♂, Mar. 21, 25, Apr. 16, 25, May 9, 28, 30, July 24, Sept. 5; 2 ♂ juv., May 6; 3 ♀ juv., May 16, June 3, July 26.

ADULTS.—Iris dark brown, rim of eyelids light grayish green; bill greenish with a little black at the tip (males), or more blackish (females), feet light blue (males), or dark gray (females), claws black.

DISTRIBUTION OF THE SPECIES.—From the Gambia and southern Abyssinia south to Cape Province, avoiding only the most arid regions and levels above 8000 feet, and living even on Fernando Po, Princes Island, and São Tomé.

C. c. cupreus, with long median rectrices (101–136 mm. in males, which have plain yellow under tail-coverts), occupies Upper Guinea and the southern Sudan east to Abyssinia. *C. c. intermedius*, with shorter tail (85–107 mm. in males, their under tail-coverts usually barred with green), extends from the Cameroon to Mt. Elgon and south to southern Angola and the Zambesi. *C. c. sharpei* van Someren¹ of South Africa has the tail averaging 6 or 7 mm. shorter than *intermedius*.

The emerald cuckoos of the Congo are all *intermedius*, unless typical

¹1922, Nov. Zool., XXIX, p. 53 (Ifafa R., Natal).

cupreus occurs in the northern Uelle. Known to Europeans as "Foliotocols," they occupy every district, except possibly the Upper Katanga and the open highlands of the Kivu. They are much more common in the forest area than in savanna country, where they keep to the gallery forests. The males attract attention, as they perch high in the trees, by their pleasant whistled call of three syllables, "hew-tu-whee," repeated again and again. Much more rarely they give a still more melodious, explosive series of notes which is not soon repeated. In the dry season they are generally rather silent.

The quiet, dull-colored females are less often seen, but the young¹ are frequently received from natives who find them in nests of other small birds, often fairly near the ground. Near Medje I have found a young emerald cuckoo alone in the nest of *Tchitreia viridis*, and seen another being fed by *Chalcomitra olivacea*. The breeding season lasts at least from May to September in that region, but the color of the eggs of the emerald cuckoo is not yet known with certainty.

Like all the parasitic cuckoos, this species feeds mainly on caterpillars, which we found in nine out of eleven stomachs. One adult male had eaten a small bird's egg, and one immature individual had swallowed hard-bodied insects and one seed. Nestlings are sometimes given fruit by their fosterers.

[*Chrysococcyx cupreus cupreus* (Shaw)]

Cuculus cupreus SHAW, 1792, 'Mus. Lever.,' p. 157 (type locality: probably Africa, restricted by C. Grant, 1915, *Ibis*, p. 419, to Gambia).—*Metallococcyx smaragdineus* BERLIOZ, 1922, *Bull. Mus. Paris*, p. 346 (Menzou, Lado Enclave).—*Chrysococcyx auratus* SCLATER AND M.-PRAED, 1919, *Ibis*, p. 645 (Tembura; Yei).

This race extends across the southern Sudan, and so perhaps may be expected along the northern border of the Congo, but neither Sclater and Praed nor Berlioz distinguished between *cupreus* and *intermedius*. About Faradje I heard the emerald cuckoo call only twice, in October, and was unable to secure a specimen.

Subfamily **Phœnicophainæ**

Ceuthmochares æreus æreus (Vieillot)

Cuculus æreus VIEILLOT, 1817, 'Nouv. Dict. Hist. Nat.,' VIII, p. 229 (type locality: Malimbe, Portuguese Congo).—*Zanclostomus æreus* HARTLAUB, 1850, 'Beitr. Orn. Westafr.,' p. 36.—*Zanclostomus æreus* SHARPE AND BOUVIER, 1876, *Bull. Soc. Zool. France*, I, p. 312 (Nemlao).—*Ceuthmochares æneus* OUSTALET, 1893, *Natur-*

¹ Young of *C. cupreus* are apt to be confused with those of *C. klaasi*, but the barring of the fore-crown is much whiter in *cupreus*, while *klaasi* always has a white outer border on several lateral upper tail-coverts.

aliste, VII, p. 61 (Ubangi R.).—*Ceuthmochares australis* DUBOIS, 1905, Ann. Mus. Congo, Zool., I, f. 1, p. 35 (Mayombe; Cataracts; Kisantu ?).—*Ceuthmochares aereus* LÖNNBERG, 1907, Arkiv f. Zool., III, No. 21, p. 6 (Mukimbungu).—*Ceuthmochares æreus æreus* SCLATER AND M.-PRAED, 1919, Ibis, p. 647. BANNERMAN, 1922, Rev. Z. A., X, p. 123; 1933, 'Birds Trop. W. Afr.,' III, p. 135. BOWEN, 1933, Ecology, XIV, p. 257, Fig. 6D. BOUET, 1934, Ois. R. F. O., (N. S.) IV, p. 631.

DISTRIBUTION OF THE SPECIES.—From the Senegal to Cameroon, southern Bahr-el-Ghazal, northern Uganda, and Kenya Colony, south to Angola and Natal.

C. æ. flavirostris of Upper Guinea and Southern Nigeria is the darkest race, violaceous on back and tail. Typical *æreus* is less blue but rather dark. It ranges from Fernando Po, the Cameroon, and the Ubangi River to the Cuanza River, Angola. There is a specimen in the Frankfort Museum from Fort Sibut, north of the Ubangi, and this race is the one found in the Lower Congo. *C. æ. intermedius*, of the Upper Congo and Uganda, is slightly more greenish; and *C. æ. australis* of eastern and southern Africa still more bronze-green above, and washed with ochraceous below.

Ceuthmochares æreus intermedius Sharpe

Ceuthmochares intermedius SHARPE, 1884, Journ. Linn. Soc. Lond., Zoöl., XVII, p. 432 (type locality: Semio, upper Mbomu R.). REICHENOW, 1893, Jahrb. Hamb. Wissensch. Anstalten (1892), X, pt. 1, p. 118; 1894, J. f. O., p. 166 (old Irumu).—*Zanclostomus aereus* REICHENOW, 1887, J. f. O., p. 307 (Kibongi).—*Ceuthmochares æreus* SHELLEY, 1891, 'Cat. Birds Brit. Mus.,' XIX, p. 402.—*Ceuthmochares australis* EMIN, 1894, J. f. O., p. 166. FLOWER, 1894, P. Z. S. Lond., p. 597 (Ituri R.; Ipoto). DUBOIS, 1905, Ann. Mus. Congo, Zool., I, f. 1, p. 35 (in part. Prov. Orientale).—*Ceuthmochares aereus* REICHENOW, 1902, 'Vög. Afr.,' II, p. 73 (Kwango R.). O.-GRANT, 1908, Ibis, p. 312 (Ponthierville); 1910, Tr. Z. S. Lond., XIX, p. 423 (N. W. of Fort Beni; Mpanga forest).—*Ceuthmochares aereus intermedius* REICHENOW, 1902, 'Vög. Afr.,' II, p. 74; 1911, Wiss. Ergeb. D. Z.-Afr. Exp., III, p. 273 (near Beni). SASSI, 1912, Ann. Naturh. Hofmus. Wien, XXVI, p. 380 (N. W. of L. Tanganyika; Beni; Moera; Mawambi; Ukaika). SCHOUTEDEN, 1914, Rev. Z. A. III, p. 263 (Kilo); 1918, idem, V, p. 238 (Kalumendo; Lesse; Sibatwa forest; Loashi; Marissawa); 1923, idem, XI, pp. 320, 391 (Basongo; Luebo; Kamaiambi; Macaco; Ngombe; Tshisika; Kwamouth); 1924, idem, XII, pp. 264, 411 (Leopoldville; Eala; Tondou); 1925, idem, XIII, p. 8 (Bolobo region); 1936, Ann. Mus. Congo, Zool., I, f. 2, p. 81 (Buta; Titule; Panga; Poko; Mauda; Bondo Mabe; Aru; Mahagi Port). LÖNNBERG, 1917, Archiv f. Zool., X, No. 24, p. 16 (Rutshuru). SCLATER AND M.-PRAED, 1919, Ibis, p. 647 (Meridi; Tembura; Yambio). BANNERMAN, 1922, Rev. Z. A., X, p. 124; 1933, 'Birds Trop. W. Afr.,' III, p. 135. W. L. SCLATER, 1924, 'Syst. Av. Æth.,' pt. 1, p. 188. CHAPIN, 1927, Bull. A. M. N. H., LIII, p. 477.—*Ceuthmochares aereus aereus* GYLDENSTOLPE, 1924, K. Svenska Vet. Akad. Handl., (3) I, No. 3, p. 253 (Molemba; Kartushi).

SPECIMENS.—Bengamisa, ♂, Sept. 29. Avakubi, 3 ♂, Jan. 21, July 31, Dec. 27; 4 ♀, Jan. 17, July 31, Sept. 9, Oct. 27. Ngayu, 2 ♂, Apr. 16, Dec. 19; 2 ♀, Apr. 16, July 30. Niapu, ♂ im., Dec. 10. Pawa, ♂, July 12; ♀, July 5. Faradje, ♀, Oct. 5.

ADULTS.—Iris carmine, eyelids grayish green, rest of naked skin about eye bluish, lores green-yellow; bill yellow, a black patch on culmen near its base; feet blackish, soles yellowish gray. Iris brown in sub-adults.

DISTRIBUTION.—Middle Congo River to southern Bahr-el-Ghazal, east to Mt. Kenya and British Ruanda. Southward it reaches the southern Kasai, Dilolo, and Kinda in the Katanga. This race really differs but slightly from *æreus*. Specimens from the Ituri have wings 106–122 mm., those from Kinda and Dilolo in the Congo Museum, 124, 125, and 129 mm.

Ceuthmochares is not a coucal, but the African representative of an important Oriental subfamily. *C. æ. intermedius*, like typical *æreus*, is a bird of the equatorial forest and gallery forests extending out from it. In the great forest it is not seen in the virgin growth, but rather in dense secondary thickets near clearings and roads. It scarcely invades the mountain forests.

Often going in pairs, it has one call mid-way between a whistle and a whine, another being a prolonged clicking chatter, the first notes separate, but later running together more rapidly. For a forest bird it has a short breeding season. Just north of the equator this comes toward July. This cuckoo builds its own nest. An egg from the oviduct was pure white with chalky patches on it. It was broken, but an egg of *C. æ. flavirostris* is known to measure 27×21.5 mm.

The juvenal plumage is dull soot-color above, the breast dark gray with buffy feather-tips, remiges and rectrices not quite so glossy as in the adult.

Fourteen stomach examinations showed orthoptera in nine, caterpillars in nine, beetles in six, hemiptera in three, two leaf-hoppers, and a slug.

[*Ceuthmochares æreus australis* Sharpe]

Ceuthmochares australis SHARPE, 1873, P. Z. S. Lond., p. 609 (type locality: Natal).

DISTRIBUTION.—From Natal northward through Mozambique and Nyasaland to eastern Kenya Colony and the Nakwai Hills in northern Uganda. There is a possibility of its occurrence in the extreme southeastern corner of the Belgian Congo, but as yet no record is available.

Subfamily Centropodinae

KEY TO THE CONGO SPECIES OF CENTROPUS

- 1.—Throat white or brownish.....3.
Throat black.....2.
- 2.—Whole underparts black.....*C. grillii* ad. in breeding plumage.
Lower breast whitish in mid-line, flanks buff.....*C. leucogaster*.
- 3.—Throat white or buffy white, like remaining underparts, fore-neck sometimes streaked.....4.
Throat deep buff, or buff with blackish bars.....*C. anselli*.
- 4.—Crown uniform black, more or less glossy, but without streaks or even superciliary line.....5.
Streaks on crown, or a light superciliary line.....8.
- 5.—Back black, wing-coverts rufous.....*C. anselli*.
Back rufous to olive-brown.....6.
- 6.—Crown and hind-neck black with a faint green gloss.....*C. senegalensis*.
Crown and hind-neck black with blue gloss.....7.
- 7.—Tail with rather faint green luster.....*C. monachus*.
Tail with bronze luster.....*C. cupreicaudus*.
- 8.—Light streaking of crown continues to forehead, no distinct superciliary stripe.....*C. grillii*, imm., and eclipse.
Light streaks of nape do not extend to the fore part of crown, which is brown; a distinct superciliary stripe; and more pronounced streaks at sides of chest.....*C. superciliosus*.

Centropus superciliosus superciliosus Hemprich and Ehrenberg

Centropus superciliosus HEMPRICH AND EHRENBURG, 1833, 'Symb. Phys.,' Aves (2), Pl. xi (type locality: southern Arabia). SHELLEY, 1891, 'Cat. Birds Brit. Mus.,' XIX, p. 363 (in part. Lado). EMIN, 1894, J. f. O., p. 163 (Ndussuma). HARTERT, 1900, Nov. Zool., VII, p. 32 (Karimia, Ussongora). REICHENOW, 1902, 'Vög. Afr.,' II, p. 65 (in part. Ndussuma; Karimia). SCHOUTEDEN, 1914, Rev. Z. A., III, p. 263 (Kilo); 1918, idem, V, p. 238 (in part. Kilo; old Mission St. Gustave; Bigoisagua). LÖNNBERG, 1917, Arkiv f. Zool., X, No. 24, p. 16 (Rutshuru).—*Centropus superciliosus superciliosus* GYLDENSTOLPE, 1924, K. Svenska Vet. Akad. Handl., (3) I, No. 3, p. 252 (Ankole). SCHOUTEDEN, 1936, Ann. Mus. Congo, Zool., I, f. 2, p. 81 (Mahagi Port).

DISTRIBUTION OF THE SPECIES.—Southern Arabia, Socotra, Abyssinia, and Nubia south to Cape Province and west to the Portuguese Congo and Angola. *C. s. superciliosus*, of lighter color, is a northeastern race, extending to Kenya Colony, Lake Albert, and the savannas near Lake Edward. *C. s. loandæ*, darker, blackish on the crown, ranges from Lake Victoria to the middle Zambesi and Angola. *C. s. burchellii* Swainson, with still blacker crown and no superciliary stripe when adult, ranges from South Africa to southern Taganyika Territory. Sokotra Island has the very pale endemic race, *C. s. sokotræ* Grant.

In the northern Congo the boundary between *superciliosus* and

loandæ is hard to fix and is probably somewhere near Rutshuru. Individual variation and wear of head-plumage are complicating factors. Specimens from Lake Albert do seem a little dark, but eight skins in the Congo Museum from Mahagi Port to the Rutshuru Plain may be referable to the typical race. It is a common bird there in high grass and thickets.

***Centropus superciliosus loandæ* Grant**

Centropus superciliosus loandæ C. GRANT, 1915, B. B. O. C., XXXV, p. 54 (type locality: Ndala Tando, northern Angola); 1915, Ibis, p. 426 (Congo mouth; E. Belg. Congo). GYLDENSTOLPE, 1924, K. Svenska Vet. Akad. Handl., (3) I, No. 3, p. 253 (Goma). W. L. SCLATER, 1924, 'Syst. Av. Æth.,' pt. 1, p. 187. FRIEDMANN, 1930, Afr. Rep. Liberia Belg. Congo, II, p. 753 (Lulenga); 1930, Bull. 153, U. S. Nat. Mus., p. 281. BOWEN, 1931, Proc. Acad. Nat. Sci. Phila., LXXXIII, p. 35. SCHOUTEDEN, 1932, Rev. Z. A., XXII, p. 129 (Lulenga; Ngoma); 1933, idem, XXII, p. 379 (Kishwati); 1935, idem, XXVII, p. 401. BERLIOZ, 1932, Bull. Mus. Paris, (2) IV, p. 376 (Uvira; Katana). BANNERMAN, 1933, 'Birds Trop. W. Afr.,' III, p. 133. STONE, 1936, Proc. Acad. Nat. Sci. Phila., LXXXVIII, p. 560 (Kasenyi). GRANT AND M.-PRAED, 1937, B. B. O. C., LVII, p. 92.—*Centropus superciliosus* JOHNSTON, 1884, 'River Congo,' p. 367 (Congo R.). SCHALOW, 1886, J. f. O., p. 418 (Lufuku R.); 1887, idem, p. 233 (L. Tanganyika to Katanga). REICHENOW, 1887, J. f. O., p. 302 (Leopoldville); 1902, 'Vög. Afr.,' II, p. 65 (in part.); 1911, 'Wiss. Ergeb. D. Z.-Afr. Exp.,' III, p. 272 (Kisenyi; Usumbura). MATSCHIE, 1887, J. f. O., p. 149. SHELLEY, 1891, 'Cat. Birds Brit. Mus.,' XIX, p. 363 (in part. Landana). DUBOIS, 1905, Ann. Mus. Congo, Zool., I, f. 1, p. 35. NEAVE, 1910, Ibis, p. 117 (Bunkeya R.). SASSI, 1912, Ann. Naturh. Hofmus. Wien, XXVI, p. 380 (Urundi; Usumbura; Uvira). RODHAIN ET AL., 1913, 'Rapp. Miss. Sci. Katanga,' pp. 150, 156, 158 (Bukama). SALVADORI, 1914, Ann. Mus. Zool. Napoli, IV, No. 10, p. 15 (Ruanda). SCHOUTEDEN, 1918, p. 238 (in part. Goma; Ruzizi-Kivu; Mpala); 1933, Bull. C. Z. C., X, pp. 6, 44 (Sakania). GROMIER, 1936, 'Vie Animaux Sauvages Afr.,' p. 289 (near Rutshuru Valley).

DISTRIBUTION.—Zambesi region and Angola, north to Landana, savannas of the southern Congo, the Kivu Volcanoes, and the Kavirondo district. Apparently rare in the Lower Congo, absent from the northern Kasai, and not very common in the higher parts of the Katanga.

In haunts and habits the white-browed coucal differs little from *Centropus monachus*, except that it is more fond of high grass, and less apt to ascend mountains. Its tooting is softer and lower than that of *senegalensis* and *monachus*, the notes running together more rapidly; and it also gives a hoarse, reiterated call faintly like a francolin's.

A nest found by Dr. J. Bequaert near Bukama, April 25, was a large sphere of grass-blades with lateral opening, placed in a bush. One young bird had not yet left. In Tanganyika Territory Schuster¹ found nests with three or four eggs, 30.1–34.9 mm. × 22.5–26.6.

¹ 1926, J. f. O., p. 529. See also Pitman, 1928, Ool. Rec., VIII, pp. 41–43.

Centropus senegalensis senegalensis (Linnæus)

Cuculus senegalensis LINNÆUS, 1766, 'Syst. Nat.,' 12th Ed., I, p. 169 (type locality: Senegal).—*Polophilus* LEACH, 1818, in Tuckey, 'Narr. Exp. R. Zaire,' p. 408 (Lower Congo).—*Centropus senegalensis* DUBOIS, 1886, Bull. Mus. Roy. Hist. Nat. Belg., IV, p. 147 (L. Tanganyika); 1905, Ann. Mus. Congo, Zool., I, f. 1, p. 35 (Prov. Orientale; Umangi; L. Leopold II; Matadi). REICHENOW, 1887, J. f. O., p. 299 (Manyanga); 1902, 'Vög. Afr.,' II, p. 58 ("Ubangi R."; Manyanga; upper Lindi R.). OUSTALET, 1893, Naturaliste, VII, p. 60. FLOWER, 1894, P. Z. S. Lond., p. 606 (Muyoméma, Ituri). LÖNNBERG, 1907, Arkiv f. Zool., III, No. 21, p. 6 (Mukimbungu). SALVADORI, 1911, Ann. Mus. Civ. Stor. Nat. Genova, (3) V, p. 444 (Uelle); 1915, idem, (3) VI, p. 279 (Kasai). MOURITZ, 1914, Ibis, p. 37 (S. E. Katanga). SCHOUTEDEN, 1920, Rev. Z. A., VII, p. 190 (Malela); 1930, idem, XVIII, p. 282 (Kafubu R.).—*Centropus senegalensis senegalensis* GRANT, 1915, Ibis, p. 423. SCLATER AND M.-PRAED, 1919, Ibis, p. 646 (Uelle). BANNERMAN, 1922, Rev. Z. A., X, p. 125. SCHOUTEDEN, 1923, Rev. Z. A., XI, pp. 321, 391 (Kamaiembi; Kwamouth); 1924, idem, XII, pp. 264, 412 (Kisantu; Leopoldville; Bikoro; Eala; Ikengo; Tondou); 1925, idem, XIII, p. 8 (Bolobo; Kunungu); 1936, Ann. Mus. Congo, Zool. I, f. 2, p. 81 (Buta; Titule; Poko; Niangara; Mauda; Dungu; Dika; Mahagi Port) BOWEN, 1933, Ecology, XIV, p. 261, Fig. 7C.

SPECIMENS.—Kunzulu, ♂, Dec. 19. Nouvelle Anvers, ♂, July 24. Stanleyville, ♀, Aug. 11. Avakubi, ♂, Oct. 13; ♀, Aug. 30. Medje, ♂, Jan. 14. Niangara, ♂ juv., Nov. 30. Faradje, 2 ♂, Jan. 11, Oct. 16; ♀, Feb. 27; 2 ♂ juv., Nov. 30.

ADULTS.—Iris scarlet (male) or orange-red (female); bill black; feet lead-gray.

DISTRIBUTION OF THE SPECIES.—Senegal to Somaliland, and down the Nile to Egypt. Southward it extends to Bechuanaland and the Transvaal, though absent from East Africa and most of the country from Lake Albert to Lake Tanganyika.

C. s. senegalensis ranges from West Africa to Somaliland, northern Uganda, and the forest of the eastern Congo, south to northern Angola and possibly the Katanga. It lives in savannas and forest clearings, but does not ascend mountains. The other races are *ægyptius* (Gmelin), of Nubia and Egypt, and *flecki*, which extends from the Kalahari at least to southern Angola and Northern Rhodesia.

In the Congo forest the Senegal coucal is found commonly in clearings, haunting scrubby thickets and elephant grass. Out in the savannas it ranges more widely, but likes the denser growth, especially near swamps.

Its tooting is one of the most familiar sounds, practically throughout the year. The full performance is of fifteen to twenty notes, dropping at first in the scale, then rising a little before the end. Sometimes two birds sing a duet, one beginning a little after the other. At other times

the toots are fewer, more slowly repeated, all in the same pitch. Finally, they sometimes utter a very different harsh call.

In the Uelle nesting takes place from September to November, when the grass is high enough to conceal the nests. In the northern part of the forest belt breeding may begin a month earlier; and south of the equator the season must be reversed.

The nest of this coucal is a large ball of coarse grass lined with leaves, opening laterally, placed in the forks of a low bush, well hidden. Four or five eggs are laid, which are white, sometimes with a slight chalky coating. Measurements given by Bannerman (1933) are 29.2–36 mm. \times 22.6–25.6.

In six stomachs we found nothing but insect remains: beetles in three cases, orthoptera in two, caterpillars in two, and one single hemipter.

[*Centropus senegalensis flecki* Reichenow]

Centropus flecki REICHENOW, 1893, O. Mb., p. 84 (Nukana, N. Bechuanaland).—*Centropus s. senegalensis* \gtrsim *flecki* LYNES, 1938, Rev. Z. A., XXXI, p. 68 (Ndola, N. Rhodesia).

This race differs from *C. s. senegalensis* in the lighter rufous color of its back and wings. Austin Roberts tells me that Neave collected *flecki*, not *burchellii*¹ or *fasciipygialis*, in the Loangwa Valley, so there is a possibility that the sight records of "*senegalensis*" by Mouritz (1914) and by Schouteden (1930) in the Upper Katanga really refer to *C. s. flecki*. Admiral Lynes's specimen from Ndola, now in the Congo Museum, is much closer to *flecki* than to the typical race.

***Centropus monachus occidentalis* Neumann**

Centropus monachus occidentalis NEUMANN, 1908, B. B. O. C., XXI, p. 77 (type locality: Ogowé R., Gaboon). REICHENOW, 1911, 'Wiss. Ergeb. D. Z.-Afr. Exp.,' III, p. 272 (L. Mohasi). SASSI, 1912, Ann. Naturh. Hofmus. Wien, XXVI, p. 380 (Beni). SCHOUTEDEN, 1914, Rev. Z. A., III, p. 263 (Kilo); 1918, idem, V, p. 238 (Busuenda; W. foot of Mt. Karisimbi; old Mission St. Gustave; Talia R.); 1926, idem, XIII, p. 189 (Ganda Sundi; Makaia-Ntete; Boma; Banana); 1933, idem, XXII, p. 379 (Kisenyi); 1936, Ann. Mus. Congo, Zool., I, f. 2, p. 81 (Panga; Poko; Medje). BANNERMAN, 1922, Rev. Z. A., X, p. 131; 1933, 'Birds Trop. W. Afr.,' III, p. 128. STRESEMANN, 1924, Verh. Orn. Ges. Bayern, XVI, p. 54 (L. Mohasi; N. W. Urundi). GYLDENSTOLPE, 1924, K. Svenska Vet. Akad. Handl., (3) I, No. 3, p. 251 (Goma). CHAPIN, 1927, Bull. A. M. N. H., LIII, p. 477. BOWEN, 1933, Ecology, XIV, p. 262, Fig. 8D.—*Centropus monachus* SHARPE AND BOUVIER, 1878, Bull. Soc. Zool. France, III, p. 73 (Condé). JOHNSTON, 1884, 'River Congo,' p. 367 (Congo R.). SCHALOW, 1886, J. f. O., p. 418 (Lufuku R.). MATSCHIE, 1887, J. f.

¹ 1907, Mem. Proc. Manchester Lit. Phil. Soc., LI, pt. 3, No. 10, p. 46.

O., p. 149. OUSTALET, 1893, *Naturaliste*, VII, p. 61. EMIN, 1894, *J. f. O.*, p. 163, (Ndussuma); 1922, in Stuhlmann, 'Tageb. Emin Pascha,' III, p. 211 (N. end L. Albert). REICHENOW, 1902, 'Vög. Afr.,' II, p. 62 (Kinyawanga; "Ubangi R."). SCHUBOTZ, 1921, 'Tageb. Emin Pascha,' VI, pp. 91, 239, 245, 256 (Mangbetu country; Kuterma; Negunda; Mbiambana). STRESEMANN AND GROTE, 1928, *Verh. VI Internat. Orn. Kongr.* (1926), p. 367.—*Centropus occidentalis* O.-GRANT, 1910, *Tr. Z. S. Lond.*, XIX, p. 421 (Mubuku Valley, 5000 ft.; Beni).—*Centropus monachus fischeri* SCLATER AND M.-PRAED, 1919, *Ibis*, p. 646 (Tembura; Meridi). BERLIOZ, 1932, *Bull. Mus. Paris*, (2) IV, p. 376 (Rutshuru; Kadjudju).—*Centropus (monachus?) heuglini* GYLDENSTOLPE, 1924, *K. Svenska Vet. Akad. Handl.*, (3) I, No. 3, p. 252 (Irumu).

SPECIMENS.—Medje, ♂ juv., July 31. Faradje, 3♂, Mar. 24, 30, May 6; ♀, Feb. 21; ♂ juv., Dec. 5; ♀ juv., Oct. 11.

ADULTS.—Iris red, bill black, feet very dark gray.

DISTRIBUTION OF THE SPECIES.—Abyssinia, Sudan, and Gold Coast, south to northern Angola, Lualaba River, Marungu, and northern Tanganyika Territory. There appear to be three races. *C. m. monachus* Rüppell ranges from Eritrea and Abyssinia to central Kenya Colony, *C. m. fischeri* Reichenow from the upper Nile Valley to the southeast shore of Lake Victoria, and *C. m. occidentalis* from the northeastern Congo westward and southward.¹ The typical race is the lightest in color, *occidentalis* darker, but *fischeri* darkest of all, at least when immature.

The western blue-headed coucal is found very commonly in the northern and eastern savannas of the Congo, even south to Marungu and the Lualaba River. It scarcely enters the edge of the Upper Congo forest, is wanting in the Kasai district, but does occur in the Lower Congo, even in the clearings of the Mayombe forest. On the slopes of Ruwenzori we found it in old clearings up to 7000 feet, but not in the real mountain forest. On the Kivu Volcanoes it has been found up to 7800 feet.

Centropus monachus gives a descending series of "toots," rising at the end, so similar to those of *C. senegalensis* that I could scarcely tell them apart. The breeding season in the Uelle district extends from early May to November, thus covering the whole period of rains. A nest found at Faradje on May 6, was an oval mass of dry sedges, lined with a few green leaves and with a lateral entrance. It was effectively concealed amid the sedges and small bushes in a small marsh, only a foot above the soggy ground. The soiled white eggs numbered three. The

¹ See Friedmann, 1930, *Bull. 153, U. S. Nat. Mus.*, p. 278. Grant and M.-Praed, 1937, *B. B. O. C.*, LVII, pp. 116, 117, unite *occidentalis* with *fischeri*. *C. cupreicaudus* I regard as a distinct species.

male bird was snared as it came to the nest, thus strengthening the evidence that most of the incubation among coucals is performed by the males. The dimensions of eggs of *C. m. occidentalis*, according to Bannerman, are 35–37.5 mm. \times 26–29.5.

Centropus monachus in juvenal dress is difficult to distinguish from *senegalensis*, but it has fine buffy shaft-streaks or spots on the crown, lacking in young *senegalensis*, and dark barring on the whole distal half of the primaries, not simply at their very tips.

We examined only five stomachs of this coucal, finding grasshoppers and beetles in all. But it is known to eat snails of the genus *Limicolaria*, as well as mice, nestlings, and eggs. Lang was shown a small snake, supposedly killed by this coucal.

***Centropus cupreicaudus* Reichenow**

Centropus cupreicaudus REICHENOW, 1896, O. Mb., p. 53 (type locality: Angola). STRESEMANN AND GROTE, 1928, Verh. VI Internat. Orn. Kongr. (1926), p. 367 (southern Katanga—on map).—*Centropus monachus cupreicaudus* BOWEN, 1933, Ecology, XIV, p. 262, Fig. 8D.

DISTRIBUTION.—Damaraland east to Nyasaland and Uhehe in Tanganyika Territory, north to Ambaca and Malanje in Angola, the Upper Katanga, and Marungu.

The crown of *C. cupreicaudus* is more violet than in *C. monachus*; size somewhat larger, wing 210–225 mm., tail 220–245. I regard it as a species because I have seen no intermediate specimen, though both birds occur in Marungu.

Rockefeller and Murphy secured a male of *cupreicaudus* at Lake Suse in southern Marungu, and G. F. de Witte has collected two more specimens at Kansenia and near Tenke, in the Upper Katanga. In habits, no doubt, the coppery-tailed coucal is very similar to the blue-headed species.

***Centropus anselli* Sharpe**

Centropus anselli SHARPE, 1874, P. Z. S. Lond., p. 204, Pl. xxxiii (type locality: Danger R., Gaboon). REICHENOW, 1887, J. f. O., p. 302 (Leopoldville); 1902, 'Vög. Afr.,' II, p. 70. DUBOIS, Ann. Mus. Congo, Zool., I, f. 1, p. 35 (Umangi). CHAPIN, 1921, A. M. Nov., No. 17, p. 16 (Isangi); 1927, Bull. A. M. N. H., LIII, p. 477. W. L. SCLATER, 1924, 'Syst. Av. Æth.,' pt. 1, p. 185. SCHOUTEDEN, 1925, Rev. Z. A., XIII, p. 8 (Kunungu); 1926, idem, XIII p. 189 (Ganda Sundi). BANNERMAN, 1933, 'Birds Trop. W. Afr.,' p. 127.

SPECIMEN.—Isangi, ♀ im., Dec. 10.

DISTRIBUTION.—From Bitye in southern Cameroon south to the Mayombe Forest and the vicinity of Leopoldville, and eastward at least

to the Lomami River. The Gaboon coucal replaces *C. leucogaster* in the southern half of the equatorial forest of the Congo, but no intergradation seems to take place between them.

At Lukolela I found it to be rather common, calling like *leucogaster* early in the morning and toward evening from the thickest parts of the forest, especially where it was swampy. Both sexes seem to call, the female having a deeper voice. It is exceedingly difficult to see.

The nest of this coucal is doubtless like that of *C. leucogaster*, and its breeding season at Lukolela began with the rains, for young were obtained in the latter half of November.

***Centropus leucogaster neumanni* Alexander**

Centropus neumanni B. ALEXANDER, 1908, B. B. O. C., XXI, p. 78 (type locality: Angu, Uelle R.). MILLER, 1924, Bull. A. M. N. H., L, p. 330 (natal down).—*Centropus leucogaster* SASSI, 1912, Ann. Naturh. Hofmus. Wien, XXVI, p. 380 (Beni; Ukaika).—*Centropus leucogaster neumanni* SASSI, 1916, Ann. Naturh. Hofmus. Wien, XXX, p. 240. BANNERMAN, 1922, Rev. Z. A., X, p. 128 (Uelle R.; Ituri R.); 1933, 'Birds Trop. W. Afr.', III, pp. 125, 126. W. L. SCLATER, 1924, 'Syst. Av. Æth.', pt. 1, p. 185. CHAPIN, 1927, Bull. A. M. N. H., LIII, p. 477. SCHOUTEDEN, 1936, Ann. Mus. Congo, Zool., I, f. 2, p. 81 (Buta; Poko; Medje; Bondo Mabe).—*Centropus efulensis neumanni* BANNERMAN, 1919, B. B. O. C., XXXIX, p. 95 (Poko; Medje).

SPECIMENS.—Avakubi, ♀, Dec. 1. Medje, ♂ im., Aug. 3; ♀ Apr. 7; 3 ♂ juv., Apr. 10, May 13, Oct. 8; ♀ juv., Oct. 8. Niangara, ♂, Dec. 14; 3 ♀ juv., Nov. 26, Dec. 15.

ADULTS.—Iris red, bill and feet black.

DISTRIBUTION OF THE SPECIES.—From the coast of French Guinea to the Semliki Valley, south to the Gaboon coast, but scarcely known from south of the equator.

C. l. leucogaster Leach lives in the forests of Upper Guinea, *C. l. efulensis* Sharpe in the coastal region of Cameroon and Gaboon, and *C. l. neumanni* in the northern half of the Upper Congo forest. The last-named race is slightly smaller than *efulensis*, eight adult specimens from the Congo having wings 173–195 mm. Bannerman (1933) gave wing-measurements of *efulensis* as 196 and 200 mm.

The black-throated coucal is a forest-dweller, very rarely seen, skulking in the thickest second growth, but probably not fond of old virgin forest. It ranges out into heavy gallery forests on the north. Most specimens are obtained from natives and the majority are apt to be young that cannot fly well.

Its tooting differs somewhat from that of *C. senegalensis*, being deeper-

toned and less apt to rise in the scale toward the end. Young birds often repeat a soft coo at intervals of ten or fifteen seconds. The breeding season at the northern edge of the forest extends over most of the year, eggs being laid from March to December, at least.

A nest brought to us near Niangara on December 14 was a large ball of dry leaves and a little grass, lined with green leaves, about a foot through. It had been taken from a bush in the forest, and held two rounded, dirty white eggs, about to hatch. The male bird was trapped at this nest.

The young birds from these eggs had a dense growth of hairlike "trichoptiles,"¹ white in color, over the whole upper surface. These correspond to down enclosed in a persistent sheath, and are characteristic of all young coucals. Their tongues also bore the large black U-shaped mark which seems always present in young of this genus.

At Avakubi, in heavy second growth, I saw another nest with two eggs, but the birds were so shy that I could not even shoot one. I regret that I did not measure the eggs.

The eight stomachs examined all contained insects: beetles, hemiptera, grasshoppers, a mantis, and two caterpillars. One bird had also eaten a frog, three spiders, and five snails, mostly Helixarions.

[*Centropus leucogaster efulenensis* Sharpe]

Centropus efulenensis SHARPE, 1904, Ibis, p. 615 (type locality: Efulen, Cameroon).

It would seem that this race must extend along the northern edge of the Cameroon forest toward the Ubangi, but so far there is no record from that region.

***Centropus grillii grillii* Hartlaub**

Centropus grillii HARTLAUB, 1861, J. f. O., p. 13 (type locality: Gaboon). DUBOIS, 1886, Bull. Mus. Roy. Hist. Nat. Belg., IV, p. 147 (L. Tanganyika). LÖNNBERG, 1917, Arkiv f. Zool., X, No. 24, p. 16 (Kasindi; Rutshuru). HARTERT, 1925, Nov. Zool., XXXII, p. 152.—*Centropus nigrorufus* SCHALOW, 1886, J. f. O., p. 434 (L. Upemba). REICHENOW, 1902, 'Vög. Afr.,' II, p. 71. DUBOIS, 1905, Ann. Mus. Congo, Zool., I, f. 1, p. 35 (Karema).—*Centropus nigrirufus* MATSCHIE, 1887, J. f. O., p. 149.—*Centropus grillii* REICHENOW, 1903, 'Vög. Afr.,' II, p. 715; 1911, 'Wiss. Ergeb. D. Z.-Afr. Exp.,' III, p. 272 (L. Mohasi; Usumbura; Ruzizi Plain). SASSI, 1912, Ann. Naturh. Hofmus. Wien, XXVI, p. 380. SCHOUTEDEN, 1918, Rev. Z. A., V, p. 238 (Lisasa; Kalembe; Bulaimu; Bigoisagua); 1926, idem, XIII, p. 189 (Moanda); 1936, Ann. Mus. Congo, Zool., I, f. 2, p. 81 (Mahagi Port). DE RIEMAECKER, 1927, Rev. Z. A., XIV, p. 273 (near Elisabethville).—*Centropus super-*

¹ See Shelford, 1917, 'A Naturalist in Borneo,' p. 65.

ciliolus loandæ SCHOOTEDEN, 1923, Rev. Z. A., XI, p. 321 (Luebo).—*Centropus grillii* BANNERMAN, 1933, 'Birds Trop. W. Afr.,' III, p. 121, Fig. 36.

SPECIMENS.—Medje, ♀ im., July 13. Niangara, ♂ ad. in brown dress, ♂ im., Apr. 20.

DISTRIBUTION OF THE SPECIES.—Eastern Cape Province north to Witu, southern Abyssinia, the southern Sudan, Lake Chad, and Portuguese Guinea. Except for rare occurrences in clearings near their margins, it avoids the lowland forests of Upper and Lower Guinea.

The typical race is believed to occupy the greater part of the above range, *C. g. caeruleiceps* Neumann occurring in southern Abyssinia, and *C. g. wahlbergi* Grant in Natal. These forms differ supposedly in the color of the mantle and the reflections on the black head.

C. g. grillii, at any rate, is widely distributed in the savannas of the Congo, but probably not above 5000 feet. It spends much of its time low down in the grass, and thus escapes detection, though occasionally perching in bushes. A wounded bird will run off and escape even in rather short grass.

In the Uelle it is rather rare, but I found it more common at Kasenyi on Lake Albert. Its notes were heard only in the Rutshuru Plain, a hollow, laughing "cow," repeated eight or ten times, suggestive of *Crinifer zonurus*.

This is the only African coucal with a special dull plumage worn in the off-season by adults. The latter are black on head and underparts in the breeding season. My brown adult from Niangara suggested this fact, and in 1930 W. W. Bowen showed me a female from Tanganyika Territory which I found to be undergoing a post-nuptial molt from black to brown. Breeding certainly takes place during the rains, when the grass is high.

Females are markedly larger than males, and have wings averaging 18–20 mm. longer. The remarkable asymmetry of the testes in the genus *Centropus*, where the right one is regularly larger than the left, is very pronounced in the present species. In one breeding male from Kasenyi the left testis seemed entirely absent.¹ Females, nevertheless, have only the usual left ovary and oviduct. It seems probable that among African coucals the males do most or all of the incubation, though I still think that both sexes call.²

A nest of *grillii* found by Darling in South Africa was artfully con-

¹ See also A. L. Rand, 1933, Auk, pp. 219, 220, for conditions in *Centropus toulou*.

² See Spennemann, 1928, Beitr. Fortpfl.-biol. Vög., IV, pp. 139–144, on the habits of *C. javanensis*.

cealed in long grass in a vlei, woven out of living grass, invisible from a couple of yards. Its top was domed, entrance at side, and the four white eggs inside were nearly spherical.¹

In five stomachs I found beetles, grasshoppers, two mantises, a few hemiptera, a cricket, an ant, a caterpillar, and a spider.

FAMILY Musophagidæ. PLANTAIN-EATERS OR TURACOS

KEY TO THE GENERA

- 1.—Wings with conspicuous patches of bright red.....2.
Wings without red patches.....6.
- 2.—Nostrils largely or entirely covered by feathers growing forward from the lores.....TURACUS, p. 215.
Nostrils entirely exposed.....3.
- 3.—Base of culmen expanded and rounded, more than 20 mm. broad; loreal region and often orbit bare; crown-feathers red, rest of plumage largely blue or violet.....MUSOPHAGA, p. 288.
Base of culmen never 20 mm. wide, though sometimes elevated or slightly broadened.....4.
- 4.—Crown-feathers red, at least for distal half; facial region largely gray; back and wing-coverts entirely metallic green.....PROTURACUS.²
Crown-feathers metallic green or violet; facial region not gray; wing-coverts partly violaceous or gray with blue sheen.....5.
- 5.—A red patch on hind-neck, longest crown-feathers metallic green; base of culmen markedly elevated and compressed.....RUWENZORORNIS, p. 226.
No red on hind-neck, longest crown-feathers metallic violet; base of culmen rather broad, not elevated.....GALLIREX, p. 225.
- 6.—Size large, wing more than 280 mm. long; neck, back, and upper surface of wings greenish blue, crest black.....CORYTHÆOLA, p. 235.
Smaller, wing less than 270 mm. long; back not blue, but gray, with or without dark markings.....7.
- 7.—Orbit, malar region, and chin bare, or with sparse hair-like feathering; fore-neck whitish with a diffuse greenish patch.....GYMNOSCHIZORHIS, p. 234.
Facial region entirely feathered; fore-neck not white, and no green in any part of plumage.....8.
- 8.—Crest of lengthened feathers arising from top of crown; back nearly if not entirely uniform gray.....CORYTHAIXOIDES, p. 231.
Lengthened pointed feathers arising only from nape; back gray with blackish streaks or margins.....CRINIFER, p. 232.

KEY TO THE CONGO SPECIES OF TURACUS

- 1.—Cheeks and throat white.....2.
Cheeks and throat green, with only spots or stripes of white.....3.
- 2.—Crest white, forehead glossy blue.....*T. leucolophus*.
Crest largely red, but tipped with white.....*T. erythrolophus*.

¹ W. L. Slater, 1903, 'Birds S. Afr.', III, p. 209.

² *P. bannermani* Bates of Cameroon is very closely allied to *Turacus erythrolophus* of Angola.

- 3.—Crest-feathers entirely green.....*T. persa*.
 Crest-feathers green, with tips of other colors.....4.
 4.—Crest tipped with red.....*T. macrorhynchus verreauxii*.
 Crest tipped with white.....5.
 5.—Longest crest-feathers measuring not more than 30 mm.; feathers of back varying from violet to glossy green, according to subspecies.....*T. schüttii*.
 Crest-feathers exceeding 60 mm. in length; back glossy green, tail blue with violet sheen.....*T. livingstonii*.

***Turacus macrorhynchus verreauxii* (Schlegel)**

Musophaga verreauxii SCHLEGEL, 1854, J. f. O., p. 462 (type locality: Gaboon R.).—*Corythaix meriani* SHARPE AND BOUVIER, 1878, Bull. Soc. Zool. France, III, p. 77 (Condé). REICHENOW, 1885, J. f. O., p. 217 (Stanley Pool). SCHALOW, 1886, J. f. O., p. 37.—*Turacus meriani* SHELLEY, 1891, 'Cat. Birds Brit. Mus.,' XIX, p. 442. REICHENOW, 1902, 'Vög. Afr.,' II, p. 47. DUBOIS, 1905, Ann. Mus. Congo, Zool., I, f. 1, p. 35 (Mayombe); 1907, Wytsman's 'Genera Av.,' pt. 8, p. 4. SCHOUTEDEN, 1930, in L. Franck, 'Le Congo Belge,' II, p. 372.—*Turacus macrorhynchus verreauxii* NEUMANN, 1908, Nov. Zool., XV, p. 373 (Lower Congo). BANNERMAN, 1922, Rev. Z. A., X, p. 116. W. L. SCLATER, 1924, 'Syst. Av. Æth.,' pt. 1, p. 192. v. BOETTICHER, 1935, Senckenbergiana, Frankfurt, XVII, pp. 148, 151.—*Turacus verreauxii* SCHOUTEDEN, 1926, Rev. Z. A., XIII, p. 190 (Ganda Sundi; Kisala; Mbumba in Upper Mayombe). BANNERMAN, 1933, 'Birds Trop. W. Afr.,' III, p. 61.

DISTRIBUTION OF THE SPECIES.—*T. m. macrorhynchus* (Fraser), with black-tipped crest, is restricted to forests from Sierra Leone to the Gold Coast. *T. m. verreauxii*, with red-tipped crest, extends from Southern Nigeria to Fernando Po, the Cameroon, Mayombe forest, and Stanley Pool.

The latter is not uncommon in the Mayombe, where it keeps well hidden in the forest and seems fond of patches of parasol trees (*Musanga*). One which I collected there had been giving several short gruff sounds in quick succession: "küh-k-k-k-küh!"

Two creamy white eggs taken by Bates from a nest in the Cameroon measured 38 × 30 mm.

***Turacus persa persa* (Linnæus)**

Cuculus persa LINNÆUS, 1758, 'Syst. Nat.,' 10th Ed., p. 111 (Guinea; restricted type locality: Gold Coast).—*Corythaix buffoni* REICHENOW, 1885, J. f. O., p. 217 (Stanley Pool); 1887, idem, pp. 299, 302 (Manyanga; Leopoldville). SCHALOW, 1886, J. f. O., p. 24.—*Turacus persa* REICHENOW, 1902, 'Vög. Afr.,' II, p. 54. DUBOIS, 1905, Ann. Mus. Congo, Zool., I, f. 1, p. 35 (Mayombe). LÖNNBERG, 1907, Arkiv f. Zool., III, No. 21, p. 6 (Mukimbungu). SCHOUTEDEN 1924, Rev. Z. A., XII, p. 264 (Kidada ?); 1926, idem, XIII, p. 190 (Temvo; Makaia-Ntete); 1930, in L. Franck, 'Le Congo Belge,' II, p. 372. PETIT, 1926, 'Dix Années de Chasses,' p. 138 (Nzobe).—*Turacus zenkeri* REICHENOW, 1902, 'Vög. Afr.,' II, p. 56 (in part).—*Turacus schutti* DUBOIS, 1905, Ann. Mus. Congo, Zool., I, f. 1, pp. 4, 35 (in part. Mayombe).—*Turacus persa persa* NEUMANN, 1908, Nov. Zool., XV, p. 374 (Buki).

BANNERMAN, 1922, *Rev. Z. A.*, p. 115; 1933, 'Birds Trop. W. Afr.,' III, p. 58.—*Turacus persa* subsp. STRESEMANN AND GROTE, 1926, *O. Mb.*, p. 49 (Stanley Pool; Chinchoxo).—*Turacus persa zenkeri* SCLATER, 1930, 'Syst. Av. Æth.,' App., p. 851 (in part).

SPECIMENS.—Boma, 2♂, Jan. 3, 17; ♀, Jan. 17.

ADULT MALE.—Iris rather dark brown, edges of the eyelids with their papillæ scarlet; bill dull dark red, blackish at very tip; feet black.

DISTRIBUTION OF THE SPECIES.—From the Gambia to the bend of the Ubangi River, and south through the Lower Congo to northern Angola. *T. p. buffoni* (Vieillot), from west of Liberia, has a broad black line below the eye, and little or no white below the black. *T. p. zenkeri*, in the Cameroon and vicinity, has a narrow black line below eye, and a narrower white stripe underneath. *T. p. persa*, from the Ivory Coast to Mt. Cameroon, reappearing from the Gaboon to northern Angola, has a well-developed white stripe beneath the narrow black line.

This is the common *Turacus* of the Lower Congo, often seen in pairs in the Mayombe forest and in the woods along watercourses near Boma. Its calls are very similar to those of *T. schütti*, a reiterated, resonant "k-k-kaw," and a single hoarse "haw—" slightly prolonged. Among the fruits I found in two stomachs were nine wild dates (from *Phoenix reclinata*).

Since the story was first told by Jules Verreaux, it has often been repeated that the crimson pigment of turaco wings, turacin,¹ is washed out by rain and later renewed. I have never shot a turaco with faded wings, even in the wettest forests; and a feather of *T. persa*, worn for a year and a half in my hat in the United States, instead of bleaching became actually darker red on the exposed end. The same thing happens with old mounted specimens in museums.

Turacus persa zenkeri Reichenow

Turacus buffoni zenkeri REICHENOW, 1896, *J. f. O.*, p. 9 (type locality: Yaunde, Cameroon).—*Turacus buffoni* (= *purpureus*) OUSTALET, 1893, *Naturaliste*, VII, p. 126 (Bangui).—*Turacus zenkeri* REICHENOW, 1902, 'Vög. Afr.,' II, p. 56 (in part. Ubangi R.).

DISTRIBUTION.—From the Sanaga River, Cameroon, to Spanish Guinea and the Ogowé River, eastward to the Ubangi River. This race must occur in the northwest corner of the Belgian Congo, for in the Paris Museum there is a female collected by Dybowski at Bangui, showing the very narrow white line of *zenkeri*. A male from Beso, between Bangui

¹ See Church, 1913, *P. Z. S. Lond.*, pt. 2, pp. 639-643; Krumbiegel, 1925, *J. f. O.*, pp. 440-446; Phillips, 1928, *S. Afr. Journ. Sci.*, XXV, pp. 295-299.

and Krebedje, collected by Decorse, is apparently of the same race. Specimens from the Gaboon are variable.

According to Bates, the nest of Zenker's turaco is a frail structure of dry twigs, placed in low forest trees, and containing two eggs. They are plain creamy white, often nearly spherical, measuring 34.5–37 mm. \times 32–34.5. Both sexes incubate.

Turacus schüttii schüttii (Cabanis)

Corythaix schüttii CABANIS, 1879, Orn. Centralbl., IV, p. 180 (type locality: Angola).—*Turacus schutti* DUBOIS, 1905, Ann. Mus. Congo, Zool., I, f. 1, pp. 4, 35, Pl. II (in part. L. Leopold II; Prov. Orientale). SCHOUTEDEN, 1925, Rev. Z. A., XIII, p. 8 (Kunungu); 1930, in L. Franck, 'Le Congo Belge,' II, p. 372; 1935, Bull. C. Z. C., XII, p. 35 (Lukolela).—*Turacus schüttii* DUBOIS, 1907, Wytzman's 'Genera Av.,' pt. 8, p. 5. SCHOUTEDEN, 1923, Rev. Z. A., XI, p. 321 (Luebo; Basongo; Belenge; Kabambaie; Makumbi; Kamaiembi; Ngombe in Kasai; Tshikapa).—*Turacus schüttii schüttii* NEUMANN, 1908, Nov. Zool., XV, p. 376 (Aruwimi R.).—*Turacus schutti schutti* SCHOUTEDEN, 1924, Rev. Z. A., XII, p. 412 (Eala; Ikengo; Bikoro).—*Turacus schuetti schuetti* W. L. SCLATER, 1924, 'Syst. Av. Æth.,' pt. 1, p. 192. BANNERMAN, 1933, 'Birds Trop. W. Afr.,' III, p. 58, Fig. 22 (Lulonga R.; 'lower Congo R.'). Bowen, 1933, Ecology, XIV, p. 262, Fig. 8C (map). v. BOETTICHER, 1935, Senckenbergiana, Frankfurt, XVII, pp. 147, 151. SCHOUTEDEN, 1936, Ann. Mus. Congo, Zool., I, f. 2, p. 82 (Djamba.)

SPECIMEN.—Stanleyville, ♂ juv., Aug. 21. (A nestling with violet scapulars and rectrices already visible.)

DISTRIBUTION OF THE SPECIES.—From northern Angola and the mouth of the Kasai River eastward to Uganda, the southeast side of Lake Kivu, and the forest northwest of Lake Tanganyika.

The whole western and central parts of this range are occupied by *T. s. schüttii*, with rather dull violet back, and the eastern part by *T. s. emini*, with glossy green back. Intergradation takes place in a relatively narrow band running from the vicinity of Semio and Doruma, on the northern Congo border, southward to Banalia and the vicinity of Kasongo. The intermediate specimens have been grouped in two races, *sharpei* with glossy blue back and tail, and *finshi* with these parts glossy blue-green. If both are recognized, their ranges are difficult to define.

Throughout its range in the Congo forest Schütt's turaco is a common bird, with the same habits and voice as *emini*. At Lukolela a female about to lay was collected on September 2, and a nest was found under construction in some dense second growth in early December, but it was never completed. So breeding takes place in the first half of the rains, and probably continues through the better part of the year.

Turacus schüttii sharpei Reichenow

Turacus sharpei REICHENOW, 1898, O. Mb., p. 182 (type locality: Semio, Niam-Niam country); 1902, 'Vög. Afr.,' II, p. 50. DUBOIS, 1905, Ann. Mus. Congo, Zool., I, f. 1, pp. 5, 35, Pl. III, fig. 2 (Niam-Niam; Ituri; Uelle; Banalia). SCHOUTEDEN, 1929, Bull. C. Z. C., V (1928), p. 99 (Wazimra forest, 60 km. N. of Kasongo).—*Corythaix schuetti* SHARPE, 1884, Journ. Linn. Soc. Lond., Zool., XVII, p. 433. SCHALOW, 1886, J. f. O., p. 34.—*Turacus schuetti* SHELLEY, 1891, 'Cat. Birds Brit. Mus.,' XIX, p. 441.—*Turacus emini* var. *sharpei* DUBOIS, 1905, Ann. Mus. Congo, Zool., I, f. 1, p. 35; 1907, Wytsman's Genera Av., pt. 8, p. 5.—*Turacus schüttii sharpei* NEUMANN, 1908, Nov. Zool., XV, p. 376.—*Turacus schuetti sharpei* W. L. SCLATER, 1924, 'Syst. Av. Æth.,' pt. 1, p. 192. BOWEN, 1933, Ecology, XIV, p. 262, Fig. 8C. SCHOUTEDEN, 1936, Ann. Mus. Congo, Zool., I, f. 2, p. 82 (Buta; Titule).

DISTRIBUTION.—This can only be stated by referring to the localities listed in the synonymy. The whole area of intergradation cannot be much more than 150 miles wide. In the western part of this long band across the equatorial forest, approximately between 25° and 27° east longitude—north of the equator—the bluer individuals have been collected which are called *sharpei*. South of the equator the range seems to lie a little farther to the east. The best series of specimens I have seen is in the Congo Museum.

Turacus schüttii finschi Reichenow

Turacus finschi REICHENOW, 1899, O. Mb., p. 190 (type locality: Ndoruma, Niam-Niam country).—*Turacus schüttii finschi* NEUMANN, 1908, Nov. Zool., XV, p. 376 (Likandi R.).—*Turacus schuetti finschi* W. L. SCLATER, 1924, 'Syst. Av. Æth.,' pt. 1, p. 192 (Poko). SCHOUTEDEN, 1936, Ann. Mus. Congo, Zool., I, f. 2, p. 82 (Panga; Nava R.; Medje).

The wisdom of recognizing this race may well be questioned, and I only do so in order to show where the intermediates closest to *emini* have been collected. Though not yet known from south of the equator, "*finschi*" will certainly be found there too, a little east of the 27th meridian.

Turacus schüttii emini Reichenow

Turacus emini REICHENOW, 1893, O. Mb., p. 30 (type locality: Bundeko, Semliki Valley, Belg. Congo. Also from Mumbo; Vundekakare; Karevia); 1902, 'Vög. Afr.,' II, p. 50 (Ukondju; Irumu); 1911, 'Wiss. Ergeb. D. Z.-Afr. Exp.,' III, p. 271 (region of L. Albert and Ituri). DUBOIS, 1905, Ann. Mus. Congo, Zool., I, f. 1, pp. 4, 35, Pl. III, fig. 1; 1907, Wytsman's Genera Av., pt. 8, p. 5. JACKSON, 1906, Ibis, p. 523 (Ruwenzori). WOLLASTON, 1908, 'From Ruwenzori to the Congo,' p. 71. O.-GRANT, 1910, Tr. Z. S. Lond., XIX, p. 421 (Mpanga forest; Mubuku Valley, 9000 ft.; Beni). SASSI, 1912, Ann. Naturh. Hofmus. Wien, XXVI, p. 374 (N. W. of L. Tanganyika); 1924, idem. XXXVIII, p. 75 (Beni; Moera; Ukaika). SCHOUTEDEN, 1914, Rev. Z. A., III, p. 263 (Kilo); 1918, idem, V, p. 238 (Mawambi; Sibatwa forest; Baraka; Ruzizi-Kivu; Zambo; Luvungi; Lesse; Makoioaba);

1930, in L. Franck, 'Le Congo Belge,' II, p. 372; 1933, Bull. C. Z. C., X, p. 42. GROMIER, 1936, 'Vie Animaux Sauvages Afr.,' p. 289 (near Rutshuru Valley).—*Corythaix* EMIN, 1887, Mittheil. Vereins f. Erdkunde, Leipzig (1886), p. 45 (Mangbetu country); 1894, J. f. O., p. 166 (old Irumu). SCHWEINFURTH AND RATZEL, 1888, 'Emin-Pascha,' German Ed., pp. 199, 403.—*Corythaix persa* EMIN, 1888, 'Emin Pasha Centr. Afr.,' pp. 200, 404; 1919, in Stuhlmann, 'Tageb. Emin Pascha,' II, p. 469 (Tingasi).—*Corythaix schützi* EMIN, 1894, J. f. O., p. 166 (old Irumu).—*Corythaix* (an *schuetzi* ?) FLOWER, 1894, P. Z. S. Lond., p. 598 (Ipoto; Kilongolonga's).—*Turacus schützi emini* NEUMANN, 1908, Nov. Zool., XV, p. 375 (Nzoro R.; 90 km. W. of L. Edward; Rugege forest). CHAPIN, 1927, Bull. A. M. N. H., LIII, p. 477. STONE, 1936, Proc. Acad. Nat. Sci. Phila., LXXXVIII, p. 559 (Ekibondo).—*Turacus emini ugandæ* REICHENOW, 1911, 'Wiss. Ergeb. D. Z.-Afr. Exp.,' III, p. 271 (N. W. of Beni; N. W. of Tanganyika, 2000 m.).—*Turacus* CHAPIN, 1915, A. M. Journ., p. 281.—*Turacus emini (ugandæ ?)* LÖNNBERG, 1917, Arkiv f. Zool., X, No. 24, p. 15 (Beni).—*Turacus emini emini* GYLDENSTOLPE, 1924, K. Svenska Vet. Akad. Handl., (3) I, No. 3, p. 254 (Malisawa; Simbo). SCHOUTEDEN, 1927, Bull. C. Z. C., III, p. 85 (Mt. Miken; Arebi; E. Congo forest).—*Turacus schuetzi emini* W. L. SCLATER, 1924, 'Syst. Av. Æth.,' pt. 1, p. 192. SCHOUTEDEN, 1932, Rev. Z. A., XXII, p. 129 (Lulenga; Burunga); 1936, Ann. Mus. Congo, Zool., I, f. 2, p. 82 (Bondo Mabe). BERLIOZ, 1932, Bull. Mus. Paris, (2) IV, p. 375 (Mokoto Lakes); 1936, Bull. Mus. Paris, (2) VIII, p. 328 (Mbwahi near L. Kivu). BOWEN, 1933, Ecology, XIV, p. 262, Fig. 8C (map).

SPECIMENS.—Batama, 2 ♀, Sept. 17, 18. Boyulu, ♀, Sept. 22. Avakubi, ♂, Oct. 2; 3 ♀, Oct. 2, 8, 16. Bafwabaka, 3 ♂, Jan. 3, Dec. 31; 2 ♀, Jan. 3, Dec. 31. Gamangui, ♂, Feb. 10; ♀, Feb. 3. Medje, 3 ♂, Jan. 18, Aug. 24, Sept. 3; 4 ♀, June 5, July 13, Sept. 7, 28; ♂ juv., Sept. 28. Niangara, ♂, Nov. 14; ♀, Nov. 8.

ADULTS.—Iris brown, papillæ on eyelids vermilion; bill brownish black, becoming reddish at base of mandible; feet blackish.

DISTRIBUTION.—Forests of the eastern Congo, from Niangara and Faradje south to the northwest side of Lake Tanganyika, thence eastward across Uganda to the Yala River, to the forest east of the Rutshuru Plain, and the Rugege forest in the Kivu highlands. It ascends to 9000 feet on Ruwenzori, and I have heard it at 7800 feet on Mt. Niragongo. Our specimens from Niangara, Medje, and Batama (only 90 miles eastward of Stanleyville) are definitely *emini*, though taken near the western limit of this race.

Although *T. s. ugandæ* Reichenow¹ is not usually recognized, it is a fact that specimens from the eastern Congo border often have more brassy reflections than those taken in the western part of the range of *emini*.

Emin's turaco is the only member of its genus in the interior of the eastern Congo forest and in the mountain forests from Lake Albert to the

¹ 1907, O. Mb., p. 4 (Uganda).

northern end of Lake Tanganyika. It goes in small numbers, two or three together, keeping to the heavy foliage, where the red of the wings shows but a moment as they fly for cover. As a rule their voice makes their presence known: a reiterated, resonant "khaw, khaw, khaw,—" lasting perhaps fifteen seconds. This is a most characteristic noise of the forest during almost the entire year. Two other calls, less often heard, are a long hoarse grunt and a rapid series of sharp notes like "quick! quick! quick!—"

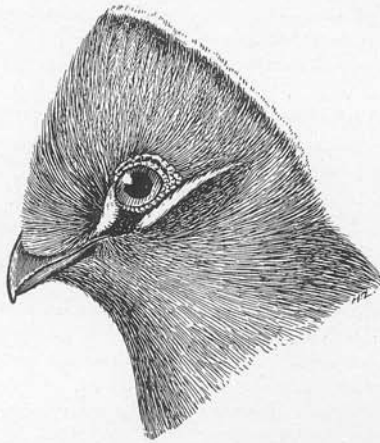


Fig. 14. *Turacus s. emini*. $\times 2/3$.

Two birds together often go through an amusing, bowing performance with raised tail and drooping wings. Along boughs they run with the agility of squirrels, and in captivity one can see that the fourth, or outer toe of *Turacus* is turned backward while perching. After death it points forward.

Dissections showed that in the Ituri breeding probably goes on throughout the year, except perhaps in the three driest months. In the region of Medje we were shown nests on August 24 and September 28, frail structures of twigs, about twelve feet up, in tangled second growth. The first, close to a native hut, contained two white eggs, 36.4×29.7 mm. and 37.5×29.6 . The male bird was incubating. In the second there was a single nestling, still clothed in sooty brown down.

Of eleven stomachs examined, ten contained fruit, the other some green vegetable matter. The fruit of the parasol tree (*Musanga*) is most commonly eaten, and one bird had added seventeen small snails to its meal of fruit.

***Turacus livingstonii schalowi* (Reichenow)**

Corythaix schalowi REICHENOW, 1891, J. f. O., p. 148 (type locality: Novo Redondo, Angola).—*Corythaix livingstonei* BÖHM, 1884, Zeitschr. Gesammte Orn., Budapest, I, p. 110 (Mpala).—*Corythaix livingstonii* SCHALOW, 1886, J. f. O., pp. 26, 412, 414, 421, 422, 425, 430 (Marungu; Kaué R.; "Lualaba" [= Luvua R.]; Lugoma R.; Lufua R.; Lulenge R.); 1887, idem, p. 232. MATSCHIE, 1887, J. f. O., p. 149 (Lufuku R.). REICHENOW, 1891, J. f. O., p. 148 (L. Upemba).—? *Corythaix livingstonii* DUBOIS, 1886, Bull. Mus. Roy. Hist. Nat. Belg., IV, p. 147 (L. Tanganyika).—*Turacus schalowi* var. *marungensis* REICHENOW, 1902, 'Vög. Afr.', II, p. 52 (type locality: Marungu, W. of L. Tanganyika).—*Turacus livingstonei* var. *schalowi* DUBOIS, 1905, Ann. Mus. Congo, Zool., I, f. 1, pp. 5, 35.—*Turacus livingstonei* var. *chalcophoph* DUBOIS, 1905, Ann. Mus. Congo, Zool., I, f. 1, pp. 5, 35.—*Turacus livingstonei schalowi* NEUMANN, 1908, Nov. Zool., XV, p. 377. DE RIEMAECKER, 1927, Rev. Z. A., XIV, p. 272 (Elisabethville; Kasempa R.; Lubumbashi R.).—*Turacus livingstonii marungensis* NEAVE, 1910, Ibis, p. 115 (upper Lofu Valley near S. end of L. Tanganyika).—*Turacus livingstonii* MOURITZ, 1914, Ibis, p. 28 (S. E. Katanga).—*Turacus schalowi marungensis* GRANT, 1915, Ibis, p. 408 (Marungu). W. L. SCLATER, 1924, 'Syst. Av. Æth.', pt. 1, p. 191. SCHOUTEDEN, 1930, Rev. Z. A., XVIII, p. 282 (Kafubu R.); 1933, Bull. C. Z. C., X, p. 32 (Kanzenze in Upper Katanga). v. BOETTICHER, 1935, Senckenbergiana, Frankfurt, XVII, pp. 145, 150, Fig. 1 (map).—*Turacus schalowi* REICHENOW, 1921, J. f. O., pp. 211–215. D. SETH-SMITH, 1931, Avicul. Mag., Lond., (4) IX, p. 1, Pl.—*Turacus chalcophoph* PAGET-WILKES, 1926, S. Afr. Journ. Nat. Hist., VI, p. 65 (Upper Kafue R.).—*Turacus marungensis* SCHOUTEDEN, 1930, in L. Franck, 'Le Congo Belge,' II, p. 375 (Katanga).—*Turacus livingstoni schalowi* and *T. l. marungensis* BOWEN, 1933, Ecology, XIV, p. 262, Fig. 8C.—*Turacus schalowi schalowi* v. BOETTICHER, 1935, Senckenbergiana, Frankfurt, XVII, pp. 145, 150, Fig. 1 (map).

DISTRIBUTION OF THE SPECIES.—Angola east to southwest Kenya Colony, the Pangani River, Portuguese East Africa, and south to Zululand. Despite the opinion of Claude Grant (1915), I do not regard *livingstonii* and *schalowi* as distinct species, for I expect complete intergradation to be found.

T. l. livingstonii Gray, of Southeastern Rhodesia, southern Nyasaland, and the lower Zambesi Valley, is short-crested (54–60 mm.), with glossy green tail. Specimens from north of Nyasa have longer crests (60–69 mm.). *T. l. hybridus* Reichenow, of Tanganyika Territory from Mahenge to Useguha, has often a more bluish gloss on scapulars and tail.¹ *T. l. reichenowi* (Fischer), Nguru Mountains south to Zululand, has a more rounded crest and is steel-blue on wing-coverts and tail. *T. l. schalowi*, of which I consider *marungensis* a synonym, is long-crested (67–98 mm.), the crest with little metallic green, scapulars and wing-coverts glossy green, tail violet. This race extends from western

¹ The type of *cabanis* probably did not come from Bagamoyo, while that of *hybridus* is from Ukami, a district only about 130 km. to the southwest of Bagamoyo. See Reichenow, 1921, J. f. O., pp. 211–215.

Angola and northern Bechuanaland to western Nyasaland, the Katanga, and Marungu. *T. l. chalcophus* Neumann, from Mt. Gurui in Tanganyika Territory to the Loita district of Kenya Colony, is like *schalowi* except that the crest-feathers, subapically, are brilliant green, almost bluish green.

In most of the highlands of the southeastern Congo Schalow's turaco is a common bird, especially in gallery forests, but even in the savanna woods. The voice as I heard it in the southern Katanga is not unlike that of *T. schüttii*. Böhm wrote the protracted call "runk-runk—" and mentioned other shorter notes.

No description of the nest and eggs of *schalowi* is available; but from the district east of Lake Victoria, Madarász¹ had a set of two white eggs of *T. l. chalcophus* which measured 41.5–42.5 mm. × 36.5–39. They were from a nest like a dove's, twelve feet up in an acacia.

Turacus leucolophus (Heuglin)

Corythaix leucolophus HEUGLIN, 1855, J. f. O., p. 65 (type locality: Bahr-el-Abiad, or upper White Nile). SHELLEY, 1888, P. Z. S. Lond., p. 44 (Kabayendi). SCHUBOTZ, 1921, 'Tageb. Emin Pascha,' VI, p. 257 (Tomaya).—*Corythaix leucolopha* ANTINORI, 1868, Boll. Soc. Geogr. Ital., I, p. 117 (Niam-Niam, near present Bafuka). SHARPE, 1884, Journ. Linn. Soc. Lond., Zool., XVII, p. 433 (Semio; Ndoruma). SCHALOW, 1886, J. f. O., p. 20. SCHUBOTZ, 1921, 'Tabeg. Emin Pascha,' VI, p. 242 (Mundu).—*Corythaix leucolophus* PETERMANN, 1868, in Petermann's Mitteil., p. 416.—*Corythaix leucotis* JUNKER, 1890, 'Reisen in Afr.,' II, p. 193 (Uere R.).—*Turacus leucolophus* SHELLEY, 1891, 'Cat. Birds Brit. Mus.,' XIX, p. 444 (Kamari; Faradjak). OUSTALET, 1893, Naturaliste, VII, p. 126. REICHENOW, 1902, 'Vög. Afr.,' II, p. 43 (Ubangi). DUBOIS, 1905, Ann. Mus. Congo, Zool., I, f. l, p. 35 (Uelle); 1907, Wytsman's Genera Av., pt. 8, p. 4, Pl. I, fig. 4. NEUMANN, 1908, Nov. Zool., XV, p. 371. SALVADORI, 1912, Ann. Mus. Civ. Stor. Nat. Genova, (3) V, p. 444. SCHUBOTZ, 1921, 'Tageb. Emin Pascha,' VI, p. 90 (Mangbetu country). W. L. SCLATER, 1924, 'Syst. Av. Æth.,' pt. 1, 193. BANNERMAN AND BATES, 1924, Ibis, p. 215. SCHOUTEDEN, 1930, in L. Franck, 'Le Congo Belge,' II, p. 373; 1936, Ann. Mus. Congo, Zool., I, f. 2, p. 82 (Faradje; Dika; Abimva; Niarembe; Mahagi Port). BANNERMAN, 1933, 'Birds Trop. W. Afr.,' III, p. 63, Fig. 23. STONE, 1936, Proc. Acad. Nat. Sci. Phila., LXXXVIII, p. 559 (Ekibondo).—*Turacus ALEXANDER*, 1907, 'From the Niger to the Nile,' II, p. 308 (Kodja hill near Mt. Gaima).—*Heuglinornis leucolophus* v. BOETTICHER, 1935, Senckenbergiana, Frankfurt, XVII, p. 150.

SPECIMENS.—Niagara, ♂, Apr. 9. Faradje, 4 ♂, Feb. 4, 13, 16, Apr. 22; 8 ♀, Feb. 13, 24, Mar. 13, Apr. 22, Aug. 13, Oct. 19, Nov. 30. Aba, ♂, July 14.

ADULTS.—Iris dark brown, eyelids red (but without papillæ); bill yellow, with base of maxilla greenish yellow above, and base of mandible whitish or greenish; feet black.

¹ 1910, Archivum Zoologicum, Budapest, I, p. 178.

DISTRIBUTION.—Eastern Benue Province of Nigeria and savannas of Cameroon to the southern Bahr-el-Ghazal, Uelle district, northern Uganda, and the Elgon district.

The white-crested turaco is partial to strips of forest along streams, usually found in parties of about a half-dozen, and often ventures out into the smaller trees of the savannas. Thus it is easily observed. The usual call is a succession of low, hoarse sounds, a grunting "cow-cow-cow—" introduced by a note somewhat longer and higher than those which follow.



Fig. 15. *Turacus leucolophus*. $\times 2/3$.

Nesting goes on through the greater part of the rainy period, but is interrupted in the drought. Near Faradje a nest was shown me as early as April 22. It was in the savanna, between the forking branches of an acacia-like tree only 20 feet tall, built of dry twigs, and only slightly concave. The two dull white eggs, of rounded form, measured 35×32.2 mm. and 35.5×32.3 . Both sexes seem to incubate.

Of seven stomachs examined, one held a fair-sized snail, and the others berries and other fruits. One bird had also eaten a small flower-head.

Turacus erythrolophus (Vieillot)

Opaethus erythrolophus VIEILLOT, 1819, 'Nouv. Dict. Hist. Nat.,' XXXIV, p. 306 (type locality: Africa).—*Turacus erythrolophus* HARTLAUB, 1852, Arch. f. Naturg., Berlin, p. 20 ("Congo?"); 1852, in Jardine's, Contrib. Orn., p. 79. NEU-

MANN, 1908, Nov. Zool., XV, p. 371. W. L. SCLATER, 1924, 'Syst. Av. Æth.,' pt. 1, p. 193. BANNERMAN, 1933, 'Birds Trop. W. Afr.,' III, p. 62.—*Corythaix paulina* HARTLAUB, 1857, 'Syst. Orn. Westafr.,' opp. p. lix.—*Corythaix erythrolopha* SCHALOW, 1886, J. f. O., p. 45 (Kwango R.).

DISTRIBUTION.—Angola, from Benguella to the upper Kwango River, Ndala Tando, and the south bank of the lower Congo River. The Gaboon record is doubtless erroneous, but the red-crested turaco is to be expected in the Lower Congo. It may occur also in the southwestern Kwango district of the Belgian Colony.

There are two adult specimens in the Congo Museum which were taken by P. Janssens between San Antonio and Ganga-Ginga, just south of the lower Congo River. Apparently this turaco prefers savanna woods to heavy forests, and it is not likely to inhabit the Mayombe forest.

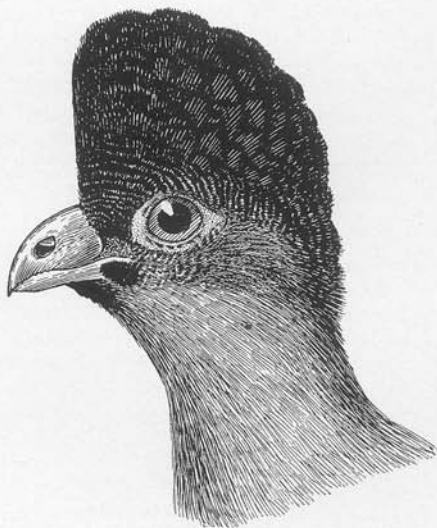


Fig. 16. *Gallirex p. chlorochlamys*. $\times 2/3$.

[*Gallirex porphyreolophus chlorochlamys* Shelley]

Gallirex chlorochlamys SHELLEY, 1881, Ibis, p. 118 (type locality: Ugogo).—*Corythaix porphyreolophus* DUBOIS, 1886, Bull. Mus. Roy. Hist. Nat. Belg., IV, p. 147 (L. Tanganyika).—*Gallirex porphyreolophus* var. *chlorochlamys* DUBOIS, 1905, Ann. Mus. Congo, Zool., I, f. 1, p. 35.

The purple-crested turaco ranges from eastern Cape Province to southern Kenya Colony. *G. p. porphyreolophus* (Vigors) is replaced

north of Beira and Mashonaland by *G. p. chlorochlamys*, lacking any rufous wash over the light green chest and upper back. The latter race extends to the Loangwa Valley, the eastern side of Lake Tanganyika, and southern Ankole.¹

Despite my hopes that a specimen might be secured in Ruanda or in the southern Katanga, none has yet been taken in Belgian Territory. In East Africa *chlorochlamys* is a retiring inhabitant of thick woods along streams, living in small parties, which give calls of the usual turaco type.

Ruwenzorornis johnstoni johnstoni (Sharpe)

Gallirex johnstoni SHARPE, 1901, B. B. O. C., XI, No. 78, p. 57 (type locality: Ruwenzori, 7000 ft.); 1902, Ibis, p. 112. O.-GRANT, 1910, Tr. Z. S. Lond., XIX, p. 420 (Mubuku Valley, 9000 ft.).—*Ruwenzorornis johnstoni* NEUMANN, 1903, B. B. O. C., XIV, p. 14. JACKSON, 1906, Ibis, p. 523. DUBOIS, 1907, Wytsman's Genera Av., pt. 8, p. 6, Pl. 1, fig. 7. REICHENOW, 1911, 'Wiss. Ergeb. D. Z.-Afr. Exp.,' III, p. 270 (W. Ruwenzori, 2500-3000 m.). CHAPIN, 1928, Nat. Hist., XXVII (1927), p. 624 (W. Ruwenzori). SCHOUTEDEN, 1933, Bull. Séances Inst. Roy. Col. Belge., IV, p. 154 (near Lubero).—*Ruwenzorornis johnstoni johnstoni* NEUMANN, 1908, Nov. Zool., XV, p. 370. W. L. SCLATER, 1924, 'Syst. Av. Æth.,' pt. 1, p. 194. VAN SOMEREN, 1932, Nov. Zool., XXXVII, p. 274 (in part).—*Ruwenzorornis chalcophthalmicus* SCHOUTEDEN, 1928, Bull. C. Z. C., V, p. 40.

ADULTS.—Iris dark brown, eyelids with a single row of raised "beads" all around, of dark scarlet like the smooth skin below and behind the eye, remainder of orbital and loreal skin bright yellow. Tip of bill blackish, sharply limited; remainder dull pale green, finely stippled toward base with purplish red, and often becoming purplish red on base of culmen, base of mandible, and adjacent corner of maxilla. Feet dusky brown to blackish.

DISTRIBUTION OF THE SPECIES.—Mountains of the eastern Congo border, from Ruwenzori and the northwest side of Lake Edward to the northwest side of Lake Tanganyika. *R. j. johnstoni* is not restricted to Ruwenzori, for I have collected specimens at Mulu, 8100 feet, northwest of Lake Edward, and expect this race to occur on Mt. Tshabirimu. It has bare orbital skin, whereas *R. j. kivuensis*, the southern race, has only the eyelids bare.

The Ruwenzori turaco has not been found in the mountains west of Lake Albert, but on Ruwenzori it is a common and conspicuous bird, mainly above 7000 feet, and extending up to nearly 12,000 feet on the western side. It seemed most numerous toward 8950 feet, just below the tree-heath zone.

¹ O.-Grant, 1905, Ibis, p. 204.

Like ordinary turacos in most of their habits, these birds nevertheless have several calls that are unusual. Single loud chirps of unusual resonance are often given, or a series of similar, ringing chirps, beginning slowly then running ever more rapidly to a diminishing close. Still another characteristic call is a cackle that suggests a monkey voice, a resounding "ch-k-k-k-krowng!" descending in pitch, nasal at the end. Lastly, there is a single "caw" like that of *Turacus schüttii*.

At times the woods re-echoed with these calls, and three or four birds were feeding in a tree together. Most of those collected had been eating a small drupe, of pale mauve color, from the *Rapanea*¹ trees. They also

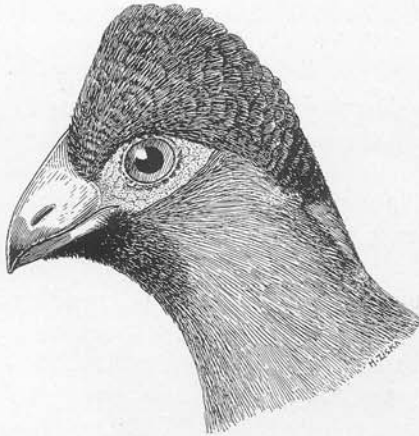


Fig. 17. *Ruwenzorornis j. johnstoni*. $\times 2/3$.

ate a smaller greenish-white berry, and are said to take the fruit of the African yew (*Podocarpus*).

In December, one of the dry periods on west Ruwenzori, the breeding season of *Ruwenzorornis* seemed to be approaching and no young birds were about. At Mulu in early March there were immature birds with remnants of juvenal plumage, and three adults were in non-breeding condition. These facts point to a rather definite reproductive period, several months earlier at Mulu than on Ruwenzori. It may be predicted that the nest of *Ruwenzorornis* is very like that of *Turacus*.

***Ruwenzorornis johnstoni kivuensis* Neumann**

Ruwenzorornis johnstoni kivuensis NEUMANN, 1908, B. B. O. C., XXI, p. 54 (type locality: western Kivu Volcanoes); 1908, Nov. Zool., XV, p. 370 (Mt. Mikeno;

¹ In 'Birds of the Belgian Congo,' Part I, 1932, pp. 170, 175, I mistakenly used the name *Agauria* for these trees.

Rugege forest). GYLDENSTOLPE, 1924, K. Svenska Vet. Akad. Handl., (3) I, No. 3, p. 255. W. L. SCLATER, 1924, 'Syst. Av. Æth.,' pt. 1, p. 194. HARTERT, 1925, Nov. Zool., XXXII, p. 151. SCHOUTEDEN, 1927, Bull. C. Z. C., III, p. 82 (Mt. Karisimbi; Burunga; Nya-Muzinga); 1932, Rev. Z. A., XXII, p. 128 (Lulenga; Burunga). HACHISUKA, 1932, Ois. R. F. O., (N. S.) II, p. 613; 1933, Nat. Hist. Mag., Lond., IV, No. 25, p. 25 (Albert Nat. Park). SCHOUTEDEN, 1933, Bull. Séances Roy. Col. Belge, IV, p. 154. BERLIOZ, 1935, Bull. Mus. Paris, (2) VII, p. 160 (Mbwahi ?); 1936, Bull. Mus. Paris, (2) VIII, p. 328 (Mbwahi near L. Kivu).—*Ruwenzorornis johnstoni* SCHOUTEDEN, 1935, Rev. Z. A., XXVII, p. 401 (Nyamukubi Mts.).—*Ruwenzorornis chalcophthalmicus* REICHENOW, 1908, O. Mb., p. 48 (Rugege forest); 1911, 'Wiss. Ergeb. D. Z.-Afr. Exp.,' III, p. 271 (Bugioie forest; Mt. Niragongo). DERSCHIED, 1925, Bull. C. Z. C., II, p. 114 (Bigogo in Kivu distr.).—*Ruwenzonnis chalcophthalmicus* SASSI, 1912, Ann. Naturh. Hofmus. Wien, XXVI, p. 375 (N. W. of L. Tanganyika).—*Ruwenzorornis chalcophthalmicus* SCHOUTEDEN, 1918, Rev. Z. A., V, p. 237 ("Baraka").—*Ruwenzorornis chalcophthalmicus kivuensis* SCHOUTEDEN, 1932, Rev. Z. A., XXI, p. 270.

DISTRIBUTION.—Mountain forests of the Kivu region, from northwest of Lake Tanganyika and Rugege north to the volcanoes, and highlands west of Lake Kivu. This race has the orbit almost completely covered with metallic green feathers, only the "beaded" rim of eyelids deep scarlet. Bill colored as in *R. j. johnstoni*.

The Kivu turaco is common on the well-wooded central volcanoes, usually from 8000 up to 12,000 feet, but at times coming down in numbers to 6500 feet. It is not dependent on bamboos, which furnish no food for it, and here too is fond of *Rapanea* fruit. One was found to have eaten a snail. On Mt. Kandashomwa, west of the Ruzizi Valley, this turaco lives between 7500 and 8800 feet; but along the escarpment east of the volcanoes in British Ruanda I failed to hear it. The voice is very similar to that of the Ruwenzori race.

On Mikeno and Karisimbi two breeding females were taken in June, also three young birds four to six months old. There may be a long breeding season starting in June, or there may be two periods of reproduction.

Musophaga rossæ rossæ Gould

Musophaga rossæ J. GOULD, 1851, P. Z. S. Lond., p. 93 (western coast of Africa; restricted type locality: Loanda¹). SHARPE, 1884, Journ. Linn. Soc. Lond., Zool., XVII, p. 433 (Semio). DE SOUSA, 1886, Jorn. Sci. Lisboa, XI, p. 78 (Luapula R.); 1886, in Capello and Ivens, 'De Angola a Contra-Costa,' II, p. 444. DUBOIS, 1886, Bull. Mus. Roy. Hist. Nat. Belg., IV, p. 147 (L. Tanganyika); 1905, Ann. Mus. Congo, Zool., I, f. 1, p. 35 (Katanga; Kisantu); 1907, Wytsman's Genera Av., pt. 8, p. 7. SCHALOW, 1886, J. f. O., pp. 14, 413, 415 (Kwango R.; Lufuku R.; E. Mar-

¹ C. Grant, 1915, Ibis, p. 413.

ungu); 1887, idem. p. 231. MATSCHIE, 1887, J. f. O., p. 149 (Mpala; Masembe; Lukumbi R.; Lufira-Kamolondo). SCHWEINFURTH AND RATZEL, 1888, 'Emin-Pascha,' German Ed., pp. 403, 517 (Monbuttu). EMIN, 1888, 'Emin Pasha Centr. Afr.,' pp. 200, 404, 520 (Niam-Niam); 1894, J. f. O., p. 166 (old Irumu). SHELLEY, 1888, P. Z. S. Lond., p. 43 (Tingasi); 1891, 'Cat. Birds Brit. Mus.,' XIX, p. 448. HARTLAUB, 1891, Abhandl. Naturwiss. Verein Bremen, XII, p. 36. FLOWER, 1894, P. Z. S. Lond., p. 597 (upper Ituri R.). REICHENOW, 1902, 'Vög. Afr.,' II, p. 29 (Nyangabo; Lukula R.; Kwango R.; Lower Congo); 1911, 'Wiss. Ergeb. D. Z.-Afr. Exp.,' III, p. 269 (Kwidjwi Is.). NEAVE, 1907, Mem. Proc. Manchester Lit. Phil. Soc., LI, No. 10, p. 42 (near Ndola); 1910, Ibis, p. 115 (Kambove; Lubudi R.; Lufupa R.). JOHNSTON, 1908, 'George Grenfell and the Congo,' II, p. 928. O.-GRANT, 1908, Ibis, p. 312. MOURITZ, 1914, Ibis, p. 27 (S. E. Katanga). SALVADORI, 1914, Ann. Mus. Zool. Napoli, IV, No. 10, p. 14 (Ruanda); 1915, Ann. Mus. Civ. Stor. Nat. Genova, (3) VI, p. 279 (Kasai). LÖNNBERG, 1917, Arkiv f. Zool., X, No. 24, p. 15 (Rutshuru). SCHOUTEDEN, 1918, Rev. Z. A., V, p. 237 (Baraka; Dogodo; Mboka; Kabambaré; Assumba); 1923, idem, XI, p. 321 (Ngombe in Kasai; Tshikapa); 1932, idem, XXI, p. 272, XXII, p. 128; 1933, idem, XXII, p. 379 (Kisenyi); 1936, Ann. Mus. Congo, Zool., I, f. 2, p. 82 (Buta; Mauda; Dramba; Mahagi Port). W. L. SCLATER, 1924, 'Syst. Av. Æth.,' pt. 1, p. 195. DE RIE-MAECKER, 1927, Rev. Z. A., XIV, p. 272 (Lubumbashi R.). BERLIOZ, 1932, Bull. Mus. Paris, (2) IV, p. 375 (Katana). STONE, 1936, Proc. Acad. Nat. Sci. Phila., LXXXVIII, p. 559 (Ekibondo).—? *Musophaga rossæ* HARTLAUB, 1857, 'Syst. Orn. Westafr.,' opp. p. lix ("Congo"). BÖHM, 1884, Zeitschr. Gesammte Orn., Budapest, I, p. 109 (Mpala).—*Musophaga violacea* JOHNSTON, 1884, 'River Congo,' pp. 361, 367 (between Vivi and Isangila).—*Musophaga böhmii* SCHALOW, 1884, Zeitschr. Gesammte Orn., Budapest, I, p. 104 (Marungu).—*Musophaga* EMIN, 1887, Mittheil. Vereins f. Erdkunde, Leipzig, p. 45 (Monbuttu). SCHWEINFURTH AND RATZEL, 1888, 'Emin-Pascha,' German Ed., p. 199. EMIN, in Stuhlmann, 1919, 'Tageb. Emin Pascha,' II, p. 470.—*Musophaga violacea rossæ* NEUMANN, 1908, Nov. Zool., XV, p. 369 (Ngombe; Kwidjwi Is.). SCLATER AND M.-PRAED, 1919, Ibis, p. 648 (Yambio). GYLDENSTOLPE, 1924, K. Svenska Vet. Akad. Handl., (3) I, No. 3, p. 256 (Goma; Irumu). SCHOUTEDEN, 1927, Bull. C. Z. C., III, p. 85 (W. of Ngoma).—*Musophaga* sp. (not *violacea*) SCHUBOTZ, 1921, 'Tageb. Emin Pascha,' VI, p. 278 (Tingasi).—*Musophaga rossæ rossæ* FRIEDMANN, 1930, 'Afr. Rep. Liberia Belg. Congo,' II, p. 753 (Ngomo in Ruzizi Valley). BANNERMAN, 1933, 'Birds Trop. W. Afr.,' III, p. 69, Fig. 25.

SPECIMENS.—Niagara, 2 ♂, Dec. 10, Mar. 27; ♀, Mar. 22. Between Faradje and Aba, 2 ♂, Nov. 30, Dec. 3; 2 ♀, Oct. 5, Dec. 3.

ADULTS.—Iris dark brown, orbit yellow. Maxilla yellow, with a little brownish red beneath nostril; on the frontal shield the yellow shades posteriorly into red; mandible brownish red with yellowish tip. Feet black.

DISTRIBUTION OF THE SPECIES.—Border regions about the Lower Guinea forest: Northeastern Cameroon to Mount Elgon, Nandi district, both shores of Lake Victoria, Katanga, Northern Rhodesia, and Angola. It ranges in to the edges of the heavy forest, but never pene-

trates far. In the Cameroon lives *M. r. savannicola* Grote, differing from *M. r. rossæ* only by its lighter red crest. This race may possibly extend to the Ubangi River. *M. violacea* Isert, of Upper Guinea, is a distinct species.

Lady Ross's plantain-eater is entirely a bird of forest patches and borders, unknown even at Medje or Lukolela, so close to the edge of the Congo forest. It cannot escape detection, on account of its loud voice. Furthermore, it is a lowland bird, ascending little above 5000 feet. Though found at Djugu, west of Lake Albert and about Lake Kivu, it does not ascend the slopes of Ruwenzori or the Kivu Volcanoes.

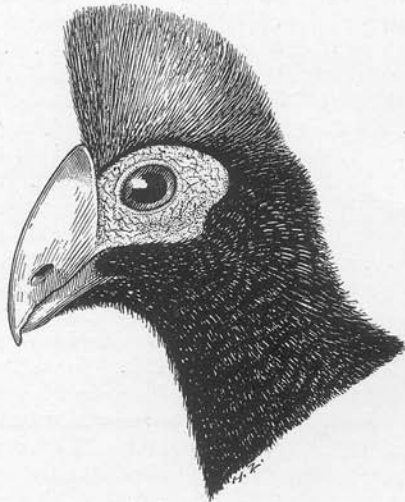


Fig. 18. *Musophaga r. rossæ*. $\times 2/3$.

More sociable than *Turacus*, these birds go in parties that may number ten or a dozen. They are shy and often difficult to collect. The notes so commonly heard are rather like the longer calls of *Turacus*, but the rhythm is less regular, and two or more birds seem to be calling at once. There is a slight suggestion of the rolling quality of *Corythæola*.

In the Uelle district their calling was most persistent in June and July, though heard till early December. A bird in breeding condition was taken in the latter half of March, and nesting presumably continues on through the rains. Nests known from Uganda were platforms of twigs, with two white eggs, 42×40 mm.

In six stomachs we found only fruit, once at least that of the parasol tree (*Musanga*).

Corythaixoides concolor concolor (Smith)

Corythaix concolor A. SMITH, 1833, S. Afr. Quart. Journ., II, p. 48 (type locality: inland of Port Natal).—*Schizorhis concolor* CAPELLO AND IVENS, 1886, 'De Angola a Contra-Costa,' II, p. 16 (Cabaco R.). SCHALOW, 1886, J. f. O., pp. 425, 431, 432 (Lugoma R.; Lulenge R.; Likulwe R.). MATSCHIE, 1887, J. f. O., p. 149.—*Chizærhis concolor* Reichenow, 1902, 'Vög. Afr.,' II, p. 34. DUBOIS, 1905, Ann. Mus. Congo, Zool., I, f. 1, p. 35 (in part. Katanga); 1907, Wytzman's Genera Av., pt. 8, p. 8 (in part). MOURITZ, 1914, Ibis, p. 33 (S. E. Katanga). DE RIEMAECKER, 1927, Rev. Z. A., XIV, p. 272 (Shindaika).—*Corythaixoides concolor* PAGET-WILKES, 1926, S. Afr. Journ. Nat. Hist., VI, p. 66 (near Ndola).

DISTRIBUTION OF THE SPECIES.—Zululand and Mafeking north to the Rufiji River, Tanganyika Territory, Marungu, Upper Katanga, and the mouth of the Congo River. Specimens from the Atlantic slope of Angola from Mossamedes north are slightly paler gray on crown and cheeks, *C. c. pallidiceps* Neumann. Two other races have been described by Roberts¹ from Bechuanaland and the Chobe River.

The goaway bird is found in the Congo only in Marungu, the Upper Katanga, along the coast near Banana, and supposedly at Kisantu. Specimens from the Lower Congo will probably prove to be *pallidiceps*. It frequents trees in the savannas, especially, according to Neave² in low-lying river valleys. The well-known name of this gray turaco is derived from its call, which Böhm wrote "k - o - ëëh."

Nests are built in southern Africa from October to January, so it may be expected to nest in the Katanga during the rains. Three eggs are laid, bluish white or pale ivory-green, measuring about 39 × 32.5 mm.

[*Corythaixoides concolor pallidiceps* Neumann]

Corythaixoides concolor pallidiceps NEUMANN, 1899, J. f. O., p. 66 (type locality: Angola).—*Chizærhis concolor* DUBOIS, 1905, Ann. Mus. Congo, Zool., I, f. 1, p. 35 (in part. Kisantu); 1907, Wytzman's Genera Av., pt. 8, p. 8 (in part. "Stanley Pool"). SCHOUTEDEN, 1926, Rev. Z. A., XIII, p. 190 (Moanda).

This Angolan race is the one to be expected near the Congo mouth. Dr. Schouteden is positive of the specific identification of the bird he saw at Moanda, though he did not secure a specimen. The occurrence of a goaway bird at Kisantu, as reported by Dubois, seems questionable, for no other example has ever been seen away from the coast in the Lower Congo. I have been unable to find the Kisantu specimen.

¹ 1932, Ann. Transvaal Mus., XV, p. 25; 1935, idem, XVI, pp. 89, 90.

² 1910, Ibis, p. 116.

KEY TO THE CONGO SPECIES OF **CRINIFER**

- Tail-feathers uniform blackish below, without light cross-band; dark streaks on underparts broader and blacker.....*C. piscator*.
 A broad whitish band crossing all but the median rectrices; streaking of underparts very fine, and grayer.....*C. zonurus*.

Crinifer zonurus (Rüppell)

Chizærhis zonurus RÜPPELL, 1835, 'Neue Wirbelth. Fauna Abyss., Vög.,' p. 9, Pl. IV (type locality: Temben, Abyssinia).—*Schizorhis zonura* SCHALOW, 1886, J. f. O., p. 69 (Niam-Niam). SALVADORI, 1914, Ann. Mus. Zool. Napoli, IV, No. 10, p. 14 (Bugeroro, Ruanda). EMIN, 1919, in Stuhlmann, 'Tageb. Emin Pascha,' II, p. 438 (Dungu). SCHUBOTZ, 1921, 'Tageb. Emin Pascha,' VI, p. 239 (Kuterma).—*Chizærhis zonura* DUBOIS, 1905, Ann. Mus. Congo, Zool., I, f. 1, p. 35 (Uelle); 1907, Wytsman's Genera Av., pt. 8, p. 8. REICHENOW, 1911, 'Wiss. Ergeb. D. Z.-Afr. Exp.,' III, p. 270 (Ruzizi plain). SASSI, 1912, Ann. Naturh. Hofmus. Wien, XXVI, p. 375 (Urundi). SCHUBOTZ, 1921, 'Tageb. Emin Pascha,' VI, p. 89 (Mangbetu country). DE RIEMAECKER, 1927, Rev. Z. A., XIV, p. 272 (Kongolo).—*Schizhornis* ALEXANDER, 1907, 'From the Niger to the Nile,' II (Kodja hill near Mt. Gaima).—*Chizoarhis zonura* SCHOUTEDEN, 1918, Rev. Z. A., V, p. 237 (Beni; Baraka; Luvungi; Mutiba; Talia-Semliki confluence; old Mission St. Gustave).—*Crinifer zonurus* FRIEDMANN, 1930, 'Afr. Rep. Liberia Belg. Congo,' II, p. 754 (Luvungi); 1930, Bull. 153, U. S. Nat. Mus., p. 253. BERLIOZ, 1932, Bull. Mus. Paris, (2) IV, p. 376 (Uvira; Ft. Archambault). SCHOUTEDEN, 1936, Ann. Mus. Congo, Zool., I, f. 2, p. 83 (Bambili; Mauda; Faradje; Dramba; Mahagi Port). STONE, 1936, Proc. Acad. Nat. Sci. Phila., LXXXVIII, p. 560 (Ekibondo).

SPECIMENS.—Niagara, ♂, Nov. 18. Dungu, ♂, Jan. 25. Faradje, 7 ♂, Jan. 14, Feb. 23, Mar. 12, Sept. 21, Oct. 12, Dec. 15, 18; 3 ♀, Jan. 12, Mar. 15, Nov. 26; 2 ♀ juv., Mar. 1, Dec. 23.

ADULTS.—Iris brown, bill light yellowish green, with a little orange at very base of maxilla; feet black.

DISTRIBUTION.—Bogosland and Abyssinia west to the Bahr-el-Ghazal and Fort Archambault on the Shari River; south through Uganda to Urundi and west again to the Lualaba River. Known in the Congo only from the Uelle, the upper Semliki, Rutshuru, and Ruzizi valleys, Ruanda, Urundi, and the vicinity of Kongolo.

This gray plantain-eater is a bird of savannas, common in the vicinity of Faradje. It prefers places where a few large trees fringe some watercourse, and goes in small numbers, from two to five. High-pitched laughter is the sound suggested by its voice. The notes may be introduced by a loud "kwah," after which follow several syllables like "how-how-how." As these continue the tone changes, and the whole is apt to end in a peculiar falsetto. The single "kwah" may be uttered alone, or in flight a low vocal "ka" may accompany each wing-beat.

A newcomer to a tree-top often performs a graceful dive before alighting near a companion.

While the birds seem noisy the year round, they nest largely in the dry season, from late November until March in the Uelle. A nest found

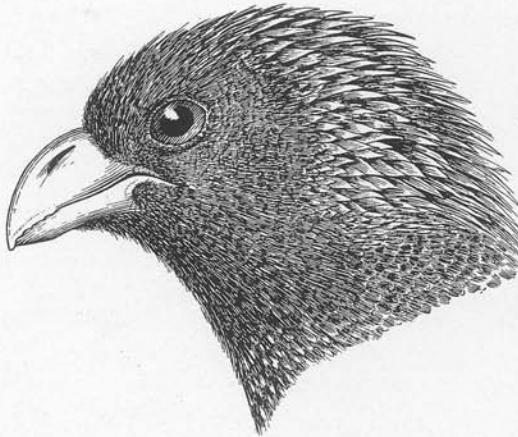


Fig. 19. *Crinifer zonurus*. $\times 2/3$.

on January 12 in a large tree along the Dungu River was built entirely of dry twigs and contained two rounded bluish-white eggs. These measure 44×35.8 mm. and 44.6×34.1 . Other nests with young were noted on December 23 and March 1. The natal down is gray, not blackish as in *Turacus* and *Corythæola*.

Examination of thirteen stomachs showed that while fruits, including those of *Ficus* and *Musanga*, form the greater part of the food, soft young leaves had also been eaten by six of the birds.

Crinifer piscator (Boddaert)

Falco piscator BODDAERT, 1783, 'Tabl. Planches Enluminées,' No. 478, p. 28 (type locality: Senegal, ex Daubenton).—*Schizorhis senegalensis* REICHENOW, 1885, J. f. O., p. 217 (Stanley Pool).—*Schizorhis africana* SCHALOW, 1886, J. f. O., p. 67. OUSTALET, 1893, Naturaliste, VII, p. 126.—*Chizaerhis africana* REICHENOW, 1902, 'Vög. Afr.,' II, p. 30 ('Ubangi'; Kimpoko). DUBOIS, 1905, Ann. Mus. Congo, Zool., I, f. 1, p. 35 ('Katanga'; L. Leopold II); 1907, Wytsman's Genera Av., pt. 8, p. 8. SCHOUTEDEN, 1923, Rev. Z. A., XI, p. 391 (Kwamouth); 1924, idem, XII, p. 264 (Kisantu).—*Crinifer piscator* W. L. SCLATER, 1924, 'Syst. Av. Æth.,' pt. 1, p. 195.—*Crinifer piscator piscator* BANNERMAN, 1933, 'Birds Trop. W. Afr.,' III, p. 76, Fig. 27. BLANCOU, 1933, Ois. R. F. O., (N. S.) III, p. 314 (southern Ubangi-Shari).

DISTRIBUTION.—Senegal east to Lake Chad, the Shari River, and the great bend of the Ubangi, in savannas; also south of the forest belt

from Stanley Pool to Lake Leopold II. Dubois's record from the Katanga is erroneous. *C. p. obscuratus* Grote¹ of French Equatorial Africa, is of doubtful validity.

Although *piscator* does not intergrade with *zonurus*, the two are representative species, closely similar in habits and voice. North of the forest *piscator* nests from January to April, laying two or occasionally three eggs. These are pale bluish white, 41–47 mm. \times 32.7–35.5. South of the forest in the Congo breeding may be expected to begin toward July.

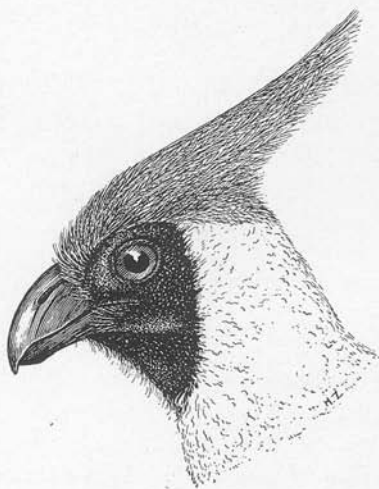


Fig. 20. *Gymnoschizorhis p. leopoldi*. \times 2/3.

***Gymnoschizorhis personata leopoldi* (Shelley)**

Schizorhis leopoldi SHELLEY, 1881, Ibis, p. 117, Pl. II, (type locality: Ugogo). DUBOIS, 1886, Bull. Mus. Roy. Hist. Nat. Belg., IV, p. 147 (region of L. Tanganyika).—*Gymnoschizorhis leopoldi* SHELLEY, 1901, Ibis, p. 166 (E. short L. Moero). REICHENOW, 1902, 'Vög. Afr.,' II, p. 37; 1911, 'Wiss. Ergeb. D. Z.-Afr. Exp.,' III, p. 270 (N. E. Ruanda; Kenahambi). DUBOIS, 1905, Ann. Mus. Congo, Zool., I, f. 1, p. 35; 1907, Wytzman's Genera Av., pt. 8, p. 8, Pl. II, fig. 7. O.-GRANT, 1910, Tr. Z. S. Lond., XIX, p. 420 (Mokia, S. E. of Ruwenzori). SALVADORI, 1914, Ann. Mus. Zool., Napoli, IV, No. 10, p. 15 (Kagera Valley; near L. Mohasi). SCHOUTEDEN, 1928, Bull. C. Z. C., V, p. 8 (Ruanda); 1937, idem, XIII, p. 39.—*Gymnoschizorhis personata centralis* NEUMANN, 1908, B. B. O. C., XXI, p. 94 (type locality: Kiten-gule, Kagera R.); 1908, Nov. Zool., XV, p. 369 (L. Urigi; between Kagera R. and Nsasa).—*Gymnoschizorhis personata leopoldi* SASSI, 1912, Ann. Naturh. Hofmus. Wien. XXVI, p. 376 (Urundi). GRANT, 1915, Ibis, p. 415 ("Ruwenzori"). BERLIOZ 1932, Bull. Mus. Paris, (2) IV, p. 376 (Kigali).—*Gymnoschizorhis leopoldi centralis* W. L. SCLATER, 1924, 'Syst. Av. Æth.,' pt. 1, p. 197. SCHOUTEDEN, 1932, Rev. Z. A., XXII, p. 128 (N. E. of L. Kivu); 1935, idem, XXVII, p. 401 (Gabi-ro).

¹ 1923, O. Mb., p. 63 (Bozum).

DISTRIBUTION OF THE SPECIES.—Hawash district of southern Abyssinia, east to Harrar, and south to Lake Zwai: *G. p. personata* (Rüppell). Also in eastern Africa, from the Masai Country of Tanganyika Territory to the Kavirondo Gulf, the base of Ruwenzori, Lake Kivu, and the northern end of Lake Nyasa. The whole of the latter area is occupied by *G. p. leopoldi*, of which *centralis* is a synonym. The East African race differs from the Abyssinian in having no green on the under surface of the rectrices, the lower breast wholly vinaceous buff, a smaller green patch on the white chest, and darker gray crest.

Within our limits the bare-faced turaco has been collected only in Ruanda and Urundi, but it is to be expected along the northern shore of Lake Edward and perhaps near Lake Moero. The Congo Museum has three specimens from Ruanda, two of them from Gabiro. In habits it resembles *Crinifer zonurus*, haunting trees near watercourses or in dry stream beds, in pairs or small parties. It utters a single loud, hoarse "caw," or similar notes repeated a few times. Since it favors areas of light rainfall it is local in the eastern Congo.

Nests found by Böhm in East Africa in tree-tops were built of twigs, sometimes with rootlets and dry grass. The eggs were white, faintly yellowish by transmitted light, measuring about 42.4×32.3 mm. The usual set was three.

Corythæola cristata (Vieillot)

Musophaga cristata VIEILLOT, 1816, 'Analyse,' p. 68 (type locality: Africa).—*Turacus giganteus* HARTLAUB, 1852, Archiv f. Naturges., Berlin, p. 20 ("Congo?"); 1852, in Jardine's Contrib. Orn., p. 79. SCHWEINFURTH AND RATZEL, 1888, 'Emin Pascha,' German Ed., p. 403 (Monbuttu). EMIN, 1888, 'Emin Pasha Centr. Afr.,' pp. 200, 404. PETIT, 1926, 'Dix Années de Chasses,' p. 138 (Nzobe in Mayombe).—*Schizorhis gigantea* JOHNSTON, 1884, 'River Congo,' pp. 207, 260, 351, 360, 361, 367 (Stanley Pool; Msuata; middle Congo R.).—*Corythæola cristata* SCHALOW, 1886, J. f. O., p. 55 (Kwango R.). SHELLEY, 1888, P. Z. S. Lond., p. 44 (Tingasi); 1891, 'Cat. Birds Brit. Mus.,' XIX, p. 449 (Semio). EMIN, 1894, J. f. O., pp. 164, 166 (Bumanja; old Irumu). FLOWER, 1894, P. Z. S. Lond., p. 598 (Ipoto). HARTERT, 1900, Nov. Zool., VII, p. 31 (E. of Avakubi). REICHENOW, 1902, 'Vög. Afr.,' II, p. 26 (Ubangi R.; Upper Congo; Beni); 1911, 'Wiss. Ergeb. D. Z.-Afr. Exp.,' III, p. 269 (Rugege forest; Bugoie forest, 2500 m.; Sormit Station). DUBOIS, 1905, Ann. Mus. Congo, Zool., I, f. 1, p. 35 (Prov. Orientale; Ituri; Lisala; Mayombe; L. Leopold II); 1907, Wytsman's Genera Av., pt. 8, p. 7, Pl. II, fig. 3. LÖNNBERG, 1907, Arkiv f. Zool., III, No. 21, p. 6 (Mukimbungu). O.-GRANT, 1910, Tr. Z. S. Lond., XIX, P. 419 (Mpanga forest, 5000 ft.; 50 miles N. W. of Fort Beni). SASSI, 1912, Ann. Naturh. Hofmus. Wien, XXVI, p. 375 (Moera; Ukaika). SCHOUTEDEN, 1914, Rev. Z. A., III, p. 263 (Kilo); 1918, idem, V, p. 237 (Kilo; Mboka; Assumba; Niembo; Kaboge; Luvungi); 1923, idem, XI, pp. 321, 391 (Luebo; Basongo; Kwamouth); 1924, idem, XII, p. 412 (Eala; Bikoro); 1925, idem, XIII, p. 8 (Mongende; Kunungu). 1936, Bull. C. Z. C., XII, p. 107. SCHUBOTZ, 1921, 'Tageb. Emin Pascha,' VI, p. 254 (Nambiri brook, betw. Bellima and the Dungu

R.). DE RIEMAECKER, 1927, Rev. Z. A., XIV, p. 271 (Kongolo). CHAPIN, 1931, Nat. Hist., XXXI, p. 614 (Lukolela). BANNERMAN, 1933, 'Birds Trop. W. Afr., III, p. 72, Pl. I, fig. 26.—*Turacus EMIN*, 1887, Mittheil. Vereins f. Erdkunde, Leipzig (1886), p. 45 (Monbuttu). SCHWEINFURTH AND RATZEL, 1888, 'Emin Pascha,' German Ed., pp. 199, 517 (Monbuttu). SCHUBOTZ, 1921, 'Tageb. Emin Pascha,' VI, pp. 246, 247 (Bellima).—*Corytholæa cristata* OUSTALET, 1893, Naturaliste, VII, p. 126.—*Corytheola cristata* JOHNSTON, 1908, 'George Grenfell and the Congo,' II, pp. 928, 965.—*Corythacola cristata* NEUMANN, 1908, Nov. Zool., XV, p. 366 (Upotu).—*Corythæola* CHAPIN, 1915, A. M. Journ., p. 281.—*Turacus (giganteus?)* SCHUBOTZ, 1921, 'Tageb. Emin Pascha,' VI, p. 278 (Bellima).—*Corythæola cristata cristata*, BANNERMAN, 1922, Rev. Z. A., X, p. 117. GYLDENSTOLPE, 1924, K. Svenska Vet. Akad. Handl., (3) I, No. 3, p. 357 (Kartushi; Malisawa). W. L. SCLATER, 1924, 'Syst. Av. Æth.,' pt. 1, p. 195. SCHOUTEDEN, 1926, Rev. Z. A., XIII, p. 190 (Temvo; Mayombe forest); 1936, Ann. Mus. Congo, Zool., I, f. 2, p. 82 (Djamba; Buta; Kotili; Bambili; Panga; Poko; Wanbanga; Niangara; Mauda; Rungu; Medje). STONE, 1936, Proc. Acad. Nat. Sci. Phila., LXXXVIII, p. 559 (Saidi; Ekibondo).—*Corythæola cristata* BERLIOZ, 1936, Bull. Mus. Paris, (2) VIII, p. 328 ("Lugege" = Rugege forest).

SPECIMENS.—Batama, ♂, ♀, Sept. 18. Avakubi, ♂ juv., Aug. 17. Ngayu, ♂, Dec. 22. Manamama (betw. Ngayu and Bafwabaka), ♂, Dec. 27. Gamangui, 3 ♂, Jan. 31, Feb. 4, 6; ♀, Jan. 31. Medje, 2 ♀, Jan. 14, Apr. 6; 4 ♂ juv., Apr. 6, Aug. 16, Oct. 8; 5 ♀ juv., Apr. 6, Aug. 16, Sept. 17, Oct. 9. Niangara, 3 ♂, Nov. 14, Dec. 17; 2 ♀, Nov. 11, 14; ♀ juv., Dec. 17.

ADULTS.—Iris dark red, skin around eye blackish. Basal half of bill bright yellow, tip orange-red, the two colors meeting abruptly; feet black.

DISTRIBUTION.—From the Casamance River eastward through Upper and Lower Guinea, including Fernando Po, to Mount Elgon, the Kavirondo district, and forests east of Lake Kivu. It is seldom found above 5500 feet. On the north it reaches the Mbomu River and a forest between Faradje and Aba, where I have heard it. On the south it extends to the forest patches of northern Angola, the Kasai and the Manyema.

There is some variation in color and size, birds from the center of the forest belt being perhaps more deeply colored than those from the periphery of the range. Yet *C. c. yalensis* Mearns, from the western boundary of Kenya Colony, has not been generally recognized, and the changes seem too gradual for exact delimitation of races.

Commonly called the "peacock" in West Africa, and "faisan bleu" in the Congo, the giant plantain-eater is also well known as the "buli-koko" all across the Belgian Congo. Everywhere in the forest area and in regions with heavy gallery forests it is one of the most conspicuous birds. Five or six generally go together, keeping to the higher trees, hopping from branch to branch or running along the larger limbs.

When flying from one tree to the next they proceed in leisurely succession, two to six flaps of the wings being followed by a short sail on outspread pinions. The crest is lowered in flight.

The common calls of this noisy bird are a rapidly reiterated "cow-cow-cow-—" and a rolling "coo-o-o-o-o - —." Both can be heard at half a mile. Another frequently heard is a slower "kulúk, kulúk, kulúk, —." Most of its native names are based on these notes.



Fig. 21. *Corythæola cristata*. $\times 2/3$.

In the forests of the Ituri and southern Uelle some individuals seem to be breeding at every season, while others are in non-breeding condition. Nestlings were brought to us by natives in wet and in dry months. Their down is mainly sooty blackish, blackest on the head, more brownish on the breast. In all young turacos the outermost primaries grow slowly, so the wing-tip is strikingly rounded. In *Corythæola* the brood is invariably of two.

The two nests I saw myself, near Medje and Avakubi, were in large trees near openings in the forest, and about thirty-five yards from the ground. Near one of them a pair of weavers (*Malimbus erythrogaster*)

was building a nest. Nests of *Corythæola* brought by natives were made of dry sticks freshly broken at the ends, some of them nearly three feet long and much branched. An egg which I took from the oviduct was light blue-green, 46.9×39.3 mm.

The principal food of the giant plantain-eater is apparently the fruit of the parasol tree (*Musanga*), which we found in seven out of ten stomachs. Other fruits of course are often eaten, and three birds had swallowed tender young leaves, a fourth some soft green shoots bearing flower-buds.

ORDER PSITTACIFORMES

FAMILY *Psittacidae*. PARROTS, PARRAKEETS

KEY TO THE GENERA OF PSITTACIDÆ IN THE CONGO AND ADJACENT REGIONS

- 1.—Tail very pointed and much longer than wing; length of wing not more than 155 mm. *PSITTACULA*, p. 238.
Tail shorter than wing, median rectrices not greatly elongated. 2.
- 2.—Wing less than 120 mm. long. *AGAPORNIS*, p. 239.
Wing more than 120 mm. long. 3.
- 3.—General coloration light gray, with whole tail red. *PSITTACUS*, p. 250.
Coloration largely greenish, or partly grayish or dark brownish, varied with green or blue, and sometimes with red or yellow on head, wings, or tibiae; tail not red. *POICEPHALUS*, p. 243.

[*Psittacula krameri krameri* (Scopoli)]

Psittacus krameri SCOPOLI, 1769, 'Annus I. Hist. Nat.,' p. 31 (type locality: none given; Senegal, after Neumann).—*Palæornis torquata* HARTLAUB, 1882, Abhandl. Naturwiss. Verein Bremen, VIII, p. 212 (Wandi).—*Palæornis docilis* SALVADORI, 1891, 'Cat. Birds Brit. Mus.,' XX, p. 447 (Niam-Niam country).—*Psittacula krameri krameri* BANNERMAN, 1931, 'Birds Trop. W. Afr.,' II, p. 407, Pl. xv, fig. 113.

This long-tailed parrakeet, divisible in about four races, extends from Senegal and Portuguese Guinea across Northern Nigeria and the Sudan to northern Abyssinia, Eritrea, and India south to Ceylon. The typical race ranges from Senegal eastward to the White Nile, keeping always a little north of the edge of the forest belt, so that it is not yet known within the borders of the Congo. Emin obtained it, however, at Wandî, only thirty-five miles from the boundary of the Upper Uelle district; and I have seen another specimen procured by Schubotz at Redjaf; so the species deserves mention here as wandering possibly, if very rarely, to within our territory.

KEY TO THE SPECIES OF *Agapornis* OCCURRING IN THE CONGO AND ADJACENT COUNTRIES

- 1.—With red or orange on crown or forehead.....2.
No red or orange on crown or forehead.....4.
- 2.—Whole rump and upper tail-coverts bright green, without a trace of blue; the red face-patch extending over a large part of the head, nape and hind-neck yellowish *A. lilianæ*.
With some blue on rump or upper tail-coverts.....3.
- 3.—Rump with a patch of light blue, upper tail-coverts green; forehead red or orange, replaced by green on whole crown or at least its posterior half. *A. pullaria*.
Upper tail-coverts blue, this color extending to posterior border of rump, the remainder of which is green; forehead orange-red, but crown dull olive-brownish..... *A. fischeri*.
- 4.—Bill grayish, forehead and crown bright green, a black collar on hind-neck. *A. swinderniana*.
Bill largely red, forehead and crown not bright green, no black collar on hind-neck.....5.
- 5.—Forehead and cheeks blackish brown, shading to olive-brown on hind-crown; upper breast bright yellow, often deepening to orange on fore-neck; hind-neck yellow..... *A. personata*.
Forehead and anterior half of crown rufous-brown, changing to olive on occiput; cheeks blackish; fore-neck usually with a salmon-orange patch, but upper breast and hind-neck green..... *A. nigrigenis*.

Agapornis swinderniana zenkeri Reichenow

Agapornis zenkeri REICHENOW, 1895, O. Mb., p. 112 (type locality: Yaunde, Cameroon); 1902, 'Vög. Afr.,' II, p. 19 ("Manjema," i.e., Ipoto in Ituri distr.); 1911, 'Wiss. Ergeb. D. Z.-Afr. Exp.,' III, p. 269 (Semliki Plain near L. Albert). BANNERMAN, 1921, Ibis, p. 104 (Bosobangi; Poko). STIGAND, 1935, Riv. Ital. Orn., (2) V, p. 97.—*Agapornis swinderniana* FLOWER, 1894, P. Z. S. Lond., pp. 598-601 (Ipoto).—*Agapornis swinderianus emini* NEUMANN, 1908, B. B. O. C., XXI, p. 42 (type locality: Ituri forest). HARTERT, 1924, Nov. Zool., XXXI, p. 127 (340 km. W. of Baraka).—*Agapornis swindernianus emini* NEUMANN, 1908, Nov. Zool., XV, p. 387 (Ituri R.).—*Agapornis swinderianus zenkeri* SASSI, 1912, Ann. Naturh. Hofmus. Wien, XXVI, p. 364 (Moera; Beni-Mawambi; Mawambi). SCHOUTEDEN, 1914, Rev. Z. A., III, p. 263 (Kilo); 1918, idem, V, p. 237 (Kasindi; Assumba). NEUNZIG, 1926, Verhandl. Orn. Ges. Bayern, XVII, p. 113. HUTSEBAUT, 1929, Bull. C. Z. C., V, p. 75 (Buta).—*Agapornis swinderniana zenkeri* GYLDENSTOLPE, 1924, K. Svenska Vet. Akad. Handl., (3) I, No. 3, p. 284 (Kampi na Mambuti). W. L. SCLATER, 1924, 'Syst. Av. Æth.,' pt. 1, p. 205.—*Agapornis swinderniana emini* W. L. SCLATER, 1924, 'Syst. Av. Æth.,' pt. 1, p. 205.—*Agapornis swinderniana zenkeri* BANNERMAN, 1931, 'Birds Trop. W. Afr.,' II, p. 413 (Bompona; Gamangui; Djamba; Kunungu).—*Agapornis swinderianus* SCHOUTEDEN, 1934, Bull. C. Z. C., XI, p. 44.—*Agapornis swinderiana zenkeri* SCHOUTEDEN, 1936, Ann. Mus. Congo, Zool., I, f, 2, p. 84 (Bondo Mabe; Panga).

SPECIMENS.—Bengamisa, ♂, Sept. 29. Avakubi, 4♂, Apr. 16, 28, Sept. 2; 2♀, Sept. 1, 2. Gamangui, 6♂, Feb. 12, 13, 14, June 18; 3♀, Feb. 12, 13, June 18. Medje, ♂ im., Sept. 20.

ADULTS.—Iris yellow; bill dark bluish gray, lighter beneath mandible; feet gray. A wounded male was observed to have decidedly reddish-orange eyes, though after death they quickly turned yellow.

DISTRIBUTION OF THE SPECIES.—Forests of Liberia, to which *A. s. swinderniana* (Kuhl) is restricted; and from western Cameroon to the Bomokandi River, the Ituri district, Semliki Valley, and Man-yema. The latter area is occupied by *A. s. zenkeri*. The southern limits of its range doubtless follow the edge of the forest belt, for it has been taken in the vicinity of Bolobo; but it is still doubtful whether *zenkeri* occurs in the Mayombe or the Kasai. Neumann's *emini* is a synonym.

Zenker's love-bird is an arboreal bird of the heavy forest, and while it also occurs in some of the larger gallery forests, it seldom comes down near the ground. Very exceptionally it visits the small bark-cloth fig trees near villages to feed on their fruit; but most of the wild figs of which it is so fond are obtained from the strangling figs that grow upon large trees, often at the edges of clearings. Ten to fifteen of them may come there together, sharing the feast with barbets and bulbuls.

Their flight and their twittering notes when they passed overhead reminded me of crossbills; and they were identified readily in places where I was unable to collect specimens, as at Lukolela. We never saw *zenkeri* and *pullaria* in the same tree, their feeding habits are so different; and their ranges overlap only along the borderland of the forest, as at Medje.

The nest of this love-bird is unknown, but in the vicinity of Medje its breeding season seems to be about July. Most of the specimens collected are found to be non-breeding.

In the crops and stomachs of eight examples we found seeds from wild figs seven times, while pieces of small dark-colored insects, one caterpillar, and a half-dozen soft white insect larvæ, apparently of beetles, were noted in three or four cases.

***Agapornis pullaria pullaria* (Linnæus)**

Psittacus pullarius LINNÆUS, 1758, 'Syst. Nat.,' 10th Ed., p. 102 (Asia, Æthiopia; restricted type locality: Gold Coast).—*Agapornis pullaria* ANTINORI, 1868, Boll. Soc. Geogr. Ital., I, p. 117 (Niam-Niam land, near present Bafuka). PETERMANN, 1868, Petermann's Mitteil., p. 416. HARTLAUB, 1882, Abhandl. Naturwiss. Verein Bremen, VIII, p. 212 (Wandi). JOHNSTON, 1884, 'River Congo,' p. 367 (Lower Congo). REICHENOW, 1887, J. f. O., p. 302 (Leopoldville). SHELLEY, 1888, P. Z. S. Lond., p. 45 (Tingasi). SALVADORI, 1891, 'Cat. Birds Brit. Mus.,' XX,

p. 510 (Landana). DUBOIS, 1905, Ann. Mus. Congo, Zool., I, f. 1, p. 35 ('Ituri'; Stanley-Pool; Mayombe). MENEGAUX, 1918, Rev. Fr. O., V, p. 258 (Zambi). EMIN, 1919, in Stuhlmann, 'Tageb. Emin Pascha,' II, p. 425 (Tobbo); 1922, idem, III, pp. 377, 380 (Mswa). SCHUBOTZ, 1921, 'Tageb. Emin Pascha,' VI, pp. 86, 238, 247 (Mangbetu country; Kaia; Bellima). BERLIOZ, 1922, Bull. Mus. Paris, p. 347 (Uelle R.).—*Psittacula pullaria* DEL PRATO, 1893, 'Le Raccolte zool. fatte nel Congo dal Cav. Giuseppe Corona,' p. 8 ('Congo'). THONNER, 1910, 'Vom Kongo zum Ubangi,' p. 47 (Ubangi).—*Agapornis pullarius* REICHENOW, 1902, 'Vög. Afr.,' II, p. 21 (Leopoldville; Nyangabo). LÖNNBERG, 1907, Arkiv f. Zool., III, No. 21, p. 6 (Mukimbu). SCHOUTEDEN, 1920, Rev. Z. A., VII, p. 189 (Temvo in the Mayombe). HUTSEBAUT, 1929, Bull. C. Z. C., V, p. 76 (Buta—recently introduced).—*Agapornis pullaria pullaria* NEUMANN, 1908, Nov. Zool., XV, p. 387 (Ubangi R.; Uelle R.; Manyanga). SCHOUTEDEN, 1924, Rev. Z. A., XII, p. 264 (Kisantu; Kidada); 1936, Ann. Mus. Congo, Zool., I, f. 2, p. 84 (Buta; Poko; Medje; Mauda; Mahagi Port). W. L. SCLATER, 1924, 'Syst. Av. Æth.,' pt. 1, p. 204. BANNERMAN, 1931, 'Birds Trop. W. Afr.,' II, p. 410, Pl. xiv, fig. 114.—*Agapornis pullarius ugandæ* SCLATER and M.-PRAED, 1919, Ibis, p. 677 (Mt. Baginzi). GYLDENSTOLPE, 1924, K. Svenska Vet. Akad. Handl., (3) I, No. 3, p. 284 (Irumu).—*Agapornis pullarius pullarius* BANNERMAN, 1922, Rev. Z. A., X, p. 161 (Kibali R.; Poko). SCHOUTEDEN, 1926, Rev. Z. A., XIII, p. 190 (Temvo; Lower Congo). NEUNZIG, 1926, Verhandl. Orn. Ges. Bayern, XVII, p. 113.

SPECIMENS.—Medje, 8 ♂, May 25, 28, July 6, 23, 26, Aug. 15, 20, Sept. 21; 8 ♀, May 25, 28, July 5, 7, 26, Aug. 11, Sept. 21, 26. Niangara, ♂, Dec. 1; ♀, Dec. 13; 2 ♂ im., Dec. 1, 13; ♀ im., Dec. 10. Faradje, ♂ im., Apr. 30; 4 ♂ juv. Oct. 23. Garamba, ♂, July 21.

ADULTS.—Iris dark brown, eyelids dusky; maxilla dull orange, with whitish tip, mandible whitish; feet light gray.

DISTRIBUTION OF THE SPECIES.—Western Africa from Fouta Djallon and Sierra Leone to northern Angola, also on Fernando Po, Princes Island, and São Tomé. Eastward it extends north of the forest belt to the Bahr-el-Ghazal and Uganda, thence to southern Abyssinia. To the south of the forest it is found from the Loango Coast to Stanley Pool, but not in the Kasai.

There are only two races, *pullaria* occupying the greater part of the above area, and *ugandæ* the region from the Omo River to Lake Victoria and Lake Edward. The rump of the latter race is distinctly paler blue. In the eastern Congo typical *pullaria* is found north of the Semliki forest,¹ *ugandæ* to the south of it. Around the borders of the great forest the red-faced love-bird penetrates a little way into the clearings where tall grasses are found, but it is unknown in the whole central area.

Even in the wild state these love-birds are often seen huddled together in pairs as they perch on some dry branch. Their food consists

¹ My specimens from Irumu are certainly *pullaria*, though the three collected at Mahagi Port by Dr. Schouteden are more difficult to determine, and possibly intermediate.

mainly of the seeds of tall grasses, along the stalks of which they climb. "Durra" or guinea-corn (*Sorghum*) is eaten while green, and I have known them to attack guavas. No insect-remains were found in their stomachs, but occasionally tiny pebbles. On taking wing they fly rapidly, with a continuous chirruping note, much weaker than that of *A. swinderniana*. Seven or eight was the largest number I ever noted in a single flock.

In the Uelle district the breeding season is evidently during the rains, from May to October. Five young of a single brood were brought to us in October at Faradje, taken, it was said, from a hole in a large termite hill on the ground. In West Africa nests have been found by Bates and others in earthy nests of termites or ants, high up in trees. In captivity nesting material is carried by tucking it between the feathers of the rump. The eggs are white, measuring 20×16 mm.

Agapornis pullaria ugandæ Neumann

Agapornis pullaria ugandæ NEUMANN, 1908, Nov. Zool., XV, p. 388 (type locality: Entebbe, Uganda. Also from Ruanda; W. of L. Edward; Rutshuru; between Kisaka and Usuwu, Kagera R.). W. L. SCLATER, 1924, 'Syst. Av. Æth.,' pt. 1, p. 204.—*Agapornis pullarius* O.-GRANT, 1910, Tr. Z. S. Lond., XIX, p. 439 (Mokia, S. E. of Ruwenzori). REICHENOW, 1911, 'Wiss. Ergeb. D. Z.-Afr. Exp.,' III, p. 268 (Beni). LÖNNBERG, 1917, Arkiv f. Zool., X, No. 24, p. 15 (Kasindi). SCHOUTEDEN, 1918, Rev. Z. A., V, p. 237 (Kasindi; Kalegela).—*Agapornis pullarius ugandæ* SASSI, 1912, Ann. Naturh. Hofmus. Wien, XXVI, p. 364 (Kisaka; Kasindi; Beni).

DISTRIBUTION.—From the Omo River district to Uganda, the Kagera River, and the vicinity of Lake Edward. It is found at Kasindi, east of Lake Albert, though replaced by *A. p. pullaria* to the west of that Lake. In Congo territory *A. p. ugandæ* has been found only on the north and west sides of Lake Edward and in the neighborhood of the Kagera. I have collected nine specimens near the new post of Beni, in the upper Semliki Valley, and at Kasindi Landing.

In habits this race is exactly like the western one. It frequents patches of tall grasses, feeding with avidity on their seeds, as well as on "mutama" (*Sorghum*). The condition of our specimens indicated that in the vicinity of the upper Semliki breeding takes place toward July or August.

[*Agapornis fischeri* Reichenow]

Agapornis fischeri REICHENOW, 1887, J. f. O., p. 54 (type locality: Ussure, Tanganyika Terr.).

Fischer's love-bird inhabits the countries from central Tanganyika

Territory to Unyamwezi and the southern and eastern shores of Lake Victoria, so perhaps it may be found to reach our limits in eastern Urundi. The group to which *fischeri* belongs includes *A. personata* Reichenow, *A. lilianæ* Shelley, and *A. nigrigenis* W. L. Sclater, all of them agreeing in the conspicuous ring of bare skin around the eye. So far as known they carry nesting materials in the beak. Neunzig¹ regards them all as races of one species, *personata* being the oldest name, in spite of the conspicuous differences in color and in size of bill.

None of these love-birds has yet been taken within our limits, though *personata* approaches them in the region north of Lake Nyasa, *lilianæ* in the upper Loangwa Valley, and *nigrigenis* in Northwestern Rhodesia. It does seem surprising that no member of the genus has ever been found in the Upper Katanga or Marungu.

KEY TO THE SPECIES OF *POICEPHALUS* OCCURRING IN AND NEAR THE CONGO

- 1.—Wing more than 180 mm. long. 2.
 Wing less than 180 mm. long. 3.
- 2.—Both maxilla and mandible whitish or pale leaden gray; cheeks and ear-coverts gray, more or less suffused with reddish; fore-crown similar, or else red *P. robustus*.
 Maxilla light gray (often buff in skins) with more or less blackish, usually at tip; mandible darker gray or blackish; cheeks and ear-coverts green, feather-bases dusky; fore-crown red in adults, green in young. *P. gulielmi*.
- 3.—Upper back green. 4.
 Upper back brownish gray, dark gray, or dusky brown, faintly tinged at most with olive. 5.
- 4.—Under wing-coverts largely bright yellow; green of abdomen and flanks extends up to chest. *P. cryptozanthus*.²
 Under wing-coverts wholly green; upper breast brown, this color cut off abruptly from the green of the abdomen. *P. crassus*.
- 5.—Flanks gray-brown to dusky brown, crissum and under tail-coverts either bright blue or dark brown. *P. rüppellii*.
 Flanks green or greenish blue, though bases of feathers may be dusky; crissum and under tail-coverts yellowish green or green with a blue wash. *P. meyeri*.

[*Poicephalus meyeri meyeri* (Cretzschmar)]

Psittacus meyeri CRETZSCHMAR, 1826, 'Atlas Reise N. Afr. Rüppell,' p. 18, Pl. XI (type locality: Kordofan).—*Pionus meyeri* ANTINORI, 1868, Boll. Soc. Geogr. Ital., I, p. 117 (Niam-Niam land, supposedly near present Bafuka). PETERMANN, 1868, Petermann's Mitteil., p. 416.—*Pœocephalus meyeri* SALVADORI, 1891, 'Cat. Birds Brit. Mus.,' XX, p. 373 (Kutchagali).—*Poicephalus meyeri meyeri* W. L. SCLATER, 1924, 'Syst. Av. Æth.,' pt. 1, p. 201.—? *Poicephalus meyeri* SCHOUTEDEN, 1936, Ann. Mus. Congo, Zool., I, f. 2, p. 83 (Mahagi Port).

¹ 1926, Verhandl. Orn. Ges. Bayern, XVII, p. 114; 1929, Beitr. Fortpfl.-biol. Vög., V, pp. 124-132.

² East African, probably not approaching our limits.

DISTRIBUTION OF THE SPECIES.—From Eritrea to French Equatorial Africa, southern Bahr-el-Ghazal, and through eastern Africa to Portuguese East Africa, the Transvaal, Ovampoland, and Angola. Eight races are recognized, of which four or five may reach the Congo.

P. m. meyeri is a relatively light-colored race, with green rump distinctly washed with blue. The crown is often traversed by a yellow band, especially in females. Wing-length 142–154 mm. This form ranges from Eritrea and the Sudan almost to the northern border of the Uelle district and to the vicinity of Lado. *P. m. adolfi-friderici*, of the Ubangi-Shari territory, is supposedly darker, with underparts grass-green. *P. m. saturatus*, of Uganda and adjacent countries, also differs from the typical race in being somewhat darker, the green rump only faintly tinged with bluish. Wings 140–159 mm. *P. m. neavei*, from the southeastern Congo to Angoniland, is very dark, the underparts often more washed with blue, and the rump bluish rather than green. Wings 148–165. *P. m. reichenowi* of Angola is more strongly washed with blue below, and light blue on the rump. It usually lacks yellow on the forehead, and has wings 152–167 mm.

The remaining subspecies are *P. m. matschiei* Neumann of Tanganyika Territory and adjacent countries, *P. m. transvaalensis* Neumann of eastern South Africa, and *P. m. damarensis* Neumann of Southwest Africa.

Although Piaggia was supposed to have collected *P. m. meyeri* close to the northern boundary of the Uelle district, I have been unable to find a single specimen from that part of our territory. The flock seen by Schouteden at Mahagi Port may perhaps have belonged to this race, if they were not *saturatus*. In the district about Lado, Emin Pascha¹ found *meyeri* rather common in the wooded savanna, forming parties which split up during the breeding season, toward the beginning of the rains.

[*Poicephalus meyeri adolfi-friderici* Grote]

Poicephalus senegalus adolfi-friderici GROTE, 1926, J. f. O., p. 746 (type locality: Badingoua, near Fort Crampel, Ubangi-Shari distr.). BANNERMAN, 1931, 'Birds Trop. W. Afr.', II, p. 405, Fig. 112.

Doubtfully distinct from *meyeri*, and possibly occurring rarely near the great bend of the Ubangi River.

***Poicephalus meyeri saturatus* Sharpe**

Poicephalus saturatus SHARPE, 1901, B. B. O. C., XI, p. 67 (type locality: North Ankole, 3000 ft.). SALVADORI, 1906, Ibis, p. 659.—*Poicephalus meyeri satura-*

¹ Schubotz, 1921, 'Tageb. Emin Pascha,' VI, p. 85.

tus NEUMANN, 1908, Nov. Zool., XV, p. 385 ("between L. Edward and L. Kivu"; Ruanda; near Kagera R.). SASSI, 1912, Ann. Naturh. Hofmus. Wien, XXVI, p. 363 (Urundi; Baraka). C. GRANT, 1915, Ibis, p. 260 (Ruwenzori). SCHOUTEDEN, 1918, Rev. Z. A., V, p. 236 (Luvungi; Milumba; Mboka; Manakwa; Lubilu). W. L. SCLATER, 1924, 'Syst. Av. Æth.,' pt. 1, p. 202. HARTERT, 1924, Nov. Zool., XXXI, p. 122 (L. Kivu). BOWEN, 1931, Proc. Acad. Nat. Sci. Phila., LXXXIII, p. 36; 1933, Ecology, XIV, p. 268, Fig. 11C.—*Pœocephalus reichenowi* O.-GRANT, 1910, Tr. Z. S. Lond., XIX, p. 439 (Mokia in Uganda; Semliki Valley).—*Poicephalus meyeri matschiei* REICHENOW, 1911, 'Wiss. Ergeb. D. Z.-Afr. Exp.,' III, p. 267 (Issenje; Kesimbili; Nyawatura).—*Poicephalus senegalus neavei* GROTE, 1926, J. f. O., p. 746 ("Kisenyi"; L. Rugasha).

DISTRIBUTION.—From the interior of Kenya Colony across Uganda to Unyoro, the base of Ruwenzori, Kagera and Ruzizi valleys, the eastern shore of Lake Tanganyika, and the grasslands southwest of Baraka. Woosnam noted that it was plentiful in the acacia country at the southern end of the Ruwenzori range and in the upper Semliki Valley; but it does not ascend the mountains, and it avoids the lowland forests. There seem to be no reliable records from the Rutshuru Plain or the shores of Lake Kivu.

Pairs or parties of four to six are the rule, and they are very noisy. This parrot is a shy bird, of straight and swift flight, very apt to dart out of the far side of a tree in its escape. Besides feeding on wild fruit in the trees, it raids native grain-fields. Its rounded white eggs are laid in holes in trees, presumably two or three to a set. One collected by Böhm measured 27×24 mm.

***Poicephalus meyeri neavei* Grant**

Poicephalus meyeri neavei C. GRANT, 1914, B. B. O. C., XXXV, p. 19 (type locality: Kaluli Valley, S. E. Belgian Congo); 1915, Ibis, p. 260. W. L. SCLATER, 1924, 'Syst. Av. Æth.,' pt. 1, p. 202.—*Pionias meyeri* SCHALOW, 1886, J. f. O., p. 428 (Lufua R.). DUBOIS, 1886, Bull. Mus. Roy. Hist. Nat. Belg., IV, p. 147 (L. Tanganyika). MATSCHIE, 1887, J. f. O., p. 149 (Lufua R.).—*Pœocephalus meyeri* SCHALOW, 1887, J. f. O., p. 231 (W. of L. Tanganyika). MOURITZ, 1914, Ibis, p. 35 (Musoshi).—*Poicephalus meyeri reichenowi* REICHENOW, 1902, 'Vög. Afr.,' II, p. 14 (in part. Lufua R.). BOWEN, 1933, Ecology, XIV, p. 268, Fig. 11C.—*Poicephalus meyeri* DUBOIS, 1905, Ann. Mus. Congo, Zool., I, f. 1, p. 35 (Tanganyika; Pweto). SALVADORI, 1907, Boll. Mus. Zool. Anat. Torino, XXII, No. 570, p. 2 (Lukonzolwa).—*Pœocephalus meyeri saturatus* NEAVE, 1910, Ibis, p. 107 (Dikulwe R.; S. Kalule R.).—*Pœocephalus meyeri* DE RIEMAECKER, 1927, Rev. Z. A., XIV, p. 281 (Elisabethville).

DISTRIBUTION.—From the southwest shore of Lake Tanganyika and the Katanga through Northern Rhodesia to the southwest side of Lake Nyasa. According to Grote (1926) the range of *neavei* extended to Lake Kivu and the Kagera River; but a large series of specimens in the Congo

Museum shows that birds from the savannas of the eastern Manyema district are better referred to *saturatus*. Others from Tembwe on Lake Tanganyika and Kabalo on the Lualaba River are perhaps intermediate, but approach *neavei* in the very dark brown of their upperparts, though having more yellow on the crown than is usual in birds from the Upper Katanga.

This is the common brown parrot of the Katanga, almost ubiquitous, and similar in its habits to *saturatus*.

[*Poicephalus meyeri reichenowi* Neumann]

Poicephalus reichenowi NEUMANN, 1898, J. f. O., p. 501 (type locality: Malanje, northern Angola).—*Poicephalus meyeri reichenowi* REICHENOW, 1902, 'Vög. Afr.,' II, p. 14 (in part. Kwango R.). C. GRANT, 1915, Ibis, p. 259 ("probably western basin of Congo"). W. L. SCLATER, 1924, 'Syst. Av. Æth.,' pt. 1, p. 201.—*Pœocephalus reichenowi* SALVADORI, 1906, Ibis, p. 659 (in part).—*Poicephalus senegalus reichenowi* GROTE, 1926, J. f. O., p. 747.

DISTRIBUTION.—From Benguella to northern Angola and possibly to the Kwango district of the Congo, or the lower Congo River. It has been a common supposition that this parrot would occur in the southern parts of the Belgian Congo, but it has not been found in the Kasai district. Future collecting may show that it does reach the Kwango. Sir Harry Johnston¹ reported seeing parrots at Kissangé, on the left bank of the lower Congo below Boma, which were "grey and blue and yellow-shouldered." The name *P. rüppellii* appears in his list of Congo birds; but I cannot help thinking that these remarks were prompted by birds he had previously seen in Angola, and I doubt the occurrence of *P. m. reichenowi* on the lower Congo.

Poicephalus cryptozanthus Peters

Psittacus (Poicephalus) cryptozanthus W. PETERS, 1864, Ber. K. Preuss. Akad. Wiss. Berlin, p. 371 (type locality: Inhambane, Port. E. Afr.—? *Pionus fuscicapillus* DUBOIS, 1886, Bull. Mus. Roy. Hist. Nat. Belg., IV, p. 147 (region of L. Tanganyika).

Dubois's reference to this species from the vicinity of Lake Tanganyika was probably based on an immature specimen of *P. meyeri*, or one without yellow on the crown; for in his list of birds from the Congo (1905) only *meyer*i is mentioned from Tanganyika. *Poicephalus cryptozanthus* ranges from Lamu to Nyasaland, Portuguese East Africa, and Zululand;² but it is not known to go so far inland as Lake Tanganyika.

¹ 1884 'River Congo,' pp. 38, 362, 367.

² For geographic variation see Bowen, 1930, Proc. Acad. Nat. Sci. Phila., LXXXII, pp. 267, 268.

Poicephalus crassus (Sharpe)

Pionias crassus SHARPE, 1884, Journ. Linn. Soc. Lond., Zoöl., XVII, p. 429 (type locality: Nduruma, Upper Uelle distr., Belg. Congo).—*Pæocephalus crassus* SALVADORI, 1891, 'Cat. Birds Brit. Mus.,' XX, p. 369.—*Poicephalus flavifrons* REICHENOW, 1902, 'Vög. Afr.,' II, p. 18.—*Psittacus (Poicephalus) flavifrons* OUSTALET, 1904, Bull. Mus. Paris, p. 431 (Krebedje).—*Poicephalus crassus* NEUMANN, 1904, J. f. O., p. 376. SCLATER AND M.-PRAED, 1919, Ibis, p. 676 (Yambio). W. L. SCLATER, 1924, 'Syst. Av. Æth.,' pt. 1, p. 200. GROTE, 1925, J. f. O., pp. 92, 632 (Fort Crampel). BANNERMAN, 1931, 'Birds Trop. W. Afr.,' II, p. 399, Fig. 111.—*Poicephalus cryptoxanthus crassus* PETERS, 1937, 'Check-List,' III, p. 226.

DISTRIBUTION.—From the Bahr-el-Ghazal province and the northern end of the Uelle district west to northern Cameroon. Often regarded as the young of some form of *P. flavifrons* (Rüppell), this rare parrot has proved to be a distinct species. Its general color is green, brightest and yellowest on rump and abdomen; remiges and rectrices duskier, but under wing-coverts green. Head, neck, and chest brown, throat tinged with olive, and ear-coverts with a grayish cast. Wing length, 155–178 mm.

The habitat of this parrot is evidently the more or less wooded savanna of the southern Sudanese border. It does not approach the northern edge of the equatorial rain forest, and certainly does not occur near Nian-gara or Faradje.

Poicephalus gulielmi gulielmi (Jardine)

Pionus gulielmi JARDINE, 1849, 'Contrib. Orn.,' p. 64, Pl. xxviii (type locality: Congo).—*Psittacus gulielmi* HARTLAUB, 1850, 'Beitr. Orn. Westafr.,' p. 34; 1857, 'Syst. Orn. Westafr.,' p. 167.—*Pæocephalus aubryanus* SOUANCE, 1856, Rev. Mag. Zool., p. 216 (type locality: Gaboon). SALVADORI, 1891, 'Cat. Birds Brit. Mus.,' XX, p. 367. HARTERT, 1900, Nov. Zool., VII, p. 31 (Sakarumbi). O.-GRANT, 1910, Tr. Z. S. Lond., XIX, p. 439 (Mawambi).—*Poicephalus gulielmi* HARTLAUB, 1884, J. f. O., p. 194.—*Pæocephalus gulielmi* SALVADORI, 1891, 'Cat. Birds Brit. Mus.,' XX, p. 366. FLOWER, 1894, P. Z. S. Lond., p. 603 (Urumbi).—*Psittacus (Pæocephalus) aubryanus* OUSTALET, 1893, Naturaliste, VII, p. 60 (Ubangi).—*Psittacus aubryanus* DYBOWSKI, 1893, 'La Route du Tchad,' p. 320 (region of Bangui).—*Poicephalus gulielmi aubryanus* REICHENOW, 1902, 'Vög. Afr.,' II, p. 10; 1911, 'Wiss. Ergeb. D. Z.-Afr. Exp.,' III, p. 267 (near Beni). LÖNNBERG, 1907, Arkiv f. Zool., III, No. 21, p. 5 (Mukimbungu). SASSI, 1912, Ann. Naturh. Hofmus. Wien, XXVI, p. 363 (Moera; Mawambi). SCHOUTEDEN, 1914, Rev. Z. A., III, p. 263 (Kilo); 1918, idem, V, p. 236 (in part. Beni). STIGAND, 1935, Riv. Ital. Orn., (2) V, p. 45.—*Poicephalus gulielmi* var. *aubryana* DUBOIS, 1905, Ann. Mus. Congo, Zool., I, f. 1, p. 35 (Prov. Orientale; Lisala; Umangi; Mayombe).—*Poicephalus gulielmi gulielmi* NEUMANN, 1908, Nov. Zool., XV, p. 381 (Mayumba; Luki); 1931, J. f. O., p. 549. SCHOUTEDEN, 1923, Rev. Z. A., XI, p. 321 (Djoko-Punda, Luebo). W. L. SCLATER, 1924, 'Syst. Av. Æth.,' pt. 1, p. 199. FRIEDMANN, 1930, Bull. 153, U. S. Nat. Mus., p. 286. BANNERMAN, 1931, 'Birds Trop. W. Afr.,' II, p. 397.

STONE, 1936, Proc. Acad. Nat. Sci. Phila., LXXXVIII, p. 559 (Saidi).—*Poicephalus gulielmi* SCHOUTEDEN, 1927, Bull. C. Z. C., IV, p. 15 (Upper Mayombe).

SPECIMENS.—Kamunione, near Bafwasende, ♀, Sept. 22. Avakubi, 3 ♂, Apr. 28, Oct. 13, 15. Gamangui, ♂, ♀, Jan. 29. Medje, 2 ♂, Apr. 14, May 17; ♀, May 9; 3 ♂ juv., ♀ juv., Oct. 3.

ADULTS.—Iris reddish orange on outer side, changing to yellow on inner edge; bill gray, tip black, cere and skin around eye dirty grayish yellow; feet blackish.

DISTRIBUTION OF THE SPECIES.—From the Gold Coast east to the Lower Guinea forest, Mount Kenya, and Kilimanjaro; south to northern Angola and the Kasai district. *P. g. fantisiensis* Neumann is restricted to the forests of the Gold Coast. *P. g. gulielmi*, slightly larger and with more scarlet crown, ranges over the lowland forests from the base of Mount Cameroon to the eastern Congo border. On the north it seems to stop at the edge of the unbroken forest, on the south it occupies patches of forest in northern Angola and the Kasai district. I cannot distinguish *aubryanus* Souancé from *gulielmi*. Although the latter race has been stated to be smaller, seven males from the Ituri have wings 195–207 mm., and three females from the same district 195–198. These are very close to the figures given by Bannerman¹ for *aubryanus*. The mountain forests of Kilimanjaro and Kenya Colony are inhabited by *P. g. massaicus* Fischer and Reichenow,² a little lighter than *gulielmi*.

Poicephalus g. gulielmi is the only green parrot in the forests of the central Congo. Though found from the Mayombe practically across the whole colony, it is nowhere so abundant and conspicuous as the gray parrot. It goes about in small numbers, usually twos and threes; and its voice is harsher, lacking the clear whistles with which the cries of the gray parrot are interspersed. The green parrot keeps very much to the tree-tops, and seems to be more of a seed-eater than a fruit-eater. Some of the seeds, however, are soft and green; and in one stomach we found pieces of a few insects.

Little can be said as to the breeding season except that only one adult, in mid-October, showed some enlargement of the gonads. A year later, in the early part of the same month, natives brought us a brood of four young taken from a cavity in a tree. The green plumage was beginning to appear, without a red or yellow feather anywhere; and the down that still clothed the body was grayish white.

In adults the extent of red on crown and wings is not indicative of

¹ 1931, 'Birds Trop. W. Afr.' II, p. 398.

² Birds from the highlands west of the Rift Valley may be separable as *P. g. permistus* Neumann, 1931, J. f. O., p. 549 (Eldama Ravine).

sex. This green parrot is not considered a desirable pet, and is seldom seen in captivity.

***Poicephalus robustus suahelicus* Reichenow**

Poicephalus suahelicus REICHENOW, 1898, J. f. O., p. 314 (type locality: East Africa). SALVADORI, 1907, Boll. Mus. Zool. Anat. Torino, XXII, No. 570, p. 2 (near Lukonzolwa).—*Pionias robustus* SCHALOW, 1886, J. f. O., pp. 414, 421 (E. Marungu; "Lualaba" [= Luvua R.]).—*Poecephalus robustus* Matschie, 1887, J. f. O., p. 149 (Mpala). SCHALOW, 1887, J. f. O., p. 231.—*Poicephalus robustus angolensis* REICHENOW, 1902, 'Vög. Afr.,' II, p. 8 (in part. Lufuku R.; Luapula R.; Dikulwe R.).—*Paecephalus angolensis* NEAVE, 1910, Ibis, p. 107 (Kapopo-Kansanshi, N. W. Rhodesia).—*Poicephalus robustus suahelicus* REICHENOW, 1911, 'Wiss. Ergeb. D. Z.-Afr., Exp.,' III, p. 267 (Rugege forest; N. W. of L. Tanganyika, 2000 m.). SASSI, 1912, Ann. Naturh. Hofmus. Wien, XXVI, p. 362 (N. W. of L. Tanganyika). SCHOUTEDEN, 1918, Rev. Z. A., V, p. 236 (Sibatwa forest; Goma; Rutshuru). DE RIEMAECKER, 1927, Rev. Z. A., XIV, p. 282 (Lubumbashi R.). VINCENT, 1934, Ibis, p. 769 (Katanga).—*Poicephalus robustus fuscicollis* SASSI, 1912, Ann. Naturh. Hofmus. Wien, XXVI, p. 362 (Kisenyi-Rutshuru); 1916, idem, XXX, p. 239. SCHOUTEDEN, 1918, Rev. Z. A., V, p. 236 (Baraka); 1932, Rev. Z. A., XXII, p. 128 (Burunga).—*Paecephalus* sp. MOURITZ, 1914, Ibis, p. 35 (Musoshi Escarpment).—*Poicephalus gulielmi aubryanus* SCHOUTEDEN, 1918, Rev. Z. A., V, p. 236 (in part. Sibatwa forest).

DISTRIBUTION OF THE SPECIES.—From eastern Cape Province and Natal to the vicinity of Dar-es-Salaam, Lake Tanganyika, the Kivu Volcanoes, the Katanga, northern Angola, and the Gaboon coast. Reappearing in Upper Guinea, it is found from Togoland through the Gold Coast hinterland to the Gambia.

P. r. robustus (Gmelin) of South Africa has the lower mandible less than 23 mm. broad. *P. r. suahelicus*, which replaces it from Mashonaland north to Tanganyika Territory, the Kivu district, and Katanga, has a slightly larger beak—mandible 22.6–28.3 mm. broad—and lighter, more grayish head. Adult females have the forehead and fore-crown bright red, whereas in males these parts are silvery gray, merely tinged with red. *P. r. fuscicollis*, the Upper Guinea race, has likewise a large beak, with mandible 25 or 26 mm. in breadth, and green of underparts and rump less yellowish.

From Angola Reichenow described *P. r. angolensis*, which Neumann¹ regarded as inseparable from *suahelicus*, while Bannerman (1931) found specimens from Angola to agree with *fuscicollis*.

The Congo Museum has two specimens from the Kivu Volcanoes, ten from the highland near Baraka, two from Tembwe on Lake Tanganyika, two from the vicinity of Tenke, and sixteen from Funda Biabo. A

¹ 1908, Nov. Zool., XV, p. 380.

female from Tembwe is unusually light-colored, especially about the head. Specimens from the Kivu district resemble those from the Katanga, though some of the former have the mandible a little wider.

In Marungu and the Katanga *P. r. suahelicus* occurs regularly at rather low levels, but in no great numbers. It is seen flying over in pairs or small parties, calling loudly, or perching on the bare branches in tree-tops. Northwest of Baraka and in the Kivu district it frequents the mountain forest. On the slopes of Mikeno and Karisimbi I watched it passing over occasionally, usually in pairs, squawking disagreeably, at altitudes between 6700 and 12,000 feet.

Poicephalus robustus fuscicollis (Kuhl)

Psittacus fuscicollis KÜHL, 1820, 'Conspectus Psitt.,' p. 93 (type locality uncertain, probably Gambia).—*Poicephalus angolensis* REICHENOW, 1898, J. f. O., p. 314 (type locality: Angola).—*Pæocephalus robustus* JOHNSTON, 1884, 'River Congo,' pp. 38, 367 (Kissangé on lower Congo).—*Poicephalus robustus* var. *angolensis* REICHENOW, 1902, 'Vög. Afr.,' II, p. 8 (in part. Kwango R.; Loango).—*Poicephalus robustus* var. *suahelica* DUBOIS, 1905, Ann. Mus. Congo, Zool., I, f. 1, p. 36 (Stanley Pool).—*Poicephalus robustus fuscicollis* BANNERMAN, 1931, 'Birds Trop. W. Afr.,' II, p. 394, Figs. 109, 110, Pl. xv.

DISTRIBUTION.—Gambia to Togoland, and Gaboon coast to Angola. Inasmuch as Falkenstein obtained this species at Loango, it must occur at times in the Lower Congo, and it is likely to be found in the southeastern Kwango district. Dubois's specimen from Stanley Pool cannot be located, and I can only follow Bannerman in calling the race that occupies this part of Africa *fuscicollis*. Its southern limit seems rather doubtful.

Psittacus erithacus erithacus Linnæus

Psittacus erithacus LINNÆUS, 1758, 'Syst. Nat.,' 10th Ed., p. 99 (type locality: Guinea). PETERMANN, 1868, Petermann's Mitteil., p. 416. P. L. SCLATER, 1874, Ibis, p. 186 (Manyema). REICHENOW, 1887, J. f. O., p. 309 (Kibondo); 1902, 'Vög. Afr.,' II, p. 2 (Ubangi R.; Kibondo; Manyema; Mabode land; Irumu; L. Albert; northern Monbuttu); 1911, 'Wiss. Ergeb. D. Z.-Afr. Exp.,' III, p. 266 (Wau Is.; N. W. base of Ruwenzori; Kwidjwi Is., forest N. W. of Tanganyika, 2000 m.). SHEILLEY, 1888, P. Z. S. Lond., p. 44 (E. of L. Albert and northern part of Monbuttu, Mabode land). JUNKER, 1891, 'Reisen in Afr., III,' p. 155 (Uere R., distr. of Badinde). OUSTALET, 1893, Naturaliste, VII, p. 60. Emin, 1894, J. f. O., p. 166 (old Irumu). FLOWER, 1894, P. Z. S. Lond., p. 597 (Ituri R.; Ipoto). SASSI, 1912, Ann. Naturh. Hofmus. Wien, XXVI, p. 364 (Usumbura; Kwidjwi; mountains E. of Rutshuru Plain; Ukaika). SCHOUTEDEN, 1914, Rev. Z. A., III, p. 263 (Kilo); 1918, idem, V, p. 236 (Kilo; Beni; Maganga forest; Mutiba); 1935, Bull. C. Z. C., XII, p. 60 (Kwango). LÖNNBERG, 1917, Arkiv f. Zool., X, No. 24, p. 15 (Rutshuru). SCHUBOTZ, 1921, 'Tageb. Emin Pascha,' VI, p. 84 (Amadi country on

Uelle R.; Mabode and Mangbetu countries).—*Psittacus erythacus* HARTLAUB, 1857, 'Syst. Orn. Westafr.,' p. 166 (Congo). ANTINORI, 1868, Boll. Soc. Geogr. Ital., I, p. 117 (Niam-Niam land, near present Bafuka). JOHNSTON, 1884, 'River Congo,' pp. 71, 180, 186, 202, 224, 230, 255, 362, 367 (Pallaballa; Stanley Pool; Msuata; middle Congo R.). SCHWEINFURTH AND RATZEL, 1888, 'Emin-Pascha,' German Ed., p. 404 (Amadi country). EMIN, 1888, 'Emin Pasha Centr. Afr.,' p. 405 (Monbuttu); 1919, in Stuhlmann, 'Tageb. Emin Pascha,' II, p. 476 (Tingasi). DEL PRATO, 1893, 'Le Raccolte zool. fatte nel Congo dal Cav. Guiseppe Corona,' p. 8 (Stanley Pool). DUBOIS, 1905, Ann. Mus. Congo, Zool., I, f. 1, p. 36 (Prov. Orientale; Nouvelle Anvers; Mayombe). THONNER, 1910, 'Vom Kongo zum Ubangi,' p. 47 (eastern Bangala distr.). SCHUBOTZ, 1921, 'Tageb. Emin Pascha,' VI, pp. 215, 247, 253, 263, 264, 267, 279 (Mangbetu country; 3rd day S. E. of Bel-lima; Nomayo R.; S. S. W. of Tingasi; Mabode country).—*Psittacus erithacus* HARTLAUB, 1882, Abhandl. Naturwiss. Verein Bremen, VIII, p. 211 (Monbuttu).—*Psittacus erithacus* DYBOWSKI, 1893, 'La Route du Tchad,' p. 320 (region of Bangui).—*Psittacus erythacus megarhynchus* SALVADORI, 1907, Ibis, p. 122 (Congo).—*Psittacus erithacus megarhynchus* BANNERMAN, 1922, Rev. Z. A., X, p. 161. GYLDENSTOLPE, 1924, K. Svenska Vet. Akad. Handl., (3) I, No. 3, p. 282 (Simbo). SNOUCKAERT VAN SCHAUBURG, 1932, Orgaan Club Nederl. Vogelkunjigen, IV, pp. 121, 122.—*Psittacus erithacus erithacus* SCHOUTEDEN, 1923, Rev. Z. A., XI, pp. 322, 391 (forested parts of the Kasai; Kwamouth); 1924, idem, XII, pp. 265, 412 (Kisantu; Leopoldville; Eala); 1925, idem, XIII, p. 8 (Kunungu); 1926, idem, XIII, p. 190 (Lower Congo); 1936, Ann. Mus. Congo, Zool., I, f. 2, p. 83 (Buta; Djamba; Kotili; Panga; Medje; Rungu). W. L. SCLATER, 1924, 'Syst. Av. Æth.,' pt. 1, p. 197. BANNERMAN, 1931, 'Birds Trop. W. Afr.,' II, p. 389. STONE, 1936, Proc. Acad. Nat. Sci. Phila., LXXXVIII, p. 559 (Saidi).

SPECIMENS.—Lukolela, ♀, July 17. Avakubi, 2 ♂, Mar. 3, Apr. 29; ♀, Oct. 11. Gamangui, 2 ♂, Feb. 8, 10; ♀, Feb. 5. Medje, 2 ♂, May 21, 25. Isiro, ♀, July 4.

ADULTS.—Iris light yellow, skin about orbit whitish; bill black; feet dark gray.

DISTRIBUTION OF THE SPECIES.—Sierra Leone to Cameroon, and east to Kenya Colony, the southeast shore of Lake Tanganyika and northern Angola; also on Fernando Po and Princes Island.

Psittacus e. timneh Fraser is a small dark-colored race of Liberia and Sierra Leone. The birds of Fernando Po and Princes Island have been separated as *P. e. princeps* Alexander, but at most they are only somewhat darker than the typical form on the adjacent mainland.

P. e. erithacus ranges from the eastern Ivory Coast to the Ubangi, the northern Uelle district, Unyoro, western Kenya Colony, the northern and western shores of Lake Victoria, and the southeast corner of Lake Tanganyika. Elsewhere in the south it reaches the forest patches of the Kasai and probably the upper Kwango River. Nearer the coast it seems scarcely to venture south of the lower Congo River, though numerous about Stanley Pool.

The gray parrot is one of the common and characteristic birds of the lowland forest belt in the Upper Congo, and has also been reported from the Mayombe forest. In the gallery forests of the Uelle it is scarce, and we never saw it north of the Uelle and Kibali rivers. On the east, too, it quickly diminishes in numbers beyond the edge of the solid forest. But in the Kasai district it is common far out in the forest patches that interrupt the savannas. Near Boma and Matadi I never saw it.

When feeding, these parrots keep almost entirely to the high forest trees, and might escape notice were it not for their raucous voices. In flight they are conspicuous, with something a little duck-like in their wing-movements. Pairs are frequent, and flocks of fifteen to twenty are formed, apparently when they are not breeding. The harsh screeches of gray parrots are constantly interrupted by clear, pleasant whistles. No imitative sound have I ever heard from a wild parrot. For a truly diurnal bird the gray parrot is exceptional in its habit of flying about and calling well after night has begun to fall. It reawakens, too, at the first sign of approaching dawn.

The off-season roosts of these birds are notable. Evening after evening they will be seen passing over in the same direction to join their fellows for the night. On Stanley Pool in the dry season they gather apparently at the upper end of Bamu Island. Near Lukolela I watched them come to sleep on a group of a half-dozen *Borassus* palms in a grassy area surrounded by forest, until the assemblage numbered approximately two hundred. This was in August, but the birds may have been using this roost for a month or more. The sturdy leaves of the palms were already bowed down permanently from the parrots' weight. Toward December the roost was abandoned. A little north of the equator, along the Ituri River, I camped in February and March beneath some giant forest trees where fifteen or twenty gray parrots slept every night.

All this would point to a definite breeding season during the rains; and at Lukolela we did find a pair sitting in some cavities in a large dead tree on December 12. Near Medje, in the northern Ituri, we saw two nests in August and September. There each "parrot-tree" had its jealous owner in some nearby village, waiting for the young birds that he would obtain from it. They were articles of commerce, and nearly every post had six to a dozen captive parrots, mostly young.

The natal down of gray parrots is white, as I saw it on several nestlings offered for sale on the Gaboon coast, just south of the equator, in early February. The red tail-feathers of older birds are very fashionable millinery in all the Upper Congo.

One of the nests at Medje was within sight of the post, in a knot-hole of a huge isolated tree, 75 feet up. Early in August a pair of birds entered it frequently. A native climber reported eggs, and left them undisturbed. But the parrots became alarmed and were seldom seen thereafter. Five weeks later the eggs were still there, and a flying squirrel had taken possession of the cavity. These two eggs were pure white, with finely pitted surface, measuring 37.7×31.5 and 38.5×31.7 mm. Three others, laid in captivity in New York, measure $36-38.4$ mm. $\times 29-30.3$.

On the west coast gray parrots are said to raid maize-fields, but I have never seen this in the Congo. Captive birds eat peanuts and palm-nuts. In the wild state they consume various forest fruits and seeds, the latter often rather soft and green; and bits of quartz are occasionally found in their stomachs. To get these they must come to the ground.

ORDER CORACIIFORMES

FAMILY *Coraciidæ*. ROLLERS

KEY TO THE AFRICAN GENERA OF CORACIIDÆ

- Length of culmen approximately equal to width of bill at gape; adults with crown, back, breast, and most of wing-coverts rufous, not streaked or spotted, but often washed in part with lilac or lilac-blue; young are bluish on underparts. EURYSTOMUS, p. 259.
- Bill much narrower, length of culmen twice as great as width of bill at gape; coloration not predominately rufous, there is always more blue or green on crown, wing-coverts, or under surface; and if underparts are rufous, then they are streaked with whitish. CORACIAS, p. 253.

KEY TO THE AFRICAN SPECIES OF CORACIAS

- 1.—With a white spot on nape or hind-neck; underparts almost wholly rufous glossed with lilac and heavily streaked with whitish; tail nearly square, no lengthened rectrices. *C. nœvia*.
- No white spot on nape, abdomen not rufous or lilac. 2.
- 2.—Fore-neck and chest light brown or buff washed with green, remaining underparts deep blue, more or less ultramarine; outermost pair of rectrices narrowed and lengthened in adults. *C. cyanogaster*.
- Abdomen always light blue, breast and fore-neck either light blue or lilac, fore-neck often with light streaking. 3.
- 3.—Fore-neck and chest lilac, streaked anteriorly with whitish; outermost rectrices in adults narrowed and greatly lengthened. *C. caudata*.
- Throat, fore-neck, and breast light blue. 4.
- 4.—Primary-coverts, alula, and outermost upper secondary-coverts dark blue like the anterior upper border of wing (lesser or marginal coverts); outermost pair of tail-feathers in adults lengthened and with widened tips. *C. spatulata*.
- Primary-coverts, alula, and outermost secondary-coverts light blue, unlike the dark blue anterior border of wing. 5.

- 5.—Wing more than 180 mm. long, outermost rectrices never appreciably narrowed or lengthened.....*C. garrulus*.
 Wing less than 180 mm. long, outermost rectrices of adults with elongated, narrow tips.....*C. abyssinica*.

Coracias garrulus garrulus Linnæus

Coracias garrulus LINNÆUS, 1758, 'Syst. Nat.,' 10th Ed., p. 107 (Europe; restricted type locality: Southern Sweden). REICHENOW, 1902, 'Vög. Afr.,' II, p. 217 (Landana); 1911, 'Wiss. Ergeb. D. Z.-Afr. Exp.,' III, p. 285 (Ruasa Volcano). MOURITZ, 1914, Ibis, p. 33 (near Kalonga, S. E. Katanga). SCHOUTEDEN, 1918, Rev. Z. A., V, p. 245 (Goma; Baudouinvillie); 1923, idem, XI, p. 322 (Ngombe in Kasai); 1932, idem, XXII, p. 128.—? *Coracias abyssinica* DUBOIS, 1886, Bull. Mus. Roy. Hist. Nat. Belg., IV, p. 147 (L. Tanganyika); 1905, Ann. Mus. Congo, Zool., I, f. 1, p. 34 (in part. Mpala).—*Coracias garrula* EMIN, 1892, Zool. Jahrb., VI, p. 147 (L. Albert). DUBOIS, 1905, Ann. Mus. Congo, Zool., I, f. 1, p. 34 (Kisantu).—*Coracias garrulus garrulus* GROTE, 1930, Mitt. Zool. Mus. Berlin, XVI, p. 59. BAN- NERMAN, 1933, 'Birds Trop. W. Afr.,' III, p. 207, Fig. 64. SCHOUTEDEN, 1936, Ann. Mus. Congo, Zool., I, f. 2, p. 84 (Buta), 1938, 'Expl. P. N. A., Mission de Witte,' f. 9, p. 65 (Rwindi R., Bobandana).

SPECIMENS.—Medje, ♂, Mar. 23. Faradje, ♀, Nov. 15.

MALE.—Iris grayish brown, rim of eyelids light brown; bill black; feet greenish brown, claws black.

DISTRIBUTION OF THE SPECIES.—In summer, central Europe and western Asia as far as Kashmir, also North Africa. A paler, more greenish race, *C. g. semenowi* Loudon and Tschusi, breeds from Persia eastward. The typical form migrates through western as well as eastern Africa and reaches Cape Province; but it is comparatively rare in the forested equatorial regions, over which it must pass rapidly and in no great numbers. The main migration route is doubtless through East Africa.

In all our stay in the Congo we saw it twice. The bird collected at Medje was sitting on a large dead tree in a clearing, its posture very crow-like; that from Faradje was in bushy pastureland. Father Callewaert has sent us one immature example from Luluabourg, Kasai district, taken on November 3. The European roller is much more common in southern Africa, where it winters, than it is in any part of the Congo.

Our two examples had eaten large grasshoppers, two dung-beetles, and other coleoptera.

Coracias abyssinica Hermann

Coracias abyssinica HERMANN, 1783, 'Tabula Affinitatum Animalium,' p. 197 (type locality: Abyssinia). DUBOIS, 1905, Ann. Mus. Congo, Zool., I, f. 1, p. 34

(in part. "Ituri").—*Coracias abyssinicus* OUSTALET, 1893, *Naturaliste*, VII, p. 126.—*Coracias abyssinus* SALVADORI, 1911, *Ann. Mus. Civ. Stor. Nat. Genova*, (3) V, p. 446 (Uelle).—*Coracias abyssinus abyssinus* SCLATER AND M.-PRAED, 1919, *Ibis*, p. 672 (Tembura; Meridi; Mt. Baginzi; Yambio).—*Coracias abyssinicus abyssinicus* SCHOUTEDEN, 1936, *Ann. Mus. Congo, Zool.*, I, f. 2, p. 84 (Mauda; Dramba).

SPECIMENS.—Dungu, ♂, Feb. 1. Faradje, 3 ♂, Jan. 28, Feb. 22, Mar. 10; ♀, Nov. 22. Aba, ♀ im., Dec. 21.

MALE.—Iris brown, bill blackish, feet greenish brown.

DISTRIBUTION.—From Southern Arabia and Abyssinia across the whole Sudan to the coast of Senegal. On the south it reaches northern Uganda and the savannas immediately north of the equatorial forest belt. In my opinion *arabica* Reichenow and *minor* Neumann are not valid races.

Within our limits the Abyssinian roller has been found only in the Uelle district. Dubois's "Ituri" specimen must have come from there or from the Lado district. From Dungu to Aba we found these rollers each year, arriving in November to spend the dry season, and retiring northward in March. The internal condition of all our specimens showed that they did not breed there; and they are known to nest in the northern part of the range, in the French Niger Colony, the region of Lake Chad,¹ and Darfur,² from April to June. Nests are in natural cavities in trees, or sometimes in holes in mud walls. The normal set of eggs is four, plain white, measuring around 30.3×25 mm.

While in the Uelle the birds are not truly gregarious, and usually found here and there on the trees of the open savanna, preferably where it has been burned. About a grass-fire, however, as many as eight were seen to gather. Their flight is graceful, but no courting antics are indulged in at this season, and the only note heard was a hoarse, rasping "kah-k-k-k-k" that bore a faint resemblance only to that of *Eurystomus afer*.

Four out of five stomachs examined held grasshoppers of varying sizes, and large winged ants were present once. One bird at least had eaten slender green grasshoppers of the genus *Homocoryphus*, which were being captured that same day for food by Logo natives, while a small flock of kites (*Milvus*) hovered over them in the same pursuit.

Coracias caudata caudata Linnæus

Coracias caudata LINNÆUS, 1766, 'Syst. Nat.', 12th Ed., I, p. 160 (type locality: Angola). HARTLAUB, 1857, 'Syst. Orn. Westafr.', opp. p. lix ("Congo"). DE

¹ Bates, 1927, *Ibis*, p. 25; 1934, *idem*, p. 224.

² Lynes, 1925, *Ibis*, p. 385.

SOUSA, 1886, *Jorn. Sci. Lisboa*, XI, p. 77 (Tenke). SCHALOW, 1886, *J. f. O.*, pp. 415, 422* (E. Marungu; "Lualaba" [= Luvua R.]); 1887, *idem*, p. 236 (W. shore Tanganyika). DUBOIS, 1886, *Bull. Mus. Roy. Hist. Nat. Belg.*, IV, p. 147; 1905, *Ann. Mus. Congo, Zool.*, I, f. 1, p. 34. MATSCHIE, 1887, *J. f. O.*, p. 152.—*Coracias caudatus* SHARPE, 1892, 'Cat. Birds Brit. Mus.', XVII, p. 21 (Ambriz). REICHENOW, 1902, 'Vög. Afr.', II, p. 223; 1911, 'Wiss. Ergeb. D. Z.-Afr. Exp.', III, p. 285 (Kenshambi; L. Kivu). O.-GRANT, 1908, *Ibis*, p. 314 (E. of Kasongo). NEAVE, 1910, *Ibis*, p. 107 (Bunkeya R.). SASSI, 1912, *Ann. Naturh. Hofmus. Wien*, XXVI, p. 364 (Usumbura). SCHOUTEDEN, 1918, *Rev. Z. A.*, V, p. 245 (N. Ruzizi; Baraka; Bigoisagua); 1923, *idem*, XI, p. 322 (Tshikapa).—*Coracias caudatus* DE RIEMAECKER, 1927, *Rev. Z. A.*, XIV, p. 268 (Elisabethville).—*Coracias caudatus caudatus* FRIEDMANN, 1930, 'Afr. Rep. Liberia Belg. Congo,' II, p. 754 (Luvungi); 1930, *Bull. 153, U. S. Nat. Mus.*, p. 376. SCHOUTEDEN, 1932, *Rev. Z. A.*, XXII, p. 128; 1935, *idem*, XXVII, p. 401 (St. Louis near Moba).

DISTRIBUTION OF THE SPECIES.—British Somaliland and Shoa, south through East Africa to the Vaal River, and west to Angola. The north-eastern part of the range is occupied by *C. c. lorti* Shelley, with lilac color restricted to fore-neck and ear-region, which has been taken as far south as Mombasa, Tsavo, and Naivasha in Kenya Colony. There it is within the area occupied by *C. c. caudata*, ranging from Natal north to Lamu, the Laikipia Plateau, Mt. Elgon, Kager and Ruzizi valleys, Kongolo on the Lualaba, Luluabourg in the Kasai district, and Ambriz in northern Angola. The overlapping of *lori* and *caudata* may be due to migration, but the former is a very distinct race, showing some approach to *C. abyssinica*.

The lilac-chested roller is a rather common bird in the southeastern savannas of the Congo, from the Ruzizi Valley to the Katanga and the Kasai. The record from Lake Kivu may be questioned, for in all this region it inhabits especially the river-valleys and low ground, being rare or wanting on the higher plateaus. A noisy, quarrelsome bird, it perches on the tops of the taller trees and flies out to pursue smaller birds and even the brown kite.

Böhm and Alexander regarded the species as somewhat migratory in Tanganyika Territory and on the Zambesi. The specimens we received from Luluabourg were all taken between June 30 and August 23, yet at Kongolo H. C. Raven secured five in February. Breeding is reported from Kenya Colony as well as from southern Africa. While so engaged, the males are said to mount high in the air, and then with an abrupt somersault to shoot straight down to earth again.

In Nyasaland and Southern Rhodesia nesting is carried on from September to November in holes in trees, where two or three white eggs are laid. Belcher gave the average dimensions of eggs as 32.2×26.5 mm.

The food consists largely of insects such as beetles and grasshoppers, often captured at grass-fires, but sometimes includes small snakes, lizards, or small birds.

Coracias spatulata Trimen

Coracias spatulatus TRIMEN, 1880, P. Z. S. Lond., p. 31 (type locality: Leshumo Valley, near Victoria Falls). REICHENOW, 1902, 'Vög. Afr.,' II, p. 221. NEAVE, 1910, Ibis, p. 108 (Kambove; Dikulwe R.; upper Lualaba R.). DE RIEMAECKER, 1927, Rev. Z. A., XIV, p. 268 (Elisabethville; Kifumanshi R.; Mulando). SCHOUTEDEN, 1930, Rev. Z. A., XVIII, p. 282.—*Coracias spatulata* JOHNSTON, 1884, 'River Congo,' p. 366 (Cataract distr.). DUBOIS, 1886, Bull. Mus. Roy. Hist. Nat. Belg., IV, p. 147 (region of L. Tanganyika); 1905, Ann. Mus. Congo, Zool., I, f. 1, p. 34.—*Coracias spatulatus spatulatus* W. L. SCLATER, 1924, 'Syst. Av. Æth.,' pt. 1, p. 206 ('Kasai distr.'). v. BOETTICHER, 1936, Ois. R. F. O., (N. S.) VI, p. 423 ('Kasai').

DISTRIBUTION.—From Southern Rhodesia and Mozambique north to Ugogo and Ugalla in Tanganyika Territory, the Katanga, and northern Angola.¹ There seem to be no specimens from the Kasai district and while Sir Harry Johnston mentioned it as "occasional" in the Cataract district of the Congo, this also needs confirmation. The Congo Museum has four skins from Tembwe on Lake Tanganyika, one each from Elisabethville, Nieuwdorp, Kanzenze, and the Kando River, and two from Dilolo.

The racquet-tailed roller was found by Neave to be a common bird on the Katanga Plateau, less numerous on the low ground of that district. During the latter half of the rains it was usually in family parties, a pair of adults with three or four younger birds. Marshall found that it perched on the lower branches in woods close to watercourses, not on the summits of trees in more open places. While courting, it "will fly with a very rapid zig-zag for some distance, and then suddenly shoot straight up into the air for fifteen or twenty feet with closed wings, curving gently over and down again head foremost, screaming all the while." Marshall compared its cries to the yelping of a litter of puppies.

[*Coracias cyanogaster* Cuvier]

Coracias cyanogaster CUVIER, 1817, 'Règne Animal,' 1st Ed., p. 401 (type locality: Java, erroneous; Senegal, after Swainson). OUSTALET, 1904, Bull. Mus. Paris, p. 434 (Beso). BERLIOZ, 1922, Bull. Mus. Paris, p. 344 (Kajo-Kaji).

The blue-bellied roller ranges from Senegal and Portuguese Guinea to Togoland, the Benue River, Ubangi-Shari district, and Kajo-Kaji near the Bahr-el-Jebel. Mr. Berlioz assures me that the specimens from

¹ *C. s. dispar* Bocage, described from Caconda, Angola, is not a valid race.

Beso and Kajo-Kaji are correctly identified. At Beso, only a little north of the Ubangi River, in the same district as Fort de Possel, Dr. Decorse obtained two specimens.

While there is still no Congo record of this striking savanna bird, it may perhaps be expected to wander occasionally over our northern border.

Coracias nœvia mosambica Dresser

Coracias mosambicus DRESSER, 1890, Ibis, p. 386 (type locality: Mozambique; later corrected to Zambesi).—*Coracias olivaceiceps* SHARPE, 1892, 'Cat. Birds Brit. Mus.,' XVII, p. 25 (Ambriz). NEAVE, 1910, Ibis, p. 108 (Chirui Is., L. Bangweolo).—*Coracias mosambicus* (*nœvius* ?) MOURITZ, 1914, Ibis, p. 37 (near Musoshi R.).—*Coracias naevius* DE RIEMAECKER, 1927, Rev. Z. A., XIV, p. 268 (Elisabethville).—*Coracias mossambicus* SCHOUTEDEN, 1932, Bull. C. Z. C., IX, p. 9 (Lomami distr.).

DISTRIBUTION OF THE SPECIES.—From Senegambia across the whole Sudan to Eritrea, Abyssinia, and Somaliland. Then south through Kenya Colony and Tanganyika Territory to Natal and the Orange River. From the vicinity of Lake Bangweolo the range also extends westward to Damaraland and Angola north to Ambriz.

C. n. nœvia Daudin, the Sudanese form, extends south in East Africa to Tanganyika Territory; but it is not known to reach the northern or eastern borders of the Congo, although reported from Bozum in French Equatorial Africa, the Bahr-el-Ghazal, and near the Bahr-el-Jebel at Kajo-Kaji.¹ It has the crown much more rufous than the southern form *mosambica*, occupying the remainder of the range.

Coracias n. mosambica invades our territory only in the Upper Katanga and Lomami district. It is a rare bird—according to Neave—west of the Mchinga Escarpment. There is no record from the Kasai, or even from Lake Tanganyika.

The purple roller is usually less sociable than most members of the genus *Coracias*, and seen singly or in pairs, keeping a lookout from trees and then flying down upon its small prey of insects, other arthropods, and occasional small reptiles. It has harsh, grating notes, and during the breeding season—the beginning of the rains—rises in the air with a sidewise rocking or rolling, as though the wings were beaten unequally. The descending part of this flight was compared by Andersson to the movements of a paper kite after the string has been broken.

The nest is a hollow in a tree, often an old woodpecker's nest; and the eggs are white, approximately 34×28 mm.

¹ Selater and M.-Praed, 1919, Ibis, p. 673.

KEY TO THE AFRICAN SPECIES OF **EURYSTOMUS**

(Adults only)

- 1.—Throat with well-marked patch of light blue or greenish blue; under tail-coverts deep rufous with lilac sheen, the longer ones usually tipped with very dark blue; longest upper tail-coverts black or very dark blue. *E. gularis*.
 Throat of same rufous ground-color as breast, and often brilliantly glossed, as the breast may be, with lilac or lilac-blue; under tail-coverts wholly light blue or greenish blue. 2.
- 2.—Wing less than 195 mm. long; tail-length less than 108 mm. *E. afer*.
 Wing more than 195 mm. long; tail-length more than 108 mm. *E. glaucurus*.

Eurystomus gularis neglectus Neumann

Eurystomus gularis neglectus NEUMANN, 1908, O. Mb., p. 28 (type locality: Canhoca, Angola). BANNERMAN, 1921, Ibis, p. 104; 1922, Rev. Z. A., X, pp. 151, 152; 1933, 'Birds Trop. W. Afr.', III, p. 221. GYLDENSTOLPE, 1924, K. Svenska Vet. Akad. Handl., (3) I, No. 3, p. 282 (Beni). W. L. SCLATER, 1924, 'Syst. Av. Æth.', pt. 1, p. 209. BOUET, 1934, Ois. R. F. O., (N. S.) IV, p. 633. STONE, 1936, Proc. Acad. Nat. Sci. Phila., LXXXVIII, p. 562 (Saidi). v. BOETTICHER, 1936, Ois. R. F. O., (N. S.) IV, p. 430.—*Eurystomus gularis* REICHENOW, 1887, J. f. O., p. 308 (Kasongo); 1902, 'Vög. Afr.', II, p. 231; 1911, 'Wiss. Ergeb. D. Z.-Afr. Exp.', III, p. 286. EMIN, 1894, J. f. O., p. 169 (old Irumu). FLOWER, 1894, P. Z. S. Lond., p. 603 (Urumbi). HARTERT, 1900, Nov. Zool., VII, p. 33 (Kitima). DUBOIS, 1905, Ann. Mus. Congo, Zool., I, f. 1, p. 34. SASSI, 1912, Ann. Naturh. Hofmus. Wien, XXVI, p. 365 (Moera, Beni-Mawambi, Ukaika; Irumu). SCHOUTEDEN, 1918, Rev. Z. A., V, p. 246 (Ikanga); 1923, idem, XI, p. 322 (Basongo; Luebo; Dumbi); 1924, idem, XII, p. 412 (Eala); 1926, idem, XIII, p. 190 (Kai Bumba); 1936, Rev. Z. A., XXVIII, p. 431 (Buta; Titule; Poko, Medje).

SPECIMENS.—Risimu, ♂, Sept. 8. Batama, ♂, Sept. 16. Avakubi, ♂, Feb. 1; ♂ im., Oct. 27. Penge, ♀, Apr. 27. Medje, ♂, May 10; ♀ juv., May 3.

ADULT MALE.—Iris dark brown; bill yellow; feet dark greenish brown, claws black.

DISTRIBUTION OF THE SPECIES.—Supposedly from Senegal, but more probably from Sierra Leone, east to Uganda and south to northern Angola. *E. g. gularis* Vieillot is restricted to the Upper Guinea forests, intergrading with *E. g. neglectus* in Nigeria. The latter race, which is more strongly washed with violet beneath and has violet-blue upper tail-coverts, occupies the Lower Guinea forest, and reaches the Bugoma forest in Uganda. It seems not to range north into the gallery forests of the Uelle, though on the south it is found in the forest patches of the Kasai and northern Angola, and the Congo Museum has one specimen from Luvungi in the Ruzizi Valley.

The blue-throated roller is essentially a forest bird, only occasionally seen near clearings or villages. It perches on the tallest forest trees and

flies over them with a shrill "kwe, kwe, kwe,—" or "kwi, kwi, kwi," very different from the calls of *E. afer*. Pairs, or family parties of four or five are the rule. While neither *gularis* nor *afer* really rolls or tumbles in the air, both make long swooping flights. I have watched *gularis* holding its wings rigid, pointing considerably below the horizontal, while it sped obliquely downward.

At Medje a nestling was obtained from natives in early May, and at Lukolela I saw a pair on November 22, coming to their nest in a hole in the top of a dead tree-trunk, at the edge of a clearing. A few days later one of their young was brought to me. So breeding takes place at the beginning of the rains, and possibly at other times as well. The young of *gularis* can be distinguished from those of *afer* by their deeper rufous color on upperparts, with greater upper tail-coverts black.

The food of this roller is taken on the wing, and consists almost entirely of insects. In the four stomachs examined, beetles were commonest, among them one elater, but many large winged ants were noted in one case. A young bird in captivity ate a small mouse.

Eurystomus afer afer (Latham)

Coracias afra LATHAM, 1790, 'Index Orn.,' I, p. 172 (type locality: "Africa," now restricted to Senegal). LEACH, 1818, in Tuckey, 'Narr. Exp. R. Zaire,' p. 407 (Lower Congo).—*Eurystomus afer* SHARPE, 1873, P. Z. S. Lond., p. 716 (Congo R.); 1892, 'Cat. Birds Brit. Mus.,' XVII, p. 30 (in part. Congo; Landana). REICHENOW, 1887, J. f. O., p. 305 (Leopoldville); 1902, 'Vög. Afr.,' II, p. 228 (in part.). BÜTTIKOFER, 1888, Notes Leyden Mus., X, p. 211 (Vista). DUBOIS, 1905, Ann. Mus. Congo, Zool., I, f. 1, p. 34 (Kisantu; L. Leopold II; Mayombe; Lower Congo). MENEGAUX, 1918, Rev. Fr. O., V, p. 258 (Zambi; Katala).—*Eurystomus* sp. JOHNSTON, 1884, 'River Congo,' pp. 207, 362, 366 (Stanley Pool-Bolobo).—*Eurystomus afr.* OUSTALET, 1893, Naturaliste, VII, p. 126.—*Eurystomus afer afer* SCLATER AND M.-PRAED, 1919, Ibis, p. 673. BANNERMAN, 1922, Rev. Z. A., X, p. 150; 1933, 'Birds Trop. W. Afr.,' III, p. 216. SCHOUTEDEN, 1923, Rev. Z. A., XI, pp. 322, 392 (Luebo; Macaco; Basongo; Kabambaie; Kwamouth); 1924, idem, XII, pp. 265, 412 (Eala; Bikoro); 1925, idem, XIII, p. 8 (Bolobo; Kunungu); 1926, idem, XIII, p. 190 (Banana; Ganda Sundi). W. L. SCLATER, 1924, 'Syst. Av. Æth.,' pt. 1, p. 208. FRIEDMANN, 1930, 'Afr. Rep. Liberia Belg. Congo,' II, p. 754 (Bumba); 1930, Bull. 153, U. S. Nat. Mus., p. 380. BOWEN, 1933, Ecology, XIV, p. 262, Fig. 8B.—*Eurystomus glaucurus afr.* M.-PRAED AND GRANT, 1937, Ibis, p. 664.

SPECIMENS.—Boma, ♂, Jan. 11. Maluku, ♀ im., July 13.

ADULTS.—Iris dark brown, bill yellow, feet brownish green (immature birds have anterior half of maxilla dark brown).

DISTRIBUTION OF THE SPECIES.—From Senegal and northern Hausaland to Darfur, Eritrea, Abyssinia, and the coast of Kenya Colony;

thence southward through the whole equatorial region to the southern border of Angola (Kubango district at about 17° S. lat.), Southern Rhodesia, Portuguese East Africa, and occasionally to the Transvaal. Six geographic races were admitted by Selater, but their characters are not always clear-cut, so individual specimens from central Africa are often hard to name with assurance.

E. a. afer extends from Senegal to the vicinity of Wadai or Darfur, and south at least to the Lower Congo, the Kwango district, and northern Kasai. The middle upper tail-coverts in this race are rufous brown, and the underparts strongly washed with lilac. Wings 169–186 mm.

E. a. rufobuccalis Reichenow, of Uganda, the eastern Congo forest, and adjacent districts, is similar to the foregoing, but less washed with lilac on the breast and especially dull and rufous on cheeks and ear-coverts. There is scarcely more blue on the central tail-coverts than in typical *afer*, but the brown there is apt to be duller and darker.

E. a. æthiopicus Neumann, inhabiting the Anglo-Egyptian Sudan, Eritrea, northern and western Abyssinia, is likewise similar to typical *afer*, but the upperparts are generally lighter rufous. The wing averages slightly longer (179–190 mm.).

E. a. praedi Bannerman, of the higher parts of Abyssinia, is darker rufous on the upperparts than any of the foregoing, with some of the upper tail-coverts almost blackish, and a more purplish sheen on the under surface.

E. a. suahelicus Neumann, ranging from Kenya Colony to Southern Rhodesia, through the southeastern Congo, has the underparts as richly washed with glossy lilac as in typical *afer*, but all the upper tail-coverts greenish blue.

E. a. pulcherrimus Neumann, of Angola and the southern Kasai district, is like *suahelicus* but darker rufous above, upper tail-coverts often deeper blue, and the lilac wash of the underparts more pronounced.

Examination of about one hundred and fifty specimens in the Congo Museum shows that *E. a. afer* occupies the whole western part of the colony eastward probably to Bumba, and south to the Lower Congo, Leverville in the Kwango district, and Luebo in the Kasai. In the eastern Congo forest *rufobuccalis* takes its place. Some specimens from the Uelle are supposedly *æthiopicus*. The southeastern Congo is occupied by *suahelicus*, and the only specimens which seem surely referable to *pulcherrimus* are from the southern Kasai and Dilolo. Those from near Lusambo are mostly intermediates.

The typical race is common throughout the area mentioned above,

in forests and savannas alike. Since its habits are the same as those of *rufobuccalis*, they need not be discussed here.

Eurystomus afer rufobuccalis Reichenow

Eurystomus afer var. *rufobuccalis* REICHENOW, 1892, J. f. O., p. 27 (type locality: Manjonjo, Uganda).—*Eurystomus afer* SHELLEY, 1888, P. Z. S. Lond., p. 44 (Tingasi); 1890, Ibis, p. 167 (Yambuya). SHARPE, 1890, in Jameson, 'Story of Rear Column,' p. 407 (Yambuya); 1892, 'Cat. Birds Brit. Mus.,' XVII, p. 30 (in part. Tingasi). EMIN, 1894, J. f. O., p. 163 (Ndussuma). REICHENOW, 1902, 'Vög. Afr.,' II, p. 228 (in part. Aruwimi R.; Tingasi); 1911, 'Wiss. Ergeb. D. Z.-Afr. Exp.,' III, p. 285. O.-GRANT, 1910, Tr. Z. S. Lond., XIX, p. 436 (Beni). SCHOUTEDEN, 1914, Rev. Z. A., III, p. 265 (Kilo); 1936, Ann. Mus. Congo, Zool., I, f. 2, p. 84 (in part. Kotili; Buta; Mauda; Dramba).—*Eurystomus rufobuccalis* REICHENOW, 1902, 'Vög. Afr.,' II, p. 231 (Nyangabo; Kinyawanga). SALVADORI, 1911, Ann. Mus. Civ. Stor. Nat. Genova, (3) V, p. 446 (Uelle). SASSI, 1912, Ann. Naturh. Hofmus. Wien, XXVI, p. 364 (in part. Beni-Mawambi; Ukaika; Irumu; Mawambi). SCHOUTEDEN, 1918, Rev. Z. A., V, p. 246 (Kilo; Beni-Mawambi; Buwissa; Mission St. Gustave).—*Eurystomus afer rufobuccalis* NEUMANN, 1905, J. f. O., p. 186. REICHENOW, 1911, 'Wiss. Ergeb. D. Z.-Afr. Exp.,' III, p. 286 (N. W. of Beni; W. foot of Ruwenzori; Semliki R. at L. Albert). BANNERMAN, 1922, Rev. Z. A., X, p. 149. SCHOUTEDEN, 1923, Rev. Z. A., XI, p. 322 (Ngombe in Kasai). BOWEN, 1933, Ecology, XIV, p. 262, Fig. 8 B. STONE, 1936, Proc. Acad. Nat. Sci. Phila., LXXXVIII, p. 562 (Kasenyi; Ekibondo).—*Eurystomus* between *rufobuccalis* and *afer suahelicus* SASSI, 1912, Ann. Naturh. Hofmus. Wien, XXVI, p. 365 (Beni).—*Eurystomus afer* LÖNNBERG, 1917, Arkiv f. Zool., X, No. 24, p. 19. SCHOUTEDEN, 1918, Rev. Z. A., V, p. 246. GYLDENSTOLPE, 1924, K. Svenska Vet. Akad. Handl., (3) I, No. 3, p. 280 (Kasindi; Masidongo; Kampi na Mambuti; Simbo).—*Eurystomus afer suahelicus* SCHOUTEDEN, 1918, Rev. Z. A., V, p. 246 (in part. Kilo).

SPECIMENS.—Avakubi, ♂, Oct. 7; ♀, Nov. 10; ♂ im., Apr. 14; ♀ im., June 8. Bafwabaka, ♂, Jan. 6; ♂ im., Dec. 28. Medje, 3 ♂, Jan. 17, Mar. —, May 10; ♀, ♀ juv., May 10. Niangara, ♂, May 18. Nzoro, ♂, Apr. 10.

ADULTS.—Iris brownish gray to dark brown, rim of eyelids dark brown; bill yellow; feet brownish green or greenish brown.

DISTRIBUTION.—From Uganda westward into the northeastern Congo, to the southern Uelle and Ituri districts, and probably to the lower Aruwimi and the forests to the southward. Sassi has reported young individuals of this race from the northern end of Lake Tanganyika, but the race to be expected there is *suahelicus*. Although common along the eastern edge of the Congo forest near Irumu and the Semliki Valley, *rufobuccalis* is a bird of the lowlands, and does not ascend much above 4500 feet.

Otherwise this race of the cinnamon roller is a very adaptable bird, making its home on the higher trees near watercourses or swamps in the more open savanna countries, and then in heavily forested districts be-

coming a bird of clearings. At certain places in the Cameroon, situated in almost unbroken forest, Bates¹ notes that *Eurystomus afer* was not to be found. Similarly along the road from Stanleyville to Bafwasende, in 1909, *E. afer* was scarcely to be noticed, and *E. gularis* the only common roller.

At Avakubi, Ngayu, and Medje, however, the present species became rather common about clearings, usually taking station on higher branches, whence it could fly after passing insects, or give chase to any large bird that approached. Its loud, harsh "ra-a-ack—ra-a-ack—ra-a-ack-k-k-k-k" became one of the commonest noises, a rather parrot-like sound when heard the first time. The broad-mouthed rollers become more active toward sunset, and it was surprising at times to see how late in the twilight the present species continued hawking for insects over open plots near villages. Sometimes a second look was needed to be sure they were not large bats.

In the Ituri district and northward to Niangara in the Uelle, *E. a. rufobuccalis* is to be seen throughout the year. In savannas it frequents only the taller trees near water. The breeding season comes apparently during the early part of the rains, for specimens taken at Avakubi in October and November were not breeding, slight enlargement of the gonads was noticeable in January, and in May a nestling was secured from a cavity high up in a tree. The eggs of this race seem never to have been collected; but those of *E. a. afer* are described by Shuel² as glossy and pure white, 32–38 mm. \times 27–28. He found a set of three near Kano, Northern Nigeria, on June 22.

Few careful notes were kept of the insects I found in stomachs of this roller. On two occasions, however, I did record winged ants: once a full meal of them, the other time a single individual of unusually large size. The food of the species in other regions is known to include beetles, grasshoppers, moths, and hymenoptera.

Eurystomus afer *æthiopicus* Neumann

Eurystomus afer æthiopicus NEUMANN, 1905, J. f. O., p. 184 (type locality: Schekho on upper Gelo R., southern Abyssinia). SCLATER AND M.-PRAED, 1919, Ibis, p. 673 (Mt. Baginzi; Yambio).—*Eurystomus afer* SHARPE, 1892, 'Cat. Birds Brit. Mus.,' XVII, p. 30 (in part. Kutchugali in Niam-Niam country). SCHUBOTZ, 1921, 'Tageb. Emin Pascha,' VI, pp. 104, 237 (Tobbo). SCHOUTEDEN, 1936, Ann. Mus. Congo, Zool., I, f. 2, p. 84 (in part. Buta; Dika; Faradje; Mahagi Port).

SPECIMEN.—Faradje, ♂, Apr. 11.

¹ 1911, Ibis, p. 511.

² 1938, Ibis, pp. 469, 470.

DISTRIBUTION.—From Eritrea and southern Abyssinia to Darfur, where it is said to begin to intergrade with *afer*, to the Uelle district, where it approaches *rufobuccalis*, and to northern Uganda.

Some specimens from the Uelle are certainly not *rufubuccalis*, for they have more violet on cheeks and underparts, and their upper tail-coverts are entirely greenish blue. The median rectrices are not wholly black, but more or less bluish over the basal two-thirds. Wings of nine such Uelle specimens, 174–183 mm.

While I follow Sclater and Praed in calling them *æthiopicus*, I am not sure that they would not better be referred to *suahelicus*. The same is true of Christy's specimens from Yambio, which I have seen.

Rollers of this species, while common at all seasons near Niangara, seemed regularly migratory in the vicinity of Faradje and Garamba. Entirely wanting there in the dry season, they reappeared in March, in 1912, at least, on the 26th. From then on they were frequently seen, as along the Dungu River near Faradje, until about October, and disappeared before the rains had ceased. Where they go is difficult to guess, for to the north in the Sudan they are likewise seldom seen except from March to September, inclusive.¹ Lynes found a very young bird with its mother in Darfur on September 9. It seems likely that they breed also in the Uelle.

Specimens from Dramba and Mauda are more or less intermediate between *æthiopicus* and *rufobuccalis*, while from Buta the Congo Museum has two skins with the rump as in *æthiopicus*, and seven that are more like *rufobuccalis* or *afer*. Three from Mahagi Port are *æthiopicus*.

In West Africa *E. a. afer* is believed to move northward into the savannas during the rains, and southward to the forest during the drought; but this cannot be the case with the birds of the Uelle. I believe that *rufobuccalis* is resident in the more wooded sections, and that the migrants are those here called tentatively *æthiopicus*.

Eurystomus afer suahelicus Neumann

Eurystomus afer suahelicus NEUMANN, 1905, J. f. O., p. 186 (type locality: Tschara, Tana River, East Africa). REICHENOW, 1911, 'Wiss. Ergeb. D. Z.-Afr. Exp.', III, p. 286 (Kisenyi). SCHOUTEDEN, 1918, Rev. Z. A., V, p. 246 (in part. Mission St. Gustave); 1930, idem, XVIII, p. 282 (Elisabethville). BANNERMAN, 1922, Rev. Z. A., X, pp. 149, 150 ("from Tingasi in N. E. to Kambove in extreme S."). W. L. SCLATER, 1924, 'Syst. Av. Æth.', pt. 1, p. 209. BOWEN, 1933, Ecology, XIV, p. 262, Fig. 8 B.—*Eurystomus afer* DE SOUSA, 1886, Jorn. Sci. Lisboa, XI, p. 77 (Tenke); 1886, in Capello and Ivens, 'De Angola a Contra-Costa,' II, p. 443 (Tenke).

¹ See Sclater and M.-Praed, (1919), and Lynes, 1925, Ibis, pp. 386, 387.

DUBOIS, 1886, Bull. Mus. Roy. Hist. Nat. Belg., IV, p. 147 (L. Tanganyika). SCHALOW, 1886, J. f. O., pp. 416, 424 (Masembe, Marungu; L. Itambe); 1887, idem, p. 236 (W. of L. Tanganyika). MATSCHIE, 1887, J. f. O., p. 152 (Masembe; Lualaba; L. Itambe; Luvule; Lugoma brook). REICHENOW, 1902, 'Vög. Afr.', II, p. 228 (in part. Tenke; L. Itambe; Luvule R.; "Lualaba" [= Luvua R.]; Masembe; Lugoma R.). NEAVE, 1907, Mem. Proc. Manchester Lit. Phil. Soc., LI, No. 10, p. 30 (Ndola; Kafue R.); 1910, Ibis, p. 108 (Kambove). SALVADORI, 1907, Boll. Mus. Zool. Anat. Torino, XXII, No. 570, p. 2 (near Lukonozolwa); 1914, Ann. Mus. Zool. Napoli, IV, No. 10, p. 17 (L. Bangweolo). MOURITZ, 1914, Ibis, p. 33 (S. E. Katanga). DE RIEMAECKER, 1927, Rev. Z. A., XIV, p. 268 (Elisabethville).—*Eurystomus rufobuccalis* SASSI, 1912, Ann. Naturh. Hofmus. Wien, XXVI, p. 364 (in part. Uvira; Usumbura; Kisenyi).

DISTRIBUTION.—From Lamu on the coast of Kenya Colony, the highlands near Nairobi, the vicinity of Lake Kivu, probably even the upper Semliki Valley, and the southeastern Congo to Southern Rhodesia and occasionally to the Transvaal. A specimen from Kongolo, in the U. S. National Museum, shows how close this race comes to the southern edge of the forest belt.

Böhm saw the cinnamon roller a number of times in Marungu and the Katanga during September, October, and November. Neave, after longer experience, stated that it was apparently migratory in the Katanga, present only from about September to March. Twenty-nine Katanga specimens in the Congo Museum were all collected between August and April, inclusive. They come from Kinda, Funda Biabo, Lake Musolo, Kanzenze, Elisabethville, Nieuwdorp, and Lukafu. Wings of adults measure 169–187 mm., and of two that retain juvenal primaries, 164, 165.

In Usaramo, Tanganyika Territory, Schuster¹ found a nest in a hole at the top of a dead tree-stub, 5 meters high. A single egg was taken from it on November 20. Fischer also found a nest with three young in the same month. The eggs are white, and measure about 33 × 27 mm.

***Eurystomus afer pulcherrimus* Neumann**

Eurystomus afer pulcherrimus NEUMANN, 1905, J. f. O., p. 186 (type locality: Malanje, Angola. Also probably in Congo). BANNERMAN, 1922, Rev. Z. A., X, p. 151. SCHOUTEDEN, 1923, Rev. Z. A., XI, p. 322 (Tshisika).—? *Eurystomus afer* SALVADORI, 1915, Ann. Mus. Civ. Stor. Nat. Genova, (3) VI, p. 279 (Kasai).

DISTRIBUTION.—From northern Angola and Luluabourg in the Kasai district south to Benguela and perhaps to the southern Kubango district,² near the northeastern border of Damaraland.

¹ 1913, J. f. O., p. 344.

² Menegaux and Berlioz, 1923, Mission Rohan-Chabot, Ois., p. 18.

Two males and two females from Luluabourg, received from Father Callewaert, bear out Neumann's description of *pulcherrimus*, except that the blue of the tail-coverts can scarcely be said almost to reach the rump. The upperparts are of an unusually deep rufous. Wings 176–185 mm. in these four specimens. Dr. Schouteden's specimen from Tshisika, with wing 189 mm., seems to be correctly identified; and to this same race I would refer nine collected at Dilolo by de Witte, with wings 176–195 mm.

***Eurystomus glaucurus* (Müller)**

Coracias glaucurus P. L. S. MÜLLER, 1776, 'Syst. Nat. Suppl.,' p. 86 (type locality: Madagascar).—*Eurystomus glaucurus* SCHOUTEDEN, 1918, Rev. Z. A., V, p. 246 (Baraka; Luvungi); 1923, idem, XI, p. 322 (Basongo; Ngombe in Kasai; Tshisika); 1925, idem, XIII, p. 9 (Kunungu); 1936, Ann. Mus. Congo, Zool., I, f. 2, p. 84 (Buta; Poko; Kabalo). BANNERMAN, 1919, B. B. O. C., XXXIX, p. 97 (Poko). W. L. SCLATER, 1924, 'Syst. Av. Æth.,' pt. 1, p. 208. CHAPIN, 1935, Bull. C. Z. C., XII, p. 72. v. BOETTICHER, 1936, Ois. R. F. O., (N. S.) VI, p. 430.

SPECIMEN.—Between Niangara and Dungu, ♀ im., June 9.

IMMATURE FEMALE.—Iris dark brown; bill yellow with a dusky brown patch on top of maxilla; feet dark brownish green.

DISTRIBUTION.—Madagascar and Anjuan Island, migrating to eastern Africa, the Katanga, the Kasai district, and even to the vicinity of Bolobo, Nouvelle Anvers, Buta, and the savannas of the Upper Uelle district.

One rainy day in June, 1911, I came upon the largest flock of rollers I had ever seen, numbering at least two dozen, flying about over the open savanna, taking insects on the wing, and alighting occasionally in trees. They uttered no sound, but impressed me by their size; and I went after them through the wet grass. They were so wary that I could secure only one immature bird. We never saw the species again. Three years later, Dr. Christy obtained three males at Poko, between July 8 and 13.

Among the older specimens in the Congo Museum I have since found two *glaucurus* from Banalia (Nahan) and one from Nouvelle Anvers (de la Kéthulle). In addition to the published records, cited above, there are specimens now in the Congo Museum from Kansenia, Katanga (de Witte), Tembwe, L. Tanganyika (Dr. Schouteden), Tshipama, Kasai (Drion), and Elisabetha, upper Congo R. (Mme. Tinant). Father Callewaert sent us three adults from Luluabourg.

My migration map¹ already needs revision, for this roller does invade

¹ 1932, Bull. A. M. N. H., LXV, p. 351, Fig. 168.

the Upper Congo forest. The period of occurrence in the Congo is also much longer than I supposed. At Tembwe it was taken in February, at Kansenia on March 5, at Kabalo—two in complete juvenal dress—on March 30, and at Kunungu April 3. The dates of occurrence in the Uelle are from May 14 to July 13, while in the Kasai one has been secured as late as November 13.

E. glaucurus is little more than a large island race of the same group as *E. afer*.¹ In the Congo Museum there is one puzzling specimen from Buta, October, 1929, with the dark coloration of *glaucurus*, but wing only 177 mm. It seems to be an abnormally small female with juvenal primaries. Wings of adults from the Congo measure 197–220 mm., their remiges are molted on the continent.

FAMILY Alcedinidæ. KINGFISHERS

KEY TO THE GENERA OF ALCEDINIDÆ AS REPRESENTED IN THE CONGO

- 1.—Bill laterally compressed, its height greater than its width at anterior end of nostril.....2.
 Bill not so narrow, about as wide as deep at nostril, or wider than it is deep.....5.
- 2.—Wing-length more than 120 mm.; metatarsus shorter than second toe with claw, and claw of second toe reaching to terminal joint of middle (third) toe, i. e., to base of its ungual phalanx.....3.
 Wing-length less than 90 mm.; metatarsus at least as long as second toe with claw, and claw of second toe does not reach the terminal joint of middle toe.....4.
- 3.—Wing more than 180 mm. long; back and wings with considerable slaty or bluish-gray coloration, some rufous on chest or abdomen....MEGACERYLE, p. 294.
 Wing less than 150 mm. long; plumage black-and-white, no rufous or chestnut anywhere.....CERYLE, p. 293.
- 4.—Wing-length exceeding 70 mm.; bill almost if not entirely black; feathers of crown not greatly elongated.....ALCEDO, p. 291.
 Wing-length less than 65 mm.; bill of adults largely or wholly red; feathers of crown often narrow and elongated.....CORYTHORNIS, p. 287.
- 5.—Tail longer than culmen, wing-length more than 70 mm.....HALCYON, p. 267.
 Tail not longer than culmen, wing-length less than 60 mm.....6.
- 6.—Bill markedly flattened; a black patch on forehead, behind this the crown is rufous with blue or lilac spots (in young the crown may be suffused with blackish, but is still spotted with bluish).....MYIOCEYX, p. 283.
 Bill about as deep as it is broad at nostril; superciliary region rufous, but middle of forehead and crown black barred with deep blue.....ISPIDINA, p. 284.

Subfamily Daceloninæ

KEY TO THE SPECIES OF HALCYON IN THE CONGO

- 1.—Bill wholly red or reddish, or else maxilla blackish brown and mandible largely red.....2.

¹ Grote, 1925, J. f. O., p. 92. M.-Praed and Grant, 1937, Ibis, pp. 663, 664.

- Mandible always black in adults, maxilla largely or entirely red 5.
- 2.—Crown, cheeks, and hind-neck deep rufous or maroon *H. badia*.
Crown and hind-neck blue, dull brown, or gray, sometimes streaked with blackish 3.
- 3.—Wing less than 92 mm. long; dusky streaking of crown and sides of breast always well marked, middle upper wing-coverts often edged with white or isabelline *H. chelicuti*.
Wing more than 92 mm. long; crown and breast unstreaked (save in *H. albiventris*); middle upper wing-coverts without white or isabelline edgings 4.
- 4.—Abdomen and under tail-coverts rufous to deep chestnut, or if these parts are light buff, then blue of remiges and tail is a rich violaceous blue; hind-neck and sides of breast never streaked with blackish *H. leucocephala*.
Abdomen and under tail-coverts pale buff, sometimes whitish; crown, hind-neck, and sides of breast often have narrow dusky shaft-streaks; blue of remiges and tail never violaceous, but cerulean blue or more greenish blue *H. albiventris*.
- 5.—Scapulars blue, often with gray bases, like the middle of the back *H. senegalensis*.
Scapulars black, occasionally with a slight wash of blue, but very unlike the bright blue middle of the back *H. malimbica*.

Halcyon chelicuti chelicuti (Stanley)

Alaudo chelicuti STANLEY, 1814, in Salt, 'Abyss.,' p. lvi (type locality: Chelicut, Abyssinia).—*Halcyon chelicutensis* SHARPE, 1873, P. Z. S. Lond., p. 716 (Congo R.); 1892, 'Cat. Birds Brit. Mus.,' XVII, p. 239 (Lower Congo). HARTLAUB, 1881, Abhandl. Naturwiss. Verein Bremen, VII, p. 85 (Mahagi). SCHALOW, 1886, J. f. O., pp. 417, 420, 422, 430 (Kauè R., Marungu; "Lualaba" [= Luvua R.]; Luvule R.; Lufua R.). MATSCHIE, 1887, J. f. O., p. 151. REICHENOW, 1887, J. f. O., p. 304 (Leopoldville). OUSTALET, 1893, Naturaliste, VII, p. 125. O.-GRANT, 1908, Ibis, p. 315 (N. W. of L. Tanganyika).—*Halcyon striolata* DUBOIS, 1886, Bull. Mus. Roy. Hist. Nat. Belg., IV, p. 148 (region of L. Tanganyika).—*Halcyon chelicuti* BÜTTIKOFER, 1888, Notes Leyden Mus., X, p. 211 (Boma). HARTERT, 1900, Nov. Zool., p. 34 (Holulu R.). REICHENOW, 1902, 'Vög. Afr.,' II, p. 271 ("Ubangi R."); 1911, 'Wiss. Ergeb. D. Z.-Afr. Exp.,' III, p. 288. DUBOIS, 1905, Ann. Mus. Congo, Zool., I, f. 1, p. 33 (Kisantu). LÖNNBERG, 1907, Arkiv f. Zool., III, No. 21, p. 9 (Mukimbungu); 1917, idem, X, No. 24, p. 20 (Kasindi). SALVADORI, 1907, Boll. Mus. Zool. Anat. Torino, XXII, No. 570, p. 3 (near Lukonzolwa); 1911, Ann. Mus. Civ. Stor. Nat. Genova, (3) V, p. 447 (Uelle); 1915, idem, (3) VI, p. 279 (Kasai). NEAVE, 1910, Ibis, p. 109 (Kambove). SASSI, 1912, Ann. Naturh. Hofmus. Wien, XXVI, p. 366 (Uvira; Baraka; Kasindi-Beni). MENEGAUX, 1918, Rev. Fr. O., V, p. 258 (Zambi). SCHOUTEDEN, 1918, Rev. Z. A., V, p. 248 (Beni; Karemi; Kamabo; old Mission St. Gustave; L. Edward; Boga; Bigoisagua; Mawagongo; Molekera; Dogodo; Sanghè-Ruzizi; N. Tanganyika; Baraka; Uvira; Lobozi R. near Tanganyika). SCLATER AND M.-PRAED, 1919, Ibis, p. 671 (Mt. Baginzi). SCHUBOTZ, 1921, 'Tageb. Emin Pascha,' VI, pp. 108, 237 (Mundu; Mangbetu country; Tunguru; Mswa; Tobbo).—*Dacelo tschelicutensis* EMIN, 1919, in Stuhlmann, 'Tageb. Emin Pascha,' II, p. 78 (Mahagi).—*Halcyon chelicuti* between *chelicuti* and *damarensis* HARTERT, 1921, Nov. Zool., XXVIII, p. 106 (Kivu; L. Tanganyika); 1924, idem, XXXI, p. 24.—*Halcyon chelicuti chelicuti* SCHOUTEDEN, 1923, Rev. Z. A., XI,

pp. 323, 392 (Kasai; Kwamouth); 1924, *idem*, XII, p. 265 (Kisantu); 1926, *idem*, XIII, p. 191 (Moanda; Boma). GYLDENSTOLPE, 1924, K. Svenska Vet. Akad. Handl., (3) I, No. 3, p. 280 (Kasenyi). FRIEDMANN, 1930, Bull. 153, U. S. Nat. Mus., p. 351.—*Halcyon chelicuti hylobius* GROTE, 1925, J. f. O., pp. 90, 91 (type locality: Chinchoxo. Congo region to L. Tanganyika). SCHOUTEDEN, 1930, Rev. Z. A., XVIII, p. 282 (Elisabethville); 1936, Ann. Mus. Congo, Zool., I, f. 2, p. 85 (Buta; Mauda; Faradje; Mahagi-Niarembe; Mahagi Port).—*Halcyon chelicuti phæthon* STONEHAM, 1930, Bateleur, II, p. 50 (type locality: Kitgum, Uganda. Also from Congo).

SPECIMENS.—Lower Congo, ♀, July. Boma, ♀, Jan. 16. Rungu, 2 ♀, Oct. 30. Niangara, ♀, June 19. Nzoro, ♀, Aug. 6. Faradje, 2 ♀, Feb. 2, Nov. 23.

ADULT FEMALE.—Iris dark brown; maxilla dusky brownish, mandible orange-red with tip brown; feet orange-red, larger scales brown, claws blackish.

DISTRIBUTION OF THE SPECIES.—From Senegal, Lake Chad, and Abyssinia south to the Orange and Vaal rivers, but unknown in the forest districts of both Upper and Lower Guinea.

The species has been divided by Hartert¹ into three races, the palest of which, *H. c. eremogiton* Hartert, has the wing about 75–82 mm. long, and lives along the southern margin of the Sahara from the neighborhood of Zinder and Lake Chad eastward to Akona and Kodok on the White Nile. Specimens from southern Africa are largest, with wings 81–90 mm. and as a rule their coloration is dark. For these the name *H. c. damarensis* Strickland² may be used. *H. c. chelicuti*, described from Abyssinia, is more or less intermediate in wing-length, and often in coloration. Birds of this nature are found from Abyssinia and the Sudan west to Senegal, south through eastern Africa to the Zambesi, and westward across northern Angola and the southern Congo to Landana.

Grote (1925) proposed the separation of birds from the whole equatorial belt near the Congo as *hylobius*, but their characters are very elusive. Some specimens from the Uelle seem a little dark on the breast, but the majority cannot be distinguished from Abyssinian specimens or from those of the Kasai. Fifteen Uelle specimens have wings 79–85 mm., twelve from Luluabourg in the Kasai have them 76–82, and forty from the Upper Katanga 78–87. Eight examples from Dan-gila and Maraco, Abyssinia, show wing-lengths varying exactly as in those from Luluabourg. Skins from the eastern Congo have wings no longer than those of the Uelle or Kasai, and while this measurement is slightly greater in the Katanga, I do not regard *H. c. damarensis* as reaching the Belgian Congo.

¹ 1921, Nov. Zool., XXVIII, pp. 106, 107.

² 1852, Jardine's Contrib. Orn., p. 153 (Damara country).

Even if *hylobius* were valid, it is antedated by *Alcedo variegata* Vieillot and *A. striolata* Lichtenstein. From eastern Africa Stoneham also described *phæthon* and *zinjense*, on characters which seem insufficient.

Throughout the lowland savannas of the whole Congo the little striped kingfisher is a common bird; and while it does not ascend the mountains of the eastern Congo border, as it does the highlands of Northeast Africa, two specimens have been taken at Kansenia, 5200 feet, on the Bianco Plateau. For river banks it has no liking whatever. It sits on the gnarled trees of the drier upland, or about native farms, silent most of the time, but ever on the lookout for passing insects.

The voice is nevertheless one of the notable sounds of this type of country, and is characteristically divided in two parts, often repeated. Variable as to length, it may usually be written "tirrrrrrr-rruh!" Two birds often call shrilly in unison, either perched together on the same branch—like *H. senegalensis*—or from trees some distance apart, sitting stiffly upright with outspread wings during the reiterated trilling cries. There is a certain moment between sunset and dark when all the striped kingfishers within hearing call together. Scattered birds on all sides take it up, like an evening prayer or a last good-night, which they relay every evening, weather permitting, right across the African continent. Then they are silent till dawn, when they again become noisy.

The nest of *Halcyon chelicuti* is usually in holes in trees, sometimes in an old nest of a barbet or woodpecker, or even in a mud nest of a swallow like *Hirundo abyssinica*.¹ Its eggs are white, three to five in a set; and measurements from other parts of Africa have been given as 24–25 mm. × 20.5–22.

The diet is of insects, grasshoppers especially; and in four stomachs we noted also a mantis, a cicada, and a green caterpillar.

Halcyon badia badia Verreaux

Halcyon (Cancrophaga) badia VERREAUX, 1851, Rev. Mag. Zool., Paris, p. 264 (type locality: Gaboon).—*Halcyon badia* OUSTALET, 1893, Naturaliste, VII, p. 125.—*Halcyon* sp. EMIN, 1894, J. f. O., p. 168 (old Irumu).—*Halcyon badius* REICHENOW, 1894, J. f. O., p. 168; 1902, 'Vög. Afr.', II, p. 285 ("Ubangi R."); Tshisambo on Loango Coast; Irumu; Atyanga); 1911, 'Wiss. Ergeb. D. Z.-Afr. Exp.', III, p. 290 (near Beni; W. foot of Ruwenzori). DUBOIS, 1905, Ann. Mus. Congo, Zool., I, f. 1, p. 33 (Banalia). O.-GRANT, 1910, Tr. Z. S. Lond., XIX, p. 438 (20 miles N. of Fort Beni). SASSI, 1912, Ann. Naturh. Hofmus. Wien, XXVI, p. 366 (Moera; Mawambi; Ukaika; Irumu). SCHOUTEDEN, 1914, Rev. Z. A., III, p. 265 (Kilo); 1918, idem, V, p. 249 (Lesse). LÖNNBERG, 1917, Arkiv f. Zool., X, No. 24, p. 20 (Beni).—*Halcyon badius badius* SCHOUTEDEN, 1923,

¹ Boxberger, 1910, O. Mb., pp. 63, 64.

Rev. Z. A., XI, p. 323 (Luebo; Ngombe in Kasai); 1924, idem, XII, p. 412 (Eala); 1936, Ann. Mus. Congo, Zool., I, f. 2, p. 85 (Buta; Panga; Wambanga; Nava R.). W. L. SCLATER, 1924, 'Syst. Av. Æth.,' pt. 1, p. 217 (upper Uelle distr.). BANNERMAN, 1933, 'Birds Trop. W. Afr.,' III, p. 276. STONE, 1936, Proc. Acad. Nat. Sci. Phila., LXXXVIII, p. 562 (Saidi).

SPECIMENS.—Batama, ♀, Sept. 16. Avakubi, 4♂, Feb. 11, Mar. 29, June 2, Nov. 1. Bafwabaka, 2 ♀, Dec. 30, 31. Medje, ♂, Jan. 19; ♀ juv., Oct. 15. Pawa, ♀, July 14. Niangara, ♂, Dec. 14.

ADULTS.—Iris dark brown, skin around edge of eyelids orange-red to scarlet; bill rather dark crimson; feet dark reddish brown, soles lighter and redder.

YOUNG FEMALE.—Iris gray, rim of eyelids buff; bill brownish black, its tip and the corners of mouth orange; feet blackish; back of metatarsus and soles brown.

DISTRIBUTION OF THE SPECIES.—From Liberia through the forests of Upper Guinea to the southern Cameroon and Loango Coast, eastward across the Congo to Uganda. Southward it reaches the southern Kasai district, although not yet collected in the Belgian Mayombe. *H. b. lopezi* Alexander is an island race restricted to Fernando Po; and *H. b. budongoensis* van Someren, of large size (wing 100–105 mm.), with lighter chestnut crown and back, and blue on wings more greenish, inhabits the forests of western and central Uganda. The remainder of the area is occupied by *H. b. badia*, with wings of Congo specimens usually 92–100 mm. A female in the Congo Museum from Lesse in the Semliki Valley has the wing 105 mm. but is colored like *badia*.

The chestnut-backed kingfisher is a common, characteristic forest bird of the Ituri, southern Uelle, and the other heavily wooded lowlands of the Congo. Yet it is easily overlooked, for it seldom if ever visits gardens or other open spots. Along river banks it is less in evidence than *H. senegalensis*, and probably visits watercourses only to bathe, eating neither fish nor amphibia.

In its beloved forests it usually keeps 20 or 30 feet above the ground, and often higher, where it would scarcely be noticed save for its voice. This is a characteristic sound of the forest, a prolonged series of rather slow whistles, lasting at least seven seconds. Not shrill in tone, they descend the scale gradually and die away. Their hollow quality makes it difficult to locate the bird, yet they carry a great distance, and scarcely suggest a kingfisher. I believe it has also some more excited notes in its vocabulary.

My dissections indicated a rather long and irregular breeding season. A female with ovary enlarged was obtained in September, and a young bird just out of the nest in October (at Medje). Another young bird was seen at Barumbu in December, so I believe that north of the equator nesting is carried on from July to November, during the rains.

The nest has not been found in the Congo. Bates's first set of two glossy white eggs was said to have come from a hole in a tree, but later he received two nestlings from a cavity in an arboreal ants' nest. Finally another set of two eggs was brought with a male bird, and he was able to examine the solid hanging ant or termite structure in which the nest-hole had been excavated, possibly by woodpeckers.¹ The eggs measured 26–29 mm. \times 24–26. The juvenal plumage in this species is surprisingly like that of the adult, but has a buffy wash on flanks and across chest, while the lower back is often more blackish.

Every one of the nine stomachs examined held insects, among which orthoptera and coleoptera predominated. There were grasshoppers in three cases, and I noted in particular a cricket, a mantis, an earwig, an elater, a hemipter, and a large cicada. A single large spider had also been eaten.

[*Halcyon badia budongoensis* van Someren]

Halcyon badia budongoensis VAN SOMEREN, 1919, B. B. O. C., XL, p. 28 (type locality: Bugoma Forest); 1922, Nov. Zool., XXIX, p. 78 (Budongo and Bugoma forests; Ituri).

According to its describer, this race extends from Uganda to the Ituri forest. It is true that a specimen from Lesse in the Semliki is large enough for *budongoensis*, but unless there is also some difference in color I prefer not to recognize such a race. The wings of fifteen other specimens from the Ituri and southern Uelle measure 92–100 mm., while two from the region of Bolobo have them 94 and 99 mm.

Halcyon albiventris orientalis Peters

Halcyon orientalis W. PETERS, 1868, J. f. O., p. 134 (type locality: Inhambane, Portuguese E. Africa). MATSCHIE, 1887, J. f. O., p. 151 (Mpala). SCHALOW, 1887, J. f. O. p. 236 (Marungu; Katanga). REICHENOW, 1887, J. f. O., pp. 300, 304 (Manyanga; Leopoldville). OUSTALET, 1893, Naturaliste, VII, p. 125 (Loango). SALVADORI, 1915, Ann. Mus. Civ. Stor. Nat. Genova, (3) VI, p. 279 (Kasai).—? *Alcedo* LEACH, 1818, in Tuckey, 'Narr. Exp. R. Zaire,' p. 408 (Lower Congo).—*Halcyon albiventris* JOHNSTON, 1884, 'River Congo,' p. 366. DUBOIS, 1886, Bull. Mus. Roy. Hist. Nat. Belg., IV, p. 148 (region L. Tanganyika).—*Halcyon albiventris orientalis* REICHENOW, 1902, 'Vög. Afr.,' II, p. 275 (Mpala; Stanley Pool; "Ubangi R."). LÖNNBERG, 1907, Arkiv f. Zool., III, No. 21, p. 9 (Kingoyi; Mukimbungu). NEAVE, 1910, Ibis, p. 110 (Kambove). MOURITZ, 1914, Ibis, p. 37 (S. E. Katanga). SCHOUTEDEN, 1923, Rev. Z. A., XI, pp. 323, 392 (Kamaiembi; Kwamouth); 1925, idem, XIII, p. 9 (Kunungu); 1930, idem, XVIII, p. 282 (Elisabethville). W. L. SCLATER, 1924, 'Syst. Av. Æth.,' pt. 1, p. 216. CHAPIN, 1927, Bull. A. M. N. H., LIII, p. 477. BOWEN, 1929, Proc. Acad. Nat. Sci. Phila., LXXXI, pp. 629, 631; 1933, Ecology, XIV, p. 267, Fig. 10C. FRIEDMANN, 1930, Bull. 153, U. S. Nat. Mus.

¹ Bates, 1909, Ibis, p. 24; 1911, idem, pp. 513, 514.

p. 345. BANNERMAN, 1933, 'Birds Trop. W. Afr.,' III, p. 271.—*Halcyon albiventris* var. *orientalis* DUBOIS, 1905, Ann. Mus. Congo, Zool., I, f. 1, p. 33 (Tanganyika; Kisantu).

SPECIMENS.—Boma, ♂, Jan. 7. Matadi, ♂ im., Dec. 27.

ADULT MALE.—Iris dark brown; bill rather dark red becoming blackish at tip; feet red on softer parts, but scales and claws brown.

DISTRIBUTION OF THE SPECIES.—Eastern Cape Province north to the Loango Coast, Lake Tanganyika, Mt. Kenya, and Southern Somaliland. *H. a. albiventris* (Scopoli) occupies the southern part of the range, as far north as Southern Rhodesia.

H. a. orientalis, with less pronounced streaking on chest and usually shorter wings (97–106 mm.), ranges from Portuguese East Africa and Mashonaland to the Tana River, Lake Tanganyika, the Kasai district, and the coast of southern Gaboon. A pair from Lukafu in the Katanga have wings 110 and 109 mm. *H. a. erlangeri* Neumann of southern Somaliland is stated to have shorter wings, 92–97 mm.¹ The sexes are readily distinguishable in this kingfisher by the color of the back, which is blackish in males, brown in females.

In the Congo *H. a. orientalis* does not occupy the whole of the southern savannas, for in the east it scarcely ranges north of Mpala and the limits of the Upper Katanga. On the higher plateaus it is rare, though de Witte obtained a pair at Kansenia. There is but a single record from the Kasai, yet the Congo Museum has a specimen from Eala, and I have seen it once at Lukolela. Dybowski's specimen did not come from the Ubangi River, but from Loango.

In the Lower Congo, on the other hand, I found this kingfisher rather common, frequenting open groves, as of Ceara rubber trees near Boma, on high ground. They were quiet, though the species is said to have a loud voice like that of *H. leucocephala*. Breeding is probably carried on in the first half of the rains, the nest being in a tunnel in a bank, with four white eggs. The measurements of an egg from Dar-es-Salaam were given by Nehrkorn as 26.5×24 mm.

***Halcyon leucocephala leucocephala* (Müller)**

Alcedo leucocephala P. L. S. Müller, 1776, in Linnæus, 'Syst. Nat. Suppl.,' p. 94 (type locality: Senegal).—? *Halcyon semicaerulea* SHARPE AND BOUVIER, 1877, Bull. Soc. Zool. France, II, p. 474 (Insonné on Shiloango R.).—*Halcyon semicaerulea* SHARPE, 1884, Journ. Linn. Soc. Lond., Zool., XVII, p. 435 (Semio). EMIN, 1894, J. f. O., p. 167 (old Irumu).—*Halcyon semicaeruleus* SHARPE, 1892, 'Cat. Birds Brit. Mus.,' XVII, p. 232. REICHENOW, 1902, 'Vög. Afr.,' II, p. 276. OUSTALET, 1904, Bull. Mus. Paris, p. 435 (Krebedje). DUBOIS, 1905, Ann. Mus. Congo, Zool., I, f. 1,

¹ *H. a. prentissgrayi* Bowen, from Meru, Mt., Kenya, was based on a single very dark individual.

p. 33 (in part. Uelle). O.-GRANT, 1910, Tr. Z. S. Lond., XIX, p. 437 (Mokia, W. Uganda). SASSI, 1912, Ann. Naturh. Hofmus. Wien, XXVI, p. 366 (Irumu). SCHUBOTZ, 1921, 'Tageb. Emin Pascha,' VI, p. 109 (Mangbetu country; Mswa; Tunguru).—*Halcyon semicærulea* OUSTALET, 1893, Naturaliste, VII, p. 125 (Ubangi?).—*Halcyon leucocephala leucocephala* GRANT, 1915, Ibis, p. 265 (Ruwenzori). SCLATER AND M.-PRAED, 1919, Ibis, p. 672 (Mt. Baginzi). FRIEDMANN, 1930, Bull. 153, U. S. Nat. Mus., p. 347. STONE, 1936, Proc. Acad. Nat. Sci. Phila., LXXXVIII, p. 562 (Kasenyi).—*Halcyon leucocephalus* BERLIOZ, 1922, Bull. Mus. Paris, p. 344 (Rombo R.).—*Halcyon leucocephalus leucocephalus* SCHOUTEDEN, 1936, Ann. Mus. Congo, Zool., I, f. 2, p. 85 (Buta; Mauda; Dika; Dramba; Mahagi Port).

SPECIMENS.—Niagara, 2 ♂, Jan. 19, Dec. 26; 2 ♀, Dec. 16, 19. Faradje, 5 ♂, Mar. 23, 31, Apr. 2, Nov. 21, Dec. 31; 7 ♀, Mar. 15, 22, 25, 31, Apr. 2, 4; 3 ♂ juv., 3 ♀ juv., Mar. 31, Apr. 4.

ADULTS.—Iris dark brown, bill and feet red.

NESTLINGS (feathers just sprouting).—Skin of body flesh-color; iris brownish gray; tip of bill and corners of mouth dull orange-yellow, middle part of bill blackish; feet yellow below, scales above dusky brownish.

DISTRIBUTION OF THE SPECIES.—From the Cape Verde Islands and Senegal east to Abyssinia and Southern Arabia; south through the eastern half of Africa to the Vaal River, and west again to the Kwango district, Angola, and Damaraland. Very rare in the equatorial forest belt.

H. l. leucocephala, ranging from Senegal to Abyssinia, has the abdomen deep rufous and the blue of wings, rump, and tail tinged with green. *H. l. acteon* (Lesson) of the Cape Verde Islands is larger, and its blue feathers a little less greenish. *H. l. semicærulea* (Gmelin) of Yemen and the Aden Protectorate is also less greenish blue on wings and tail.

The very different *H. l. pallidiventris*, living south of the forest belt, has the abdomen pale rufous and the blue areas strikingly violaceous. In eastern Africa there is practical intergradation between *pallidiventris* and *leucocephala*. *H. l. hyacinthina* Reichenow, from Zanzibar to Lake Nyasa, is like the former, but with deeper rufous abdomen. Farther north the blue parts become somewhat less violaceous, and *H. l. centralis* Neumann is intermediate between *hyacinthina* and *leucocephala*.

In the Congo typical *leucocephala* is found only in the northern savannas, near the Ubangi and Uelle rivers, and in those near Lake Albert and Lake Edward. In the Uelle it is migratory, appearing in November and leaving late in April. At Kasenyi on Lake Albert it may be resident, I saw several in August. Near the upper Semliki I collected two specimens in January and February, while de Witte took one in the Ruindi Plain in November.

The birds of the Uelle must move northward into the Sudan, and while many of them nest in Congo territory in March and early April,

Lynes found this kingfisher breeding also in Darfur in May and June. While in the southern part of their range, these gray-headed kingfishers scatter over the dry savannas, cultivated fields, and river banks. They perch singly or in very small parties, and dart down on their insect prey with wings gleaming in the sun. While sitting they raise and lower the head from time to time with a slight jerk. The weak, dry voice has been written "ji - ji - ji - chi," but it may also be a more prolonged chattering.

Near Faradje, along the banks of the River Atua, numbers of pairs used to nest, digging tunnels about a yard long and laying two to four smooth white eggs, most often three. My measurements of two sets of eggs are 24.1-24.5 mm. \times 21.5-22.8.

Of six stomachs examined every one contained insect remains, and one a spider. The insects were mainly beetles and grasshoppers, but three crickets, one roach, and a hemipter were also noticed.

***Halcyon leucocephala centralis* Neumann**

Halcyon semicaeruleus centralis NEUMANN, 1905, J. f. O., p. 189 (type locality: Bussisi on S. shore of L. Victoria).—? *Halcyon semicaeruleus* var. *hyacinthinus* REICHENOW, 1911, 'Wiss. Ergeb. D. Z.-Afr. Exp.,' III, p. 289 (L. Kivu).—*Halcyon semicaeruleus* SCHOUTEDEN, 1918, Rev. Z. A., V, p. 248 (in part. Beni).

DISTRIBUTION.—Possibly from the vicinity of Lake Rudolf southward to Lake Manyara in Tanganyika Territory, to the southern side of Lake Victoria, and westward to the country near Lake Kivu, and perhaps the Semliki Valley.¹

In the Congo Museum there is a dark-bellied specimen from Beni, which though labeled as female, has a little rufous on the border of the hind-neck and is more probably a male. The blue on its wings and tail is much more violaceous than in typical *leucocephala*, agreeing with the color in males from Lake Baringo and the Turkwell River. It may therefore be regarded provisionally as *centralis*. So also may the individual from Lake Kivu, referred by Reichenow to *hyacinthina*.

***Halcyon leucocephala pallidiventris* Cabanis**

Halcyon pallidiventris CABANIS, 1880, J. f. O., p. 349 (type locality: Angola). MATSCHIE, 1887, J. f. O., p. 151 (Mpala). O.-GRANT, 1910, Tr. Z. S. Lond., XIX, p. 437 (Mokia; Fort Beni). BEQUAERT, 1922, Bull. A. M. N. H., XLV, p. 309. FRIEDMANN, 1930, Bull. 153, U. S. Nat. Mus., p. 349 (Luluabourg; Medje).—*Halcyon semicaerulea* REICHENOW, 1887, J. f. O., p. 308 (Kasongo). DE SOUSA, 1887, Jorn. Sci. Lisboa, XII, p. 85 (Cuango R.; Cuillo R.).—*Halcyon swainsoni* REICHENOW, 1902, 'Vög. Afr.,' II, p. 278; 1911, 'Wiss. Ergeb. D. Z.-Afr. Exp.,' III, p. 289. NEAVE,

¹ The validity of *ugandæ* van Someren, 1922, Nov. Zool., XXIX, p. 77 (Kisumu), is very doubtful. At best it is merely intermediate between *centralis* and *leucocephala*.

1907, Mem. Proc. Manchester Lit. Phil. Soc., LI, No. 10, p. 31 (Ndola; Kapopo); 1910, Ibis, p. 109 (Mehinga plateau). MOURITZ, 1914, Ibis, p. 37 (S. E. Katanga).—*Halcyon semicaeruleus* DUBOIS, 1905, Ann. Mus. Congo, Zool., I, f. 1, p. 33 (in part. L. Leopold II).—*Halcyon semicaeruleus swainsoni* SASSI, 1912, Ann. Naturh. Hofmus. Wien, XXVI, p. 366 (Moera). *Halcyon leucocephala ogilviei* GRANT, 1915, Ibis, p. 266.—*Halcyon semicoeruleus* SCHOUTEDEN, 1918, Rev. Z. A., V, p. 248 (in part. Munie-Moboka; Kiboto; Dogodo; Lubilu; Kamba-Kamba; Manakwa; Mawagongo; Uvira; Baraka).—*Halcyon semicoeruleus swainsoni* SCHOUTEDEN, 1918, Rev. Z. A., V, p. 248 (Plain of St. Louis).—*Halcyon pallidiventris kivuensis* VAN SOMEREN, 1922, Nov. Zool., XXIX, p. 77 (Kivu; L. Edward).—*Halcyon leucocephala swainsoni* SCHOUTEDEN, 1923, Rev. Z. A., XI, pp. 323, 392 (Luebo; Kwamouth). W. L. SCLATER 1924, 'Syst. Av. Æth.,' pt. 1, p. 217.—*Halcyon leucocephala pallidiventris* SCHOUTEDEN, 1930, Rev. Z. A., XVIII, p. 282 (Kafubu R.).—*Halcyon badius* CHAPIN, 1935, Bull. C. Z. C., XII, p. 72 (Buta).

SPECIMENS.—Medje, ♂, July 26; ♀, Aug. 3.

ADULTS.—Iris dark brown; bill red, a little dusky at tip; feet red, with claws very dark brown.

DISTRIBUTION.—From Damaraland and the Vaal River north to the southern edge of the Upper Congo forest, but not in the Lower Congo. It even crosses the forest in small numbers to Buta and Poko. To the east of the forest it ranges north to the vicinity of Beni; but its distribution in eastern Africa is uncertain north of Nyasaland.

H. l. pallidiventris is a common bird in the savannas of the southern Congo, from Kwamouth and the Kwango district to the Upper Katanga, Lake Tanganyika, and the Manyema. It appears to be migratory, and our fourteen specimens from Luluabourg were all collected by Father Callewaert between May 21 and August 14. The Congo Museum specimens from the Manyema and vicinity were likewise taken between May 23 and September 14, and those reported from Mokia, Beni, and Moera, May 10 to August. In the Upper Katanga dates of occurrence run from April 26 to October, with one sight record in December.

This race nests in the northern part of its range during the dry season, for Dr. Schouteden collected three large nestlings at Luebo on August 28, and Lynes reported a male in breeding condition at Banda in the western Kasai, in October. Nests have been found in Angola in September, in Northern Rhodesia from September to November, and in Nyasaland from October to December. In Southern Rhodesia Priest says this kingfisher is most plentiful from October to March, the rainy season, and then breeds freely.

The occurrence of *pallidiventris* along the northern border of the

forest is surprising. I first collected two at Medje, then Christy found one at Poko, and Hutereau sent another from Ibembo. In recent years Brother Hutsebaut has collected ten at Buta, of which only three are adults. Adults with reliable dates from this northern area were all taken in April, July, and August, but immature birds are there also in January, March, April, and May. *H. l. leucocephala* is likewise rather common at Buta in the dry season. We do not know whether *pallidiventris* nests at Buta.

The habits and nests of the present form are similar to those of *leucocephala*. The eggs occasionally number as many as six, though three or four are probably normal; and measurements have been given as 23.5–25.4 mm. \times 20.0–22.3.

The stomachs of our two birds from Medje contained a few large winged ants, two grasshoppers, a mole-cricket, and a hawk-moth. One examined by Marshall in South Africa had eaten a lizard, two "slow-worms," grasshoppers, and beetles.

Halcyon senegalensis senegalensis (Linnæus)

Alcedo senegalensis LINNÆUS, 1766, 'Syst. Nat.,' 12th Ed., p. 180 (type locality: Senegal). LEACH, 1818, In Tuckey, 'Narr. Exp. R. Zaire.,' p. 408 (Lower Congo).—*Halcyon senegalensis* JOHNSTON, 1884, 'River Congo,' p. 366 (Lower Congo). REICHENOW, 1887, J. f. O., pp. 300, 307 (Manyanga; Kibongi); 1902, 'Vög. Afr.,' II, p. 282 (in part. Semio); 1911, 'Wiss. Ergeb. D. Z.-Afr. Exp.,' III, p. 289 (L. Edward; Nyando in N. W. Ruanda; N. W. of Beni; N. W. slope of Ruwenzori; Kirk Falls on lower Semliki). BÜTTIKOFER, 1888, Notes Leyden, Mus., X, p. 211 (Banana). FLOWER, 1894, P. Z. S. Lond., pp. 599, 605, 606 (Ipoto; Ituri R. near Urumbi; Muyoméma [or Kinnene]). HARTERT, 1899, in Ansorge, 'Under the African Sun,' App., p. 336 (Pongo). OUSTALET, 1904, Bull. Mus. Paris, p. 435 (Bangui). DUBOIS, 1905, Ann. Mus. Congo, Zool., I, f. 1, p. 33 (in part. Prov. Orientale; Banalia; Umangi; Kisantu). LÖNNBERG, 1907, Arkiv f. Zool., III, No. 21, p. 9 (Kingoyi); 1917, idem, X, No. 24, p. 20 (Kasindi). O.-GRANT, 1910, Tr. Z. S. Lond., XIX, p. 437 (Mokia; Beni). SASSI, 1912, Ann. Naturh. Hofmus. Wien, XXVI, p. 366 (Urundi; Moera; Beni-Mawambi; Mawambi; Ukaika; Irumu). SALVADORI, 1914, Ann. Mus. Zool. Napoli, IV, No. 10, p. 17 (Kagera R.). SCHOUTEDEN, 1914, Rev. Z. A., III, p. 265 (Kilo); 1918, idem, V, p. 248 (Kamabo; Kasindi; Semliki; Kabambaré; Alimasi; old Mission St. Gustave; Kaniki); 1920, idem, VII, p. 190 (in part. Malela); 1926, idem, XIII, p. 191 (Kifuku on Banana Bay; Moanda; Temvo; Ganda Sundi); 1933, idem, XXII, p. 379 (Kisenyi; Goma; Rwaza). CHAPIN, 1916, A. M. Journ., p. 543 (Uelle). MENEGAUX, 1918, Rev. Fr. O., V, p. 258 (Zambi). SCHUBOTZ, 1921, 'Tageb. Emin Pascha,' VI, p. 110 (Mswa).—*Halcyon cyanoleuca* SHELLEY, 1890, Ibis, p. 167 (Aruwimi R.). SHARPE, 1890, in Jameson, 'Story of Rear Column,' pp. 400, 412 (Yambuya).—? *Halcyon senegalensis* OUSTALET, 1893, Naturaliste, VII, p. 125.—? *Halcyon cyanoleuca* OUSTALET, 1893, Naturaliste, VII, p. 125.—*Halcyon cyanoleucus* REICHENOW, 1902, 'Vög. Afr.,' II, p. 284 (in part.

Aruwimi R.; Stanley Pool-Aruwimi).—?*Halcyon cyanoleucus* O.-GRANT, 1910, Tr. Z. S. Lond., XIX, p. 438 (Mokia).—?*Halcyon senegalensis cyanoleucus* REICHENOW, 1911, 'Wiss. Ergeb. D. Z.-Afr. Exp.,' III, p. 289 (in part. Mokia).—*Halcyon senegalensis cyanoleucus* SASSI, 1912, Ann. Naturh. Hofmus. Wien, XXVI, p. 367 (Moera; Mawambi; Ukaika). SCHOUTEDEN, 1918, Rev. Z. A., V, p. 249 (in part. Semliki; Beni; Lubilia R.; Ikanga).—*Halcyon senegaloides* SASSI, 1912, Ann. Naturh. Hofmus. Wien, p. 367 (Ukaika).—*Halcyon senegalensis senegalensis* BANNERMAN, 1922, Rev. Z. A., X, p. 153; 1923, Ibis, p. 736. GYLDENSTOLPE, 1924, K. Svenska Vet. Akad. Handl., (3) I, No. 3, p. 277 (Kampi na Mambuti). SCHOUTEDEN, 1936, Ann. Mus. Congo, Zool., I, f. 2, p. 85 (Buta; Titule; Mauda).

SPECIMENS.—Bumba, ♂, 2 ♀, July 29. Lubilo R., ♂, Sept. 20. Avakubi, ♂, Nov. 11; ♂ juv., Oct. 22. Ngayu, ♀, Dec. 22. Gamangui, ♂, Feb. 1. Medje, ♂ juv., Oct. 12. Niangara, ♂, Dec. 26; ♀, Jan. 22; 2 ♀ juv., Dec. 8. Faradje, ♂, Dec. 13; 3 ♀, July 21, Nov. 28, 30.

ADULTS.—Iris dark brown; mandible black, but maxilla entirely bright red save for the very tip, which is dusky; feet blackish, with an orange-red patch on soles.

NESTLINGS.—Iris gray; color of bill variable, in one case entirely blackish except at tip, in two others it was very largely orange, even below.

DISTRIBUTION OF THE SPECIES.—From the Gambia and northern Abyssinia south to Damaraland and the Orange River. Three races may be distinguished. In the heavy forests of both Upper and Lower Guinea many birds have dusky crowns, even when fully adult. These are rightly called *H. s. fuscopile*, but unfortunately one often finds in the same localities individuals with lighter gray crowns, the latter agreeing closely with *H. s. senegalensis*. The typical race ranges from the Gambia to northern Cameroon, Khartoum, Abyssinia, western Kenya Colony, the eastern Congo border, the Lower Katanga, and central Angola. Its home is largely in savannas with gallery forests, but it also inhabits clearings in the northern and eastern parts of the Congo forest, while on the southern border of the forest it is largely replaced by *fuscopile*. In open country from the Transvaal and Damaraland north to southern Angola, the Upper Katanga, inner East Africa, and Eritrea, lives *H. s. cyanoleuca*. This race is the lightest in color, and is best distinguished by a short black line behind the eye in the adult.

The young of all three races have a black line there, and are apt to be washed with blue on the crown. This has caused much confusion in the past. In my synonymies an exact division between *senegalensis* and *fuscopile* is impossible, nor can any sharp line be drawn between their ranges. The wing-length averages slightly less in *fuscopile* (94–101 mm.) than in *senegalensis* (97–108 mm.), and greatest in *cyanoleuca* (107–112 mm.).

The behavior and voice of *senegalensis* and *fuscopile* are identical.

Throughout the forested lowlands of the Congo this kingfisher is the commonest bird of its family, frequenting the borders of clearings, native plantations, and even the vicinity of dwellings, whether near water or not. Attention is continually attracted by its loud trilled call, starting with a single high note and then descending the scale. The whole duration is about a second, and the call may be written "ki—tir-r-r-r-rh!" In the savanna districts the birds are found about any dense shady woods, small though they be. They never enter mountain forests, but have been found in the Kivu district as high as 6150 feet.

Perching usually rather near the ground, they drop upon their insect prey with a sudden dash, return to a tree, and often beat their victim against a bough before attempting to swallow it. Two birds will approach each other and give a duet, of repeated calls, as they sit with body erect and wings half spread.

Most of our adult specimens were non-breeding, and nesting seems to be carried on during the rains. At Medje on September 3, I watched a Senegal kingfisher carrying food into a hole probably excavated by *Gymnobucco bonapartei* in a tall tree. The nestlings from Niangara were taken by a native from a similar cavity; and Reichenow, in the Cameroon, found a nest in a tree occupied also by several pairs of *Gymnobucco*. This must be the normal manner of nesting in the Congo, even though nests in tunnels in banks have been reported from Bornu, and in arboreal termite nests in the Gold Coast. No measurements of eggs are available.

Seven stomach examinations disclosed nothing but insects: 4 large mantises, 2 grasshoppers, several beetles, and one dragon-fly. It is probable that small lizards and frogs are occasionally eaten, but I doubt if this kingfisher ever fishes.

Halcyon senegalensis fuscopileus Reichenow

Halcyon senegalensis fuscopileus REICHENOW, 1906, O. Mb., p. 171 (type locality: Yaunde in southern Cameroon); 1911, 'Wiss. Ergeb. D. Z.-Afr. Exp.,' III, p. 290 (W. base of Ruwenzori). W. L. SCLATER, 1924, 'Syst. Av. Æth.,' pt. 1, p. 215. BANNERMAN, 1933, 'Birds Trop. W. Afr.,' III, p. 265. SCHOUTEDEN, 1936, Ann. Mus. Congo, Zool., I, f. 2, p. 85 (Buta; Kotili; Panga; Poko; Medje). STONE, 1936, Proc. Acad. Nat. Sci. Phila., LXXXVIII, p. 561 (Ekibondo).—? *Halcyon cyanoleucus* REICHENOW, 1902, 'Vög. Afr.,' II, p. 284 (in part. Stanley Pool).—*Halcyon senegalensis* DUBOIS, 1905, Ann. Mus. Congo, Zool., I, f. 1, p. 33 (in part. Mayombe; L. Leopold II). SCHOUTEDEN, 1920, Rev. Z. A., VII, p. 190 (in part. Temvo in Mayombe); 1923, idem, XI, pp. 323, 392 (Basongo; Luebo; Kamaiembi; Kwamouth); 1924, idem, XII, pp. 265, 413 (Kisantu; Kidada; Eala; Tondou); 1925, idem, XIII, p. 9 (Kunungu).

SPECIMENS.—Lukolela, ♂, July 17.

ADULT MALE.—Iris dark brown; maxilla mostly bright red, mandible black; feet black with a patch of orange-red on soles.

DISTRIBUTION.—Heavy forests in Upper Guinea from Sierra Leone to Southern Nigeria, also in Lower Guinea from southern Cameroon south to the Mayombe forest and to Ndala Tando in northern Angola. Eastward it extends through the Congo to the southern Uelle, Panga on the Aruwimi, and the Semliki Valley. On the south it reaches the Kwango and Kasai districts, and Kabambare.

Most specimens from the northeastern part of the Congo forest are, however, closer to *H. s. senegalensis*. Scarcely a third of the specimens from Buta have dark crowns. The habits of this race are the same as those of *senegalensis*.

Halcyon senegalensis cyanoleuca (Vieillot)

Alcedo cyanoleuca VIEILLOT, 1818, 'Nouv. Dict. d'Hist. Nat.,' XIX, p. 401 (type locality: Angola).—?*Halcyon cyanoleuca* HARTLAUB, 1857, 'Syst. Orn. West-afr.,' opp. p. lix ("Congo").—?*Halcyon senegalensis* SCHALOW, 1886, J. f. O., pp. 420, 431 ("Lualaba" [= Luvua R.]; Lulenge R.). REICHENOW, 1902, 'Vög. Afr.,' II, p. 282 (in part).—?*Halcyon cyanoleucus* REICHENOW, 1902, 'Vög. Afr.,' II, p. 284 (in part. Tanganyika).—?*Halcyon senegalensis* var. *cyanoleuca* DUBOIS, 1905, Ann. Mus. Congo, Zool., I, f. 1, p. 33.—*Halcyon senegalensis cyanoleucus* REICHENOW, 1911, 'Wiss. Ergeb. D.Z.-Afr. Exp.,' III, p. 289 (in part. Tanganyika). SCHOUTEDEN, 1918, Rev. Z. A., V, p. 249 (in part. L. Kivu); 1932, idem, XXII, p. 127. DE RIEMAECKER, 1927, Rev. Z. A., XIV, p. 271 (Elisabethville; Lubumbashi R.; Kambove-Elisabethville).

DISTRIBUTION.—Zululand and the Transvaal to southern Angola, Nyasaland, and the Upper Katanga; then northward through the interior of eastern Africa to the upper White Nile and Eritrea.

All the earlier records from the Congo are doubtful or erroneous, referring usually to the young of the other races, which have a black line behind the eye. Immaturity is easily recognized by the dark color of the mandible and the heavy vermiculation of the chest.

We now know that *cyanoleuca* occurs in Congo territory in the Upper Katanga, possibly also in the Marungu highland, and even in Ruanda. The Congo Museum has a very large series of *H. senegalensis* from all parts of the Belgian colony, but the only specimens agreeing completely with *cyanoleuca* are from Kiambi on the Luvua River, Elisabethville, Kasenga, and Kakyelo on the Luombwa River. Those from Lukafu and Kilwa are closer to *senegalensis* in color, though rather long-winged. A single skin from Rwaza in Ruanda, another from Kaniki, near Lake Edward, are intermediate in color and wing-length

between *senegalensis* and *cyanoleuca*. I have also seen one skin of *cyanoleuca* from Butiaba on the east shore of Lake Albert, and it is supposed to reach the upper White Nile. Specimens from the more wooded parts of Uganda are, however, typical *senegalensis*.

***Halcyon malimbica malimbica* (Shaw)**

Alcedo malimbicus SHAW, 1811, 'Gen'l. Zool.,' VIII, pt. 1, p. 66 (type locality: Malimba, Portuguese Congo).—*Halcyon cinereifrons* HARTLAUB, 1857, 'Syst. Orn. Westafr.,' p. 32 (Malimba). OUSTALET, 1893, *Naturaliste*, VII, p. 125.—*Halcyon malimbicus* REICHENOW, 1902, 'Vög. Afr.,' II, p. 281, (Kwango; "Ubangi R."; Manyanga). DUBOIS, 1905, *Ann. Mus. Congo, Zool.*, I, f. 1, p. 33 (Umangi).—*Halcyon malimbicus malimbicus* SCHOUTEDEN, 1923, *Rev. Z. A.*, XI, p. 392 (Kwamouth). BANNERMAN, 1933, 'Birds Trop. W. Afr.,' III, p. 266, Pl. ix.—*Halcyon torquatus malimbicus* BERLIOZ, 1925, *Bull. Mus. Hist. Nat. Paris*, XXXI, p. 351 (Luluabourg).—*Halcyon malimbicus prenticei* SCHOUTEDEN, 1936, *Ann. Mus. Congo, Zool.*, I, f. 2, p. 85 (in part. Buta; Titule).

DISTRIBUTION OF THE SPECIES.—Senegal to Uganda and Angola. The six races are distinguished by the color of the crown, the shade of blue on the other parts, and size. The distinctions are best explained by Bannerman (1933).

H. m. fortis Reichenow is restricted to Senegal, *H. m. torquata* Swainson to the Gambia and Portuguese Guinea, *H. m. forbesi* Sharpe ranges from French Guinea or Sierra Leone to Nigeria and the base of Mt. Cameroon. *H. m. dryas* Hartlaub occupies Fernando Po, São Tomé, and Princes Island. *H. m. malimbica* extends from southern Cameroon to southern Angola,¹ intergrading in the Upper Congo with *H. m. prenticei*, while the latter reaches the southern Bahr-el-Ghazal Province, Uganda, and supposedly the Manyema district.

Only the last two subspecies occur in the Belgian Congo, and they are not easy to tell apart. The crown in both is gray overlaid with bluish, but the blue areas on body, wings, and tail are a trifle duller or more greenish blue in *prenticei*; and while the wings in *malimbica*, when adult, measure 107–114 mm., those of adults of *prenticei* vary from 111 to 119 mm.

It is not a simple matter, therefore, to say just where in the Upper Congo *malimbica* gives way to *prenticei*. Dr. Schouteden's specimens from Buta and Titule are best referred to *malimbica*, and so are two collected at Luluabourg by Father Callewaert. My specimen from Banalia, on the other hand, seems a little closer to *prenticei*, indicating

¹ Menegaux and Berlioz, 1923, 'Mission Rohan-Chabot,' Ois., p. 19 [125].

that the line of separation lies in about that longitude. The habits and voice are exactly the same, as I know from personal experience.

Halcyon malimbica prenticei Mearns

Halcyon malimbicus prenticei MEARNS, 1915, Proc. U. S. Nat. Mus., XLVIII, p. 392 (type locality: Sesse Is., L. Victoria). SCLATER AND M.-PRAED, 1919, Ibis, p. 669 (Tembura; Upper Uelle). W. L. SCLATER, 1924, 'Syst. Av. Æth.,' pt. 1, p. 215. SCHOUTEDEN, 1936, Ann. Mus. Congo, Zool., I, f. 2, p. 85 (in part. Mauda).—*Halcyon malimbica* SHARPE, 1884, Journ. Linn. Soc. Lond., Zool., XVII, p. 435 (Semio). EMIN, 1894, J. f. O., XLII, p. 162 (Ndussuma).—*Halcyon malimbicus* SHARPE, 1892, 'Cat. Birds Brit. Mus.,' XVII, p. 247. SCHOUTEDEN, 1918, Rev. Z. A., V, p. 249 (Semliki).—*Halcyon torquatus* SASSI, 1912, Ann. Naturh. Hofmus. Wien, XXVI, p. 367 (Ukaika).—*Halcyon torquatus forbesi* SASSI, 1912, Ann. Naturh. Hofmus. Wien, XXVI, p. 367 (Rutshuru Plain); 1916, idem, XXX, p. 240.

SPECIMENS.—Banalia, ♂, Sept. 26. Avakubi, ♂, June 2. Niangara, ♂ Jan. 7; 3 ♀, June 1, 10, 15. Dungu, ♀, Jan. 23. Faradje, ♀, Apr. 26.

ADULTS.—Iris dark brown; maxilla scarlet, but dark brown at very tip and along lower edge and black at sides of base, mandible black; softer skin of feet red, with larger scales and claws dark brown.

DISTRIBUTION.—Eastern Congo forest, gallery forests of the Uelle and of the country near lakes Albert and Edward, south to the vicinity of Rutshuru; probably also in the gallery forests of the Manyema, and possibly south to the lowlands near Bukama. Likewise in the forest areas of Uganda, and on the Sesse Islands. Our skins from the Upper Uelle do not differ appreciably from the type.

This is unquestionably one of the most difficult of the wood-kingfishers to collect, and it may seem to be a very rare bird until its voice is recognized. Then one finds that it is really not uncommon, both in the heavy forest and in the woods along streams in open country. Its call may be compared with that of *Halcyon senegalensis*; but *H. malimbica*, instead of trilling, separates its four to six high-pitched syllables. The first note is highest, the others progressively lower. Thus they are louder, more whistled, and uttered more slowly. The bird calls usually from a perch, sometimes during flight. Heard most often in the very early morning, these calls seem not altogether peculiar to the male, for I once shot a female that had given them.

The extreme wariness of this kingfisher and its fondness for the tallest trees enable it to elude observation with ease. Even in the heavy forest the blue-breasted kingfisher seems to be fond of the vicinity of streams. Several times I have come upon single individuals perching low over forest brooks, where they doubtless capture small amphibia.

Concerning the nesting of the species I could learn nothing. I supposed, like Bates, that it must use holes in trees. Recently, however, two nests of *H. m. forbesi* have been discovered in arboreal termite nests, in Nigeria and the Gold Coast. That race lays three to four glossy white eggs, about 28.5×26.7 mm.

This is one of the few wood-kingfishers in Africa that regularly take vertebrate prey. In five stomachs we noted one small frog, a young toad, and bones of two other small amphibians. Four of the stomachs also held remains of insects, with a single spider. The insects included beetles, a grasshopper, and winged termites, the latter completely filling one stomach. In the Cameroon Bates found that *H. m. malimbica* was sometimes attracted by a column of driver ants, and Sjöstedt noted that *H. m. forbesi* preyed on the amphibious fish *Periophthalmus* among the mangroves.

Subfamily Alcedininae

Myioceyx lecontei lecontei (Cassin)

Ispidina lecontei CASSIN, 1856, Proc. Acad. Nat. Sci. Phila., p. 158 (type locality: Moonda R., Gaboon). SCHOUTEDEN, 1918, Rev. Z. A., V, p. 249.—*Myioceyx ruficeps* DUBOIS, 1905, Ann. Mus. Congo, Zool., I, f. 1, p. 33 (L. Leopold II). O.-GRANT, 1908, Ibis, p. 315 (Ponthierville); 1910, Tr. Z. S. Lond., XIX, p. 438 (Avakubi).—*Myioceyx lecontei* SASSI, 1912, Ann. Naturh. Hofmus. Wien, XXVI, p. 365 (Moera; Ukaika). GYLDENSTOLPE, 1924, K. Svenska Vet. Akad. Handl., (3) I, No. 3, p. 277 (Kartushi).—*Ispidina picta picta* SCHOUTEDEN, 1923, Rev. Z. A., XI, p. 323 (in part. Luebo).—*Myioceyx lecontei lecontei* SCHOUTEDEN, 1924, Rev. Z. A., XII, p. 413 (Eala); 1925, idem, XIII, p. 9 (Kunungu); 1936, Ann. Mus. Congo, Zool., I, f. 2, p. 87 (Kotili; Panga; Nava R.). W. L. SCLATER, 1924, 'Syst. Av. Æth.,' pt. 1, p. 214. BANNERMAN, 1933, 'Birds Trop. W. Afr.,' III, p. 261, Fig. 74.

SPECIMEN.—Ngayu, ♂, July 24.

ADULT MALE.—Iris dark brown; bill and feet vermillion, with a blackish mark on the upper side of the maxilla, toward its base.

DISTRIBUTION OF THE SPECIES.—West Africa from Fanti to the Gaboon, and eastward through the equatorial lowland forest to the Ituri and Mabira in Uganda. On the south it has been found at Kunungu, Lukolela, Luebo, Luluabourg, 40 miles north of Tshikapa, Lonkala, and Ponthierville. Though inhabiting gallery forests in the Kasai, it has not yet been found in those of the Uelle, nor is it known from the Mayombe, despite the remark by Bannerman (1930).

M. l. ugandæ van Someren¹ supposedly restricted to the isolated forests of Uganda, seems to me doubtfully valid. The type has pro-

¹ 1921, B. B. O. C., XLI, p. 105 (Budongo Forest).

nounced blue spots on the head, but perhaps this is only a sexual character.¹

Though never found outside forests, this tiny flat-billed kingfisher seems not to prefer the absolutely virgin forest. The few that I saw myself were in places that either were being cleared or had previously been chopped over and were now badly grown up again. There they could easily make their escape. Besides two individuals seen near Medje, I found a pair in a recent clearing between Ngayu and the Ituri River, well away from water. They were perching on the dry branches of a fallen tree, and these birds seem always to keep close to the ground.

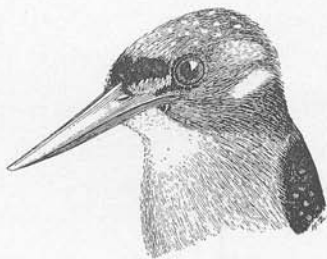


Fig. 22. *Myioceyx l. lecontei*. $\times 3/4$.

At first one is apt to confuse them with *Ispidina picta*, but they live in far more shady places, and are nowhere common. Yet at Lukolela in 1930 a native hunter secured six specimens for me within three months. Three females taken there on September 18 and November 5 were in breeding condition, so they lay during the first half of the rains. In the Cameroon Bates saw three of its small white eggs taken from a very short tunnel in the side of a pit.

I have now examined the contents of four stomachs, all of which contained only insects.

Ispidina picta picta (Boddaert)

Todus pictus BODDAERT, 1783, 'Tabl. Planches Enluminées,' p. 49 (type locality: "Juida," i.e., St. Louis, Senegal).—*Ispidina picta* SHARPE, 1884, Journ. Linn. Soc. Lond., Zoöl., XVII, p. 435 (Semio); 1890, in Jameson, 'Story of Rear Column,' pp. 403, 408 (Yambuya); 1892, 'Cat. Birds Brit. Mus.,' XVII, p. 191 (Congo R.). SCHALOW, 1886, J. f. O., pp. 421, 432 (in part. "Lualaba" [= Luvua R.]). DUBOIS, 1886, Bull. Mus. Roy. Hist. Nat. Belg., IV, p. 148 (L. Tanganyika); 1905, Ann. Mus. Congo, Zool., I, f. 1, p. 33 (Prov. Orientale; L. Dilolo; Ituri; Umangi; Kisantu; L. Leopold II; Lower Congo). MATSCHIE, 1887, J. f. O., p. 151 (in part).

¹ See, however, van Someren, 1932, Nov. Zool., XXXVII, p. 289.

SHELLEY, 1890, *Ibis*, p. 167. OUSTALET, 1893, *Naturaliste*, VII, p. 125; 1904, *Bull. Mus. Paris*, p. 435 (Krebedje). REICHENOW, 1902, 'Vög. Afr.,' II, p. 286 (Kwango); 1911, 'Wiss. Ergeb. D. Z.-Afr. Exp.,' III, p. 290 (L. Mohasi; Kasenyi; Usumbura); 1923, *Mitt. Naturh. Mus. Hamburg*, XL, p. 63 (Lupungu). LÖNNBERG, 1907, *Arkiv f. Zool.*, III, No. 21, p. 9 (Mukimbungu). SALVADORI, 1907, *Boll. Mus. Zool. Anat. Torino*, XXII, No. 570, p. 3 (near Lukonzolwa). SASSI, 1912, *Ann. Naturh. Hofmus. Wien*, XXVI, p. 365 (Uvira; Rutshuru Plain; Beni). SCHOUTEDEN, 1918, *Rev. Z. A.*, V, p. 249 (Rutshuru; old Mission St. Gustave); 1920, *idem*, VII, p. 190 (Temvo); 1935, *Bull. C. Z. C.*, XII, p. 62 (Buta). SCHUBOTZ, 1921, 'Tageb. Emin Pascha,' VI, p. 239 (Kuterma). DE RIEMAECKER, 1927, *Rev. Z. A.*, XIV, p. 271 (Bolobo).—*Alcedo picta* REICHENOW, 1887, *J. f. O.*, p. 308 (Kasongo).—*Irpitina picta* EMIN, 1919, in Stuhlmann, 'Tageb. Emin Pascha,' II, p. 492 (Tomaya).—*Ispidina picta picta* BANNERMAN, 1922, *Rev. Z. A.*, X, p. 157 (N. Belgian Congo); 1933, 'Birds Trop. W. Afr.,' III, p. 258, Fig. 73. SCHOUTEDEN, 1923, *Rev. Z. A.*, XI, pp. 323, 392 (Luebo; Kabambaie; Tshikapa; Tshisika; Kwamouth); 1924, *idem*, XII, pp. 265, 413 (Kisantu; Bikoro); 1926, *idem*, XIII, p. 191; 1932, *idem*, XXII, p. 127; 1936, *Ann. Mus. Congo, Zool.*, I, f. 2, p. 87 (Buta; Kotili; Panga; Poko; Rungu; Niangara; Mauda). W. L. SCLATER, 1924, 'Syst. Av. Æth.,' pt. 1, p. 213. FRIEDMANN, 1930, 'Afr. Rep. Liberia Belg. Congo,' II, p. 754 (Bumba); 1930, *Bull. 153, U. S. Nat. Mus.*, p. 344.

SPECIMENS.—Lukolela, ♂, July 17. Dobo, ♀, July 28. Stanleyville, 2 ♀, Aug. 16, 28. Avakubi, ♂, Jan. 28; 2 ♀, Oct. 11, Nov. 8; ♂ im., Dec. 8. Niangara, ♀, Nov. 18. Dungu, ♂, Feb. 2; ♀ im., June 7. Faradje, 3 ♂, Mar. 4, Oct. 6, 31; 2 ♀, Mar. 4, 12.

ADULTS.—Iris dark brown, bill and feet light scarlet.

DISTRIBUTION OF THE SPECIES.—Senegal and Eritrea south to Natal and Pondoland. Typical *picta* occupies the northern part of the range, from the Sudanese belt through the equatorial lowlands to Angola, the Katanga, and the coast of Kenya Colony. *I. p. jubaensis* van Someren,¹ known only from the middle Juba River in southern Somaliland, differs in having shorter wings, 43–50 mm. Those of *picta* measure 48–57 mm. *I. p. natalensis* of southeastern Africa differs from *picta* when adult in having a small patch of deep blue feathers just above the whitish spot behind the ear. Its wings measure 52–57 mm. This race extends northward to Northern Rhodesia, the vicinity of Dar-es-Salaam, and apparently to the Kivu highlands.

The typical race of the pygmy kingfisher is found in every part of the Congo save the mountains rising above 5000 feet and, it seems probable, the highlands of the Kivu and Upper Katanga. While seen occasionally close to streams and even nesting in river banks, it is really a land kingfisher, which I have never seen dive in the water. In savanna country it is seen far out in the dry bush, though more com-

¹ 1931, *Journ. E. Afr. Ug. N. H. Soc.*, No. 37, p. 193 (Serenli).

monly in shady spots about the borders of villages. In dense virgin forest it is never encountered, yet it occurs commonly throughout the forest belt in clearings and in open spots near river banks.

This gleaming blue-backed sprite of a bird, with disproportionate red bill, prefers a low perch in the shade. From time to time it raises and lowers its head nervously, and may give a single sharp chirp or "chip," uttered also in flight. I have never seen it catch insects in the air, they are usually picked up from the ground.

Earthen banks of almost any description serve as nesting sites, whether along rivers or far from water, as in game-pits or even the burrows of ant-bears. Near the equator nesting may continue throughout the year, but to the north it probably takes place from March to May or June. In the south, likewise, it is to be expected in the early part of the rains. Tunnels are drilled of very small bore, only 18 or 20 inches long, with enlarged terminal chamber. A nest at Faradje on March 4 contained three white eggs, one of them 16.2×14.3 mm. Bates has given measurements up to 19×15.5 mm.

Eight stomachs contained only insects, including grasshoppers, and (in one case) 3 of the crustaceans known as "pill-bugs." Bates has noted also spiders and a few small frogs.

Ispidina picta natalensis (Smith)

Alcedo natalensis A. SMITH, 1831, S. Afr. Quar. Journ., (1) No. 5, p. 14 (type locality: east of Cafferland, i.e., Natal).—? *Ispidina picta* SCHALOW, 1886, J. f. O., pp. 421, 432 (in part. Likulwe R.; Lufira R.). MATSCHIE, 1887, idem, p. 151.—*Ispidina natalensis* NEAVE, 1910, Ibis, p. 109 (Lulingila R., east of L. Bangweolo) — *Ispidina picta natalensis* GYLDENSTOLPE, 1924, K. Svenska Vet. Akad. Handl., (3) I, No. 3, p. 276 (L. Chahafi in British Ruanda). FRIEDMANN, 1930, Bull. 153, U. S. Nat. Mus., p. 344. PITMAN, 1934, 'Rep. Faunal Survey N. Rhodesia,' p. 216 (Broken Hill).—*Ispidina picta picta* SCHOUTEDEN, 1933, Rev. Z. A., XXII, p. 379 (Kisenyi).

DISTRIBUTION.—From Natal and Pondoland north to the vicinity of Dar-es-Salaam, Tanganyika Territory and probably the highlands of Ruanda and the Upper Katanga. I have seen no specimens from the Katanga and those noted by Böhm on the Dikulwe and Lufira rivers did not reach Europe. But *natalensis* has been reported from Broken Hill, and one usually finds Rhodesian races ranging to the northern edge of the Katanga Plateau. Count Gyldenstolpe's specimen from Ruanda must be *natalensis*, for in the Congo Museum there are also an adult male from Kisenyi and another adult from near Lake Kivu which have a few wholly blue feathers behind the ear. A third from the

Rutshuru Plain, shows almost the same approach to *natalensis*. But specimens from Usumbura and Uvira are *picta*.

Care must always be taken with the young of *I. p. picta*, which are bluer on the cheeks than adults. Even they do not usually have a definite blue patch behind the ear, though I find such a patch in one bird from Kalembelembe which is not quite adult.

The habits of *natalensis* are those of *picta*. In Nyasaland, according to Belcher, it nests from October to March.

KEY TO THE CONGO SPECIES OF *CORYTHORNIS*

- Throat and middle of lower breast pure white; cheeks, sides of breast, and flanks very rich rufous, a rufous wash sometimes extending across the chest; longest feathers of crown do not exceed 15 mm. *C. leucogaster*.
 Throat white or buffy white; remaining underparts light cinnamon-rufous, becoming paler toward the mid-line, especially on abdomen, but never pure white; longest feathers of crown usually exceed 15 mm. and measure as a rule 18 or 19 mm. *C. cristata*.

Corythornis leucogaster leopoldi (Dubois)

Ispidina leopoldi DUBOIS, 1905, Ann. Mus. Congo, Zool., I, f. 1, p. 10, Pl. VI, fig. 1 (type locality: Region of L. Leopold II).—*Alcedo leucogaster leopoldi* NEUMANN, 1908, B. B. O. C., XXIII, p. 14.—*Corythornis leopoldi* CHAPIN, 1922, Ibis, pp. 443, 445 (Avakubi). SCHOUTEDEN, 1923, Rev. Z. A., XI, pp. 212, 213 (Tondou; Bolobo); 1924, idem, XII, p. 413; 1925, idem, XIII, p. 9 (Kunungu). BANNERMAN, 1933, 'Birds Trop. W. Afr.', III, p. 255, footnote.—*Corythornis leucogaster leopoldi* CHAPIN, 1923, 'Am. Naturalist,' LVII, p. 111, map. W. L. SCLATER, 1924, 'Syst. Av. Æth.,' pt. 1, p. 214. FRIEDMANN, 1930, 'Afr. Rep. Liberia Belg. Congo,' II, p. 754 (Bumba). SCHOUTEDEN, 1936, Ann. Mus Congo, Zool., I, f. 2, p. 87 (Itimbiri R.).—*Alcedo (Ispidella) leucogaster leopoldi* LAUBMANN, 1924, Archiv f. Naturg., Berlin, LXXXIX (1923), p. 196.—*Alcedo leucogaster leopoldi* LAUBMANN, 1926, Anz. Orn. Ges. Bayern, No. 10, p. 91. SALOMONSEN, 1934, J. f. O., pp. 239, 240, 245.

SPECIMEN.—Avakubi, ♀, Nov. 3.

DISTRIBUTION OF THE SPECIES.—Forests from Portuguese Guinea to the Ituri River, and south to northern Angola and Lake Leopold II. Four subspecies are known. *C. l. leucogaster* (Fraser) of Fernando Po and *C. l. batesi* of the mainland in southern Cameroon, Gaboon, and northern Angola, have a rather large patch of rufous at each side of the forehead, as well as a rufous supercilium usually glossed with lilac. But the insular race has a slightly longer wing and distinctly thicker bill than *batesi*. In *C. l. bowdleri* (Neumann) of Upper Guinea, from the Gold Coast to Portuguese Guinea, the rufous of forehead and sides of head is still more extensive, leaving only the middle of the crown black barred

with blue. The opposite extreme of coloration is seen in *C. l. leopoldi*, where only the loreal region is rufous, the supercilium and temporal region deep blue. The blue bars on the crown-feathers are narrower and of a lighter, more greenish blue than in the other races.

Dubois's type was plainly immature, with a dark-colored bill; but even adults of *leopoldi*, such as ours from Avakubi, seem to have the bills largely dark brown, not wholly red as in *batesi* and the other western races. From the compressed form of the bill it is clear that the present species does not belong in *Ispidina*, and I prefer not to unite *Corythornis* with *Alcedo*, as Professor Neumann (1908) and Dr. Laubmann¹ have done. It is certainly superfluous to recognize *Ispidella* Mathews² for this one species.

The range of *leopoldi* probably includes most of the forest of the Upper Congo, but so far very few specimens have been obtained, from the middle Congo to the Ituri. Our single example—the only one seen—was found along a small forest brook. I do not know why it was never encountered along the heavily forested banks of the Ituri or Aruwimi, although Dr. Schouteden believes he saw it on the Itimbiri. It may be of interest to add that in this region of dense woodland, unbroken save for the clearings of man, *Corythornis cristata* is extremely rare even along the banks of large rivers.

In August, 1930, a native at Lukolela brought me the flat skin of an adult which he had captured but a day or two before. Prolonged search failed to reveal any more. Whitman's example from Bumba was seen to fly up from the river bank into a shop, where it was captured.

In its ways of life this kingfisher no doubt resembles *C. cristata*, though living exclusively along water in the heavy forest. It seems to be a very rare bird everywhere.

[*Corythornis leucogaster batesi* Chapin]

Corythornis leucogaster batesi CHAPIN, 1922, Ibis, p. 442 (type locality: Bitye, Cameroon). BANNERMAN, 1933, 'Birds Trop. W. Afr.,' III, p. 256.—*Ispidina leucogaster* SHARPE, 1892, 'Cat. Birds Brit. Mus.,' XVII, p. 193 (Landana).—*Alcedo leucogaster batesi* LAUBMANN, 1926, Anz. Orn. Ges. Bayern, No. 10, p. 91.

This subspecies is certain to be found in the Mayombe forest, for it has been obtained near Landana by Petit, and by Braun at Quicolungo in northern Angola.³

¹ 1924, Archiv f. Naturg., LXXXIX, Abt. A, pp. 190–196.

² 1918, 'Birds of Australia,' VII, p. 97.

³ Sick, 1934, O. Mb., p. 167.

In the southern Cameroon it is a much more common bird along forested streams than is *leopoldi* in the Congo. Bates found that it captures aquatic insects and frogs, rather than fish, and he dug out an empty nesting-tunnel in a bank.

***Corythornis cristata cristata* (Pallas)**

Alcedo cristata PALLAS, 1764, in Vroeg, 'Catalogue,' Adumbr., No., 55, Pl. 1 (type locality: Cape of Good Hope). REICHENOW, 1887, J. f. O., p. 307 (Kibongi).—*Corythornis cristatus* JOHNSTON, 1884, 'River Congo,' p. 366 (Congo R.).—*Corythornis cristata* DUBOIS, 1886, Bull. Mus. Roy. Hist. Nat. Belg., IV, p. 148 (L. Tanganyika). MATSCHIE, 1887, J. f. O., p. 151 (mouth of Mkombe R.). CHAPIN, 1922, Ibis, p. 445 (Ituri); 1926, Bull. A. M. N. H., LIII, p. 5. SCHOUTEDEN, 1923, Rev. Z. A., XI, pp. 323, 392 (Basongo; Luebo; Kabambaie; Kwamouth); 1924, idem, XII, p. 413 (Eala; Ikengo); 1925, idem, XIII, p. 9 (Bolobo region); 1926, idem, XIII, p. 191 (Banana; Boma); 1930, idem, XVIII, p. 282 (Kafubu R.); 1936, Ann. Mus. Congo, Zool., I, f. 2, p. 87 (Kotili; Djamba; Buta; Panga; Niangara; Mauda; Dungu; Faradje; Mahagi Port).—*Corythornis cyanostigma* SHARPE, 1892, 'Cat. Birds Brit. Mus.,' XVII, p. 163 (Landana). OUSTALET, 1893, Naturaliste, VII, p. 125. EMIN, 1894, J. f. O., p. 168 (old Irumu). REICHENOW, 1902, 'Vög. Afr.,' II, p. 289 ("Ubangi R."); 1911, 'Wiss. Ergeb. D. Z.-Afr. Exp.,' III, p. 290 (L. Edward; L. Kivu; Usumbura); 1923, Mitt. Naturh. Mus. Hamburg, XL, p. 63 (Lupungu). DUBOIS, 1905, Ann. Mus. Congo, Zool., I, f. 1, p. 33 (Mpala; Uelle; Lower Congo). NEAVE, 1910, Ibis, p. 109 (L. Bangweolo). ROTHSCILD, 1910, B. B. O. C., XXVII, p. 14 (Kasongo; Kwidjwi Is.). SALVADORI, 1914, Ann. Mus. Zool. Napoli, IV, No. 10, p. 18. LÖNNBERG, 1917, Arkiv f. Zool., X, No. 24, p. 20 (Kabare; Rutshuru). MENEGAUX, 1918, Rev. Fr. O., V, p. 258 (Zambi). SCHOUTEDEN, 1918, Rev. Z. A., V, p. 249 (Beni; Kabare; old Mission St. Gustave; Uvira); 1935, Bull. C. Z. C., XII, pp. 9, 62 (Buta; Gabiro). SCHUBOTZ, 1921, 'Tageb. Emin Pascha,' VI, p. 110 (Tingasi). DE RIEMAECKER, 1927, Rev. Z. A., XIV, p. 271 (Bukama).—*Corythornis galerita* DUBOIS, 1905, Ann. Mus. Congo, Zool., I, f. 1, p. 33 (Banalia).—*Corythornis cristata cristata* SCLATER, 1922, B. B. O. C., XLII, p. 47. BANNERMAN, 1922, Rev. Z. A., X, p. 158; 1933, 'Birds Trop. W. Afr.,' III, p. 251, Pl. VIII. STONE, 1936, Proc. Acad. Nat. Sci. Phila., LXXXVIII, p. 561 (Kasenyi; Ekibondo).—*Alcedo* (*Corythornis*) *cristata cristata* LAUBMANN, 1924, Archiv f. Naturg., Berlin, LXXXIX (1923), p. 196.—*Alcedo cristata galerita* SALOMONSEN, 1934, J. f. O., pp. 240, 241, 245.

SPECIMENS.—Lukolela, ♂; ♀, July 17. Bumba, im., July 29. Stanleyville ♂, Aug. 10; ♂ im., Aug. 11. Niangara, ♀ im., Jan. 21. Dungu, im., Jan. 27. Faradje, 3 ♂, Feb. 7, Mar. 26, Dec. 3; ♂ im., Nov. 26.

ADULTS.—Iris dark brown, bill and feet rather light scarlet.

IMMATURE.—Bill blackish with some orange on base of maxilla and beneath mandible; feet orange-red, but dark brown in front.

DISTRIBUTION OF THE SPECIES.—Most of Africa south of the Sahara, as well as Princes Island and São Tomé. A near ally, *C. vintsioides* (Eydoux and Gervais), inhabits Madagascar and the Cormoro Islands.

C. c. nais Kaup of Princes Island is distinguished by the deep blue, not greenish blue, barring of the crown-feathers. *C. c. thomensis* Salvadori of São Tomé has more greenish bars on the crown, but agrees with *nais* in having some dusky spotting on the anterior malar region. This spotting is wanting in adults of the mainland form, *C. c. cristata*, which has greenish-blue bars and margins on the long crown-feathers. The last-named race extends over a vast area, from Cape Town to Senegal, Nubia, Eritrea, and the Hadhramaut.¹

As Grote² and Salomonsen (1934) have pointed out, South African specimens have slightly longer wings than those of Upper Guinea, but the Congo lies in the area of intergradation, and I do not see how the ranges of any further subspecies could be delimited.³ In the Congo the shortest-winged birds (52.5–53 mm.) are found near Lukolela and Eala, the longest-winged (58–61 mm.) in the highlands of the Kivu and

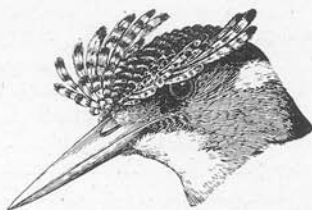


Fig. 23. *Corythornis c. cristata*, with crest somewhat erected. $\times 3/4$.

Ruanda. A half-dozen from the Upper Katanga measure 56–58 mm.

The malachite kingfisher is extremely rare in the forested southern Cameroon and in the central Ituri forest. Along the Ituri and Aruwimi rivers, from Penge to Banalia, I noted it only once, at Avakubi. Along the forested section of the Congo River it is rather frequent; and in all the savanna districts it is common near water, even up to 6500 feet in the Kivu. A favorite perch is a twig or a reed directly over the water, from which it can dive suddenly with a splash as diminutive as itself, or fly off low over the water with fast-beating wings. It has the same habit as *Ispidina* of raising its head with a slight jerk. One seldom sees the crest erected save in wounded birds. Instead of rising in the median plane it is spread into a circular tuft, some feathers at the sides of the forehead even pointing forward over the nostrils.

¹ See Bates, 1938, *Ibis*, p. 456.

² 1932, *O. Mb.*, pp. 23, 24.

³ The status of *C. c. longirostris* Roberts, 1932, *Ann. Transvaal Mus.*, XV, p. 25 (Kabulabula, Chobe R.) seems uncertain.

In the savanna districts breeding probably takes place during the rains. At Bumba on July 29 I found a nesting-tunnel about two feet in length, in the side of a small ditch. The white eggs of this kingfisher are known to number four to six, and measurements have been given as 18.5–19.3 mm. \times 14.9–15.5.

Corythornis cristata occasionally eats small frogs and fish; but in the six stomachs I examined there were only pieces of fresh-water shrimps or prawns, in four instances, and bits of beetles and a grasshopper, in the other two.

KEY TO THE AFRICAN SPECIES OF *ALCEDO*

Upperparts black, washed with deep blue, middle of back and rump bright cobalt or even deeper blue; breast and abdomen rich rufous....*A. quadribrachys*.
Upperparts more greenish blue, with scarcely any black, middle of back and rump turquoise blue; breast and abdomen light buff to pale cinnamon.....*A. semitorquata*.

Alcedo quadribrachys guentheri Sharpe

Alcedo guentheri SHARPE, 1892, 'Cat. Birds Brit. Mus.,' XVII, p. 156, Pl. iv, fig. 2 (type locality: Mt. Cameroon).—*Alcedo quadribrachys* SHARPE, 1884, Journ. Linn. Soc. Lond., Zool., XVII, p. 435 (Semio; Ndoruma). REICHENOW, 1887, J. f. O., p. 307 (Kibongi). OUSTALET, 1893, Naturaliste, VII, p. 125. SCHOUTEDEN, 1918, Rev. Z. A., V, p. 249 (Zambo; L. Edward); 1930, Bull. C. Z. C., VII, p. 82; 1935, idem, XII, p. 62 (Buta).—*Alcedo* sp. JOHNSTON, 1884, 'River Congo,' p. 366 (Stanley Pool-Bolobo).—*Alcedo quadribrachys guentheri* HARTERT, 1900, Nov. Zool., p. 34 (Panga). BANNERMAN, 1922, Rev. Z. A., X, p. 157; 1933, 'Birds Trop. W. Afr.,' III, p. 250, Pl. vii (Wembi on Ubangi R.). SCHOUTEDEN, 1923, Rev. Z. A., XI, pp. 323, 392 (Tshikapa; Kwamouth); 1925, idem, XIII, p. 9 (Kunungu); 1936, Ann. Mus. Congo, Zool., I, f. 2, p. 86 (Djamba; Kotili; Buta; Panga; Mauda; Faradje). W. L. SCLATER, 1924, 'Syst. Av. Æth.,' pt. I, p. 212.—*Alcedo güntheri* REICHENOW, 1902, 'Vög. Afr.,' II, p. 294 (Stanley Pool; "Ubangi R."; Kwango).—*Alcedo quadribrachys* var. *guentheri* DUBOIS, 1905, Ann. Mus. Congo, Zool., I, f. 1, p. 33 (Niam-Niam; Uelle; L. Leopold II).—*Alcedo quadribrachys güntheri* SCHOUTEDEN, 1926, Rev. Z. A., XIII, p. 191 (lower Congo R.).—*Alcedo (Pseudalcedo) quadribrachys guentheri* LAUBMANN, 1924, Archiv f. Naturg., Berlin, LXXXIX (1923), p. 196.—*Alcedo guntneri* SCHOUTEDEN, 1935, Bull. C. Z. C., XII, p. 35 (Lukolela).

SPECIMENS.—Boma, sex ?, Dec. 31. Avakubi, 3 ♂, Jan. 4, Feb. 13, Aug. 28; 3 ♀, May 22, Aug. 30, Oct. 4; ♀ im., Dec. 22. Medje, 2 ♂, May 23, Aug. 26. Faradje-Dungu, ♀ im., Feb. 22.

ADULT AND IMMATURE MALE.—Iris very dark brown; bill black; feet orange-red to scarlet with black claws.

ADULT FEMALE.—Similar, but a little dark red beneath mandible and at corners of mouth.

DISTRIBUTION OF THE SPECIES.—From the Gambia to Uganda and northern Angola. *A. q. quadribrachys* Bonaparte inhabits forested Upper Guinea, and is replaced by *A. q. guentheri* from Southern Nigeria eastward to the Upper Uelle district, Entebbe in Uganda, Lake Edward, and no doubt the Manyema district. On the south this latter race reaches the Lower Congo, the Kwango River in Angola, the southern Kasai, and the vicinity of Lake Kisale. The Lower Guinea race is distinguished by the cobalt blue, instead of violet blue, on its back and rump.

Though primarily a forest bird, *A. q. guentheri* ranges far out along rivers or brooks in gallery forests. It is not uncommon throughout the forest belt, including the Mayombe, and I have found it at Boma. I was surprised to see one in a vast papyrus marsh at Kiyuyu on the Lualaba River, in August, 1927. A canoe-traveler on rivers like the Ituri may expect to encounter one or two almost every day, though they are not conspicuous, perching rather on low branches over the water shielded by foliage. Their call, rarely heard, is a fine chirp or peep. They do not hesitate to follow the smaller watercourses far into the virgin forest, and live there along brooks only a few yards wide.

At Avakubi, a little north of the equator, dissections indicated a short breeding season, beginning toward October when the streams were high. Nests are in tunnels dug in shady banks near water. A female was trapped at Avakubi on October 4 in her unfinished home. The eggs seem to be unknown; but a brood of five young was obtained by Bates in southern Cameroon in December. A single nestling would produce a continuous "fizzling" sound; and when it was removed, another always began to make the same noise.

Of seven stomachs examined by me, one was empty, six held single small fish or fish-bones, and two of these also contained pieces of small crabs.

Alcedo semitorquata Swainson

Alcedo semitorquata SWAINSON, 1823, 'Zool. Illustr.,' III, Pl. CLI (type locality: Great Fish R. in Cape Prov.). LAUBMANN, 1923, O. Mb., p. 65 (Kitungulu in Urungu). DE RIEMAECKER, 1927, Rev. Z. A., XIV, p. 271 (Makobo R. in Upper Katanga).

DISTRIBUTION OF THE SPECIES.—The half-collared kingfisher ranges from Cape Province north to Damaraland and Angola, and through eastern Africa to Abyssinia. Laubmann¹ claimed that Abyssinian

¹ 1925, Anz. Orn. Ges. Bayern, No. 9, p. 74.

specimens had wings averaging 86 mm. in length, those of southern Africa only 80.6. His Abyssinian form, *A. s. heuglini*, seems however not to be tenable.

This kingfisher was known to reach the Urungu district of Tanganyika Territory, near the southern end of Lake Tanganyika, and then was discovered in the Upper Katanga by De Riemaecker. Additional specimens have been taken by de Witte at Kakyelo on the Luombwa R., and at the confluence of that river with the Luapula. Their wings measure 84 and 86 mm.

There is a possibility that the species will be found in the Kivu district or Ruanda. At Lake Bunyoni, for instance, I saw a kingfisher flying over which seemed to be *semitorquata*; and this highland lake is not far beyond the Congo border.

In South Africa the half-collared kingfisher frequents the edges of rivers, where it nests in October and November in tunnels in the banks and lays three or four glossy white eggs, 22.8–25.4 mm. \times 19.8–20.3.

Subfamily Cerylinæ

Ceryle rudis rudis (Linnæus)

Alcedo rudis LINNÆUS, 1758, 'Syst. Nat.,' 10th Ed., p. 116 (type locality: Egypt). LEACH, 1818, in Tuckey, 'Narr. Exp. R. Zaire,' p. 408.—*Alcedo* PROF. C. SMITH, 1818, in Tuckey, 'Narr. Exp. R. Zaire,' p. 290 (Mampenga Is., lower Congo R.).—*Ceryle rudis* JOHNSTON, 1884, 'River Congo,' p. 366 (Congo R.). SCHALOW, 1886, J. f. O., p. 417 (Lufuku R.); 1887, idem, p. 236 (Marungu; Urua; Katanga). DUBOIS, 1886, Bull. Mus. Roy. Hist. Nat. Belg., IV, p. 148 (L. Tanganyika); 1905, Ann. Mus. Congo, Zool., I, f. 1, p. 33 (Banalia; Umangi; L. Leopold II; Mayombe). MATSCHIE, 1887, J. f. O., p. 151. BÜTTIKOFER, 1888, Notes Leyden Mus., X, p. 211 (Ango-Ango). DYBOWSKI, 1893, 'La Route du Tchad,' p. 116 (just above Stanley Pool). OUSTALET, 1893, Naturaliste, VII, p. 125. REICHENOW, 1902, 'Vög. Afr.,' II, p. 295 ('Ubangi R. '); 1911, 'Wiss. Ergeb. D. Z.-Afr. Exp.,' III, p. 290 (L. Edward; L. Kivu; Kisenyi). SALVADORI, 1907, Boll. Mus. Zool. Anat. Torino, XXII, No. 570, p. 3 (Lukonzolwa); 1914, Ann. Mus. Zool. Napoli, IV, No. 10, p. 18 (Luapula R.). NEAVE, 1910, Ibis, p. 108 (L. Bangweolo). SASSI, 1912, Ann. Naturh. Hofmus. Wien, XXVI, p. 365 (Ishangi). MOURITZ, 1914, Ibis, p. 31 (S. E. Katanga). LÖNNBERG, 1917, Arkiv f. Zool., X, No. 24, p. 21 (Kabare; Kasindi). SCHOUTEDEN, 1918, Rev. Z. A., V, p. 250 (Molekera; Kaniki; Uvira; Baraka; Beni); 1920, idem, VII, p. 190 (Malela); 1930, idem, XVIII, p. 282 (Lubumbashi R.; Kafubu R.). EMIN, 1919, in Stuhlmann, 'Tageb. Emin Pascha,' II, p. 73 (Mahagi); 1922, in Stuhlmann, 'Tageb. Emin Pascha,' III, pp. 209, 211. SCHUBOTZ, 1921, 'Tageb. Emin Pascha,' VI, p. 111 (Mswa). MENEGAUX, 1923, 'Voyage Babault Afr. Orient.,' Ois., p. 63.—*Ceryle rudis rudis* BANNERMAN, 1922, Rev. Z. A., X, p. 155. SCHOUTEDEN, 1923, Rev. Z. A., XI, pp. 324, 392 (from Basongo to Ngombe, Kasai; Kwamouth); 1924, idem, XII, pp. 265, 413 (Stanley Pool; Kidada; Eala; Bamanian; Bikoro; Tondou); 1925, idem, XIII, p. 9 (Bolobo region):

1926, idem, XIII, p. 191 (Banana); 1932, idem, XXII, p. 127 (Kisenyi); 1933, idem, XXII, p. 379; 1936, Ann. Mus. Congo, Zool., I, f. 2, p. 86 (Buta; Titule; Panga; Rungu; Niangara; Mahagi Port). GYLDESTOLPE, 1924, K. Svenska Vet. Akad. Handl., (3) I, No. 3, p. 275 (Goma). WORTHINGTON, 1929, 'Rep. Fishing Survey Lakes Albert and Kioga,' p. 122 (L. Albert). STONE, 1936, Proc. Acad. Nat. Sci. Phila., LXXXVIII, p. 561 (Kasenyi).

SPECIMENS.—Avakubi, ♂, Apr. 28. Nzoro, ♀, Aug. 1. Faradje, 3 ♂, Sept. 16, 19, Oct. 20; 3 ♀, May 23, Nov. 17, Dec. 3.

ADULTS.—Iris dark brown, bill and feet black.

DISTRIBUTION OF THE SPECIES.—Africa to southern China. *C. r. rudis* occupies all Africa south of the Sahara, Egypt, Syria, and Asia Minor, thence eastward to the Persian Gulf. *C. r. leucomelanura* Reichenbach continues the range to India, Ceylon, and perhaps Siam; and *C. r. insignis* Hartert, to Hainan and southern China.

Females of this kingfisher never show the second, narrower breast-band; but it may be lacking also in some males, presumably immature.¹

The pied kingfisher extends over the entire area of the Congo, wherever there are fair-sized rivers or lakes, except in the forested highlands. In more open countries it occurs up to 6500 feet in the eastern Congo, or 7500 feet in Abyssinia. It is not common on the lesser rivers in the forest belt; on the Ituri I saw few, never more than a pair, and only in April, May, and September. They may not breed there. On the Congo River, and most streams and lakes in the savannas, this characteristic bird is seen frequently, perching along the shore, hovering over the water, or diving for fish. The voice is rather weak, a rattle or dry chirping sound, very unlike that of *Megaceryle maxima*.

The method of hovering over the same spot is different from that of kestrels. Instead of flapping against the wind, it holds the axis of the body so nearly vertical that gravity alone keeps it stationary. Meanwhile the head is bent forward and the bird watches the water below.²

About the lakes of the eastern Congo considerable numbers are sometimes seen together. As many as forty or fifty pairs may nest in one place, and a bank only a foot high may furnish a suitable site for excavating their tunnels, 3 to 10 feet long. The white eggs number four to six, 26–30 mm. × 21–24.

***Megaceryle maxima maxima* (Pallas)**

Alcedo maxima PALLAS, 1769, 'Spic. Zool.,' f. VI, p. 14 (type locality: Cape of Good Hope).—?*Alcedo* sp. SCHALOW, 1886, J. f. O., p. 412 (Mpala).—*Ceryle mazima*

¹ See Miller, 1912, Bull. A. M. N. H., XXXI, p. 302.

² See diagrams in Hankin, 1913, 'Animal Flight,' pp. 152–155.

SCHALOW, 1886, J. f. O., pp. 412, 428 (Lufuku R.); 1887, idem, p. 236. DUBOIS, 1886, Bull. Mus. Roy. Hist. Nat. Belg., IV, p. 148 (L. Tanganyika); 1905, Ann. Mus. Congo, Zool., I, f. 1, p. 33 (in part. Pweto; Moliro). MATSCHIE, 1887, J. f. O., p. 151. REICHENOW, 1902, 'Vög. Afr.', II, p. 298 (in part); 1911, 'Wiss. Ergeb. D. Z.-Afr. Exp.', III, p. 290. SALVADORI, 1907, Boll. Mus. Zool. Anat. Torino, XXII, No. 570, p. 3 (Lukonzolwa); 1914, Ann. Mus. Zool. Napoli, IV, No. 10, p. 18 (L. Bangweolo). O.-GRANT, 1908, Ibis, p. 315 (N. W. of L. Tanganyika). NEAVE, 1910, Ibis, p. 109 (Katanga). MOURITZ, 1914, Ibis, p. 31 (S. E. Katanga). DE RIEMAECKER, 1927, Rev. Z. A., XIV, p. 271 (Lubumbashi R.). LAUBMANN, 1929, Verh. VI Internat. Orn.-Kongr. Kopenhagen 1926, p. 185.—*Megaceryle maxima sharpii* SCHOUTEDEN, 1936, Ann. Mus. Congo, Zool., I, f. 2, p. 86 (in part. Bukama).

SPECIMEN.—Dungu, ♂, June 5.

DISTRIBUTION OF THE SPECIES.—From the Gambia, Sudan, and Abyssinia to the Cape. Almost the whole of this area is occupied by *M. m. maxima*, with conspicuous white spots on crown and back. But in forested Upper and Lower Guinea, and some adjacent regions, the majority of birds are darker above, with much finer spotting, and the middle of the upper back often unspotted. These dark birds constitute a valid race, *M. m. gigantea*, although in the border regions they may be found together with *maxima*.

In the Congo the species is found everywhere, with the exception of the mountains, but *M. m. maxima* is relatively rare except in the Katanga and perhaps along the eastern border. Only one of our specimens from the Upper Uelle can be referred to that race; and of the Congo specimens in Tervueren only a small minority are sufficiently spotted for *maxima*. They come from Bukama and Lukafu. I have seen one skin of *maxima* from Nyanza on Lake Tanganyika; but most specimens from Lake Kivu and Lake Edward are closer to *gigantea*, though somewhat intermediate. One from Mahagi Port is unexpectedly dark.

In view of these facts, no attempt to arrange synonymies can be successful without examination of every specimen. Further details of distribution and habits will be found under the following subspecies.¹

Megaceryle maxima gigantea (Swainson)

Ispida gigantea SWAINSON, 1837, 'Birds W. Afr.', II, p. 93, Pl. XI ("Senegal," but type probably from farther S. E.).—*Alcedo maxima* var.? LEACH, 1818, in Tuckey, 'Narr. Exp. R. Zaire,' p. 408 (Lower Congo).—*Ceryle maxima* HARTLAUB, 1857, 'Syst. Orn. Westafr.', p. 37 (Congo); 1884, J. f. O., p. 5. HEUGLIN, 1869, 'Orn. Nordost-Afr.', I, p. 186. SHARPE AND BOUVIER, 1877, Bull. Soc. Zool. France, II, p. 474 (Condé). JOHNSTON, 1884, 'River Congo,' pp. 122, 366, Fig. (up to Bolobo). OUSTALET, 1893, Naturaliste, VII, p. 125. REICHENOW, 1902, 'Vög. Afr.', II, p. 298

¹ For plumages see Laubmann, 1929, J. f. O., Festschr. E. Hartert, pp. 83-92.

(in part. "Ubangi R."; Congo). DUBOIS, 1905, Ann. Mus. Congo, Zool., I, f. 1, p. 33 (in part. Prov. Orientale; Kisantu). SASSI, 1912, Ann. Naturh. Hofmus. Wien, XXVI, p. 365 (L. Edward). LÖNNBERG, 1917, Arkiv f. Zool., X, No. 24, p. 21 (Kasindi). SCHOUTEDEN, 1918, Rev. Z. A., V, p. 250 (Baraka; Kivu; L. Edward).—*Ceryle sharpii* SHARPE, 1892, 'Cat. Birds Brit. Mus.,' XVII, p. 120.—*Ceryle maxima* "sharpiei" HARTERT, 1915, Nov. Zool., XXII, p. 256.—*Megaceryle maxima gigantea* SCHOUTEDEN, 1923, Rev. Z. A., XI, p. 393 (Kwamouth); 1925, idem, XIII, p. 9 (Bolobo); 1926, idem, XIII, p. 191 (Banc d'Anvers).—*Megaceryle maxima* GYLDENSTOLPE, 1924, K. Svenska Vet. Akad. Handl., (3) I, No. 3, p. 276 (L. Kivu). SCHOUTEDEN, 1924, Rev. Z. A., XII, pp. 265, 413 (Leopoldville; Eala-Bamania).—*Megaceryle maxima sharpii* W. L. SCLATER, 1924, 'Syst. Av. Æth.,' pt. 1, p. 211.—*Ceryle maxima* form *gigantea* LAUBMANN, 1929, Verh. VI Internat. Orn.-Kongr. Kopenhagen 1926, p. 186, map (Chinchoxo).—*Megaceryle maxima sharpii* FRIEDMANN, 1930, Bull. 153, U. S. Nat. Mus., p. 341. SCHOUTEDEN, 1936, Ann. Mus. Congo, Zool., I, f. 2, p. 86 (in part. Buta; Kisantu; Mahagi Port; L. Edward; Kivu; N. W. Tanganyika). BANNERMAN, 1933, 'Birds Trop. W. Afr.,' III, p. 248.—*Megaceryle maxima maxima* SCHOUTEDEN, 1932, Rev. Z. A., XXII, p. 127 (Kisenyi); 1936, Ann. Mus. Congo, Zool., I, f. 2, p. 86 (Kwamouth; Bolobo; Kunungu; Inkongo; Buta).

SPECIMENS.—Avakubi, ♂, Jan. 4; ♀, Feb. 28. Gamangui, ♂ juv., 2 ♀ juv., Feb. 26. Niangara, ♀, Mar. 4. Dungu, ♀, Mar. 2; ♀ im., Mar. 1. Faradje, ♂, Oct. 20; 2 ♀, Oct. 26, Dec. 6.

ADULTS.—Iris dark brown; bill black (often gray beneath base of mandible); feet blackish with upper portion, near tarsal joint, grayish green.

DISTRIBUTION.—Rather rare in forested Upper Guinea, though occurring in Liberia; common and widely distributed in Lower Guinea, from the Benue River east to Lake Albert, Lake Kivu, and Baraka on Lake Tanganyika. Its limit on the south is not well known, but may be expected to include the Kasai district and northern Angola. Within the borders of its range specimens of *maxima* are also found, as well as intermediate examples. Swainson's figure and description both fit this darker form, and many of his "Senegal" birds do not occur there. Having myself examined a specimen of *gigantea* from the Dukwia River, Liberia, I see no need to use the name *sharpii* of Gould.

M. m. gigantea is not restricted to the region of solid forest, for it is common in the Upper Uelle and beyond the southern edge of the forest belt. Specimens from Lake Kivu are a little more spotted than those of the Central Congo, but are mostly not typical *maxima*. The species has not been found much above 5000 feet in the Kivu.

This giant kingfisher is not sociable, and frequently attracts attention by flying about high over the trees with a loud complaining "kek-kek-kek-kek—," uttered by both sexes. It perches along the river banks, warily preferring boughs concealed in the foliage. Even

from a canoe it is often hard to see the bird until it flies out low over the stream. Along heavily forested rivers it is more numerous than *Ceryle rudis*, and does not hover like that species.

In the northeastern Congo the breeding season coincides with the drought, when perhaps fishing is easier. Nests are solitary, in banks near water; and one which I saw at Gamangui in February had its tunnel sloping downward at nearly 45 degrees to a distance of four feet. It contained three young. A female with ovary enlarged was secured at Faradje on December 6 and a young bird just out of the nest on March 1. At Bolobo Dr. Schouteden collected two half-grown nestlings on March 24, when the water is still low in the river there. In southern Africa nesting takes place in August and September. Eggs of this species are glossy white with very fine pitting, 44-46 mm. \times 34.5-37.3, in sets of three to five.

In the stomachs of six individuals I found only fish and their scales and bones, although they are credited elsewhere with eating crabs, frogs, reptiles, insects, and even a centipede.

FAMILY Meropidæ. BEE-EATERS

KEY TO THE AFRICAN GENERA OF MEROPIDÆ

- 1.—Outermost primary shorter than the primary-coverts or very little (not 10 mm.) longer, median pair of rectrices elongated. MEROPS, p. 314.
Outermost primary distinctly longer than the primary-coverts. 2.
- 2.—Tail very deeply forked. DICROCERCUS, p. 297.
Tail slightly emarginate, square, or with median rectrices elongated. 3.
- 3.—Median rectrices not prolonged beyond the rest. MELITTOPHAGUS,¹ p. 300.
Middle tail-feathers elongated. 4.
- 4.—Wing over 100 mm. long, throat black. MEROPOGON, p. 310.
Wing less than 100 mm. 5.
- 5.—Back and wings green. AEROPS, p. 311.
Back and wings deep chestnut. MELITTOPHAGUS MÜLLERI,¹ p. 309.

Dicrocercus hirundineus hirundineus (Lichtenstein)

Merops hirundineus A. LICHTENSTEIN, 1793, 'Cat. Rer. Rar. Hamburg,' p. 21 (type locality: Orange R.—Levaillant, 1806).—*Merops hirundo* SCHALOW, 1886, J. f. O., p. 420 ('Lualaba' [= Luvua R.]).—*Melittophagus hirundineus* MATSCHIE, 1887, J. f. O., p. 151.—*Dicrocercus hirundineus* REICHENOW, 1902, 'Vög. Afr.,' II, p. 315. NEAVE, 1910, Ibis, p. 112 (Lualaba R.; Lupupa R. [= Lufupa]). SCHOUTEDEN, 1918, Rev. Z. A., V, p. 251 (Manakwa). DE RIEMAECKER, 1927, Rev. Z. A., XIV, p. 269 (Elisabethville; Tambwe).—*Dicrocercus hirundineus hirundineus* C. GRANT,

¹ One species, *M. mülleri*, not infrequently has the two middle tail-feathers slightly longer than the remainder, but rather broad and blunt at the tips. In all its other characters this species agrees with *Melittophagus*.

1915, Ibis, p. 292. SCHOUTEDEN, 1923, Rev. Z. A., XI, p. 324 (Tshisika). LYNES, 1938, Rev. Z. A., XXXI, p. 110 (Kilembe).

DISTRIBUTION OF THE SPECIES.—Africa south of the Sahara, but not in forests of west and center. The three subspecies are distinguished by color-characters. *D. h. hirundineus*, with the forehead green, extends from Natal and the Orange River northward to Dar-es-Salaam, the west shore of Lake Tanganyika, and the Cuanza River in Angola. Within our limits it inhabits the southern savannas from the Upper Katanga to the Manyema, the Kasai, and probably the Kwango district.

D. h. chrysolaimus (Jardine and Selby) occupies the savannas of Upper Guinea, from Senegal to northern Cameroon and Lake Chad.¹ The forehead and a supraloral stripe are light bluish. In the intermediate region, near the eastern Sudan, lives *D. h. heuglini*, differing from *chrysolaimus* mainly in the darker blue of its chest-band and upper tail-coverts. Young birds of this species have the whole throat greenish and lack the chest-band.

Neave (1910) noted that *Dicrocercus h. hirundineus* in the Upper Katanga frequented the savanna woods. Though usually solitary, it forms family parties of as many as five in the wet season. The Congo Museum has specimens also from Kinda, Lake Musolo, and Kabalo. This bee-eater probably nests in the southeastern Congo in the latter part of the dry season, toward August or September. Nests have been found in Damaraland and in Portuguese East Africa in October. They are horizontal tunnels in soft earthen banks, about three feet long, and contain three or four eggs. The latter are white and glossy, oval or nearly spherical, measuring 20–21.3 mm. \times 18–19.

***Dicrocercus hirundineus heuglini* Neumann**

Dicrocercus hirundineus heuglini NEUMANN, 1906, B. B. O. C., XVI, p. 113 (type locality: Bongo, Bahr-el-Ghazal). SCLATER AND M.-PRAED, 1919, Ibis, p. 663 (Yambio; Yei). SCHOUTEDEN 1936, Ann. Mus. Congo, Zool., I, f. 2, p. 89 (Faradje; Mahagi Port).

SPECIMENS.—Nzoro, ♀, ♀ im., Apr. 16. Faradje, 2 ♂, Oct. 27; 2 ♀, Sept. 12, Oct. 27. Aba, ♂, Dec. 13. Garamba, ♂, June 19.

ADULTS.—Iris red, bill black, feet dark gray.

DISTRIBUTION.—Upper White Nile and Bahr-el-Ghazal east to the Omo River in southern Abyssinia, and south to northern Uganda and

¹ A mounted specimen of *D. h. chrysolaimus*, in the American Museum purchased from Verreaux Frères, is labeled "Gabon"; but the locality is evidently erroneous. It seems possible that the race may reach the Ubangi district of the Congo.

the savannas of the Upper Uelle. We found it one of the least conspicuous and most silent of the bee-eaters, living in the dry upland savanna, not along watercourses, in parties of two to five. Small trees amid the grass serve as perches. Adult specimens taken from June to



Fig. 24. *Dicrocercus hirundineus heuglini*. $\times 2/3$.

December were not in breeding condition. It is clear that the nesting season is short, coming at the end of the dry season. We saw young in the first dull-green plumage, accompanied by adults, near Nzoro in April, and at Garamba in June and July. Heuglin observed the young in the Bahr-el-Ghazal in August, probably because the rains come later a little to the north.

KEY TO THE CONGO SPECIES OF *MELITTOPHAGUS*

- 1.—Throat red.....2.
Throat yellow.....5.
- 2.—Upper tail-coverts green, the same as the back; lower breast cinnamon-brown.....*M. bullocki*.
Upper tail-coverts blue, different from the back.....3.
- 3.—Back and wings chestnut or rufous.....*M. mülleri*.
Back and wings green or black.....4.
- 4.—Back green, breast cinnamon-brown; forehead and eyebrow whitish.....*M. bullockoides*.
Back black; breast black, streaked or spotted with blue...*M. gularis*.
- 5.—Tail more than 85 mm. long; wings exceeding 95 mm.; chest-band black tinged with blue.....*M. lafresnayii oreobates*.
Tail less than 80 mm. long; wings less than 95 mm.; chest-band black, blue-black, or blue.....6.
- 6.—Lateral border of yellow throat white; chest-band deep blue or blue-black.....*M. variegatus*.
Yellow throat without white lateral border; chest-band always black, with only its anterior edge blue or green.....*M. pusillus*.

Melittophagus pusillus pusillus (Müller)

Merops pusillus P. L. S. MÜLLER, 1776, in Linnæus, 'Syst. Nat. Suppl.,' p. 95 (type locality: Senegal, ex Buffon).—*Melittophagus pusillus meridionalis* SCHOUTEDEN, 1936, Ann. Mus. Congo Zool., I, f. 2, p. 88 (in part. Buta).

SPECIMENS.—Bafwabaka, ♂, Jan. 11. Medje, 2 ♂, Jan. 18, 20; 2 ♀, Jan. 20.

ADULTS.—Iris bright red; bill black; feet very dark brown.

DISTRIBUTION OF THE SPECIES.—Senegal to Nubia and the Danakil coast, south to Natal, but wanting in the heavy forests of Upper and Lower Guinea. Four subspecies are recognized. *M. p. pusillus* extends from Senegal to the Lake Chad district, and just along the northern edge of the Lower Guinea forest east to the northern Ituri. In this race there is usually no blue superciliary line, a narrow one being present in *M. p. ocularis* of the eastern Sudan and Uelle. *M. p. meridionalis* of eastern and southern Africa has a well-marked blue supercilium; and in *M. p. cyanostictus* Cabanis, from southern Abyssinia and Somaliland to the Pangani River, the blue eyebrow is even more striking.¹

In the Congo *M. p. pusillus* is apparently confined to the northern edge of the lowland forest, coming into suitable clearings, as at Medje. Our specimens from that locality are certainly not *ocularis*, nor are those collected at Buta by Brother Hutsebaut. The Medje specimens were in breeding condition in January, their feet soiled with red earth. This

¹ The validity of *M. p. sharpei* Hartert, from Somaliland and southern Abyssinia, is doubtful.

is an excellent example of a strictly insectivorous bird nesting in the dry season.

***Melittophagus pusillus ocularis* Reichenow**

Melittophagus pusillus ocularis REICHENOW, 1900, O. Mb., p. 86 (type locality: Kordofan). SCHUBOTZ, 1921, 'Tageb. Emin Pascha,' VI, p. 113 (Makraka; Azande country; Buguera). BOWEN, 1933, Ecology, XIV, p. 266. Fig. 9 D.—*Melittophagus pusillus* var. *meridionalis* DUBOIS, 1905, Ann. Mus. Congo, Zool., I, f. 1, p. 34 (in part. "Ituri").—*Melittophagus pusillus meridionalis* SCLATER AND M.-PRAED, 1919, Ibis, p. 662 (Yei). SCHOUTEDEN, 1936, Ann. Mus. Congo, Zool., I, f. 2, p. 88) in part. Mauda; Mahagi Port).

SPECIMENS.—Niagara, ♀ im., June 22. Nzoro, ♂, Aug. 2. Faradje, 2 ♂, Mar. 4, Dec. 2; ♀, Sept. 16.

DISTRIBUTION.—From Eritrea and Nubia to the Bahr-el-Ghazal and the savannas of the northern Uelle. The two males from Faradje have a blue line over the posterior part of the eye; it is far less noticeable in the female. The male from Nzoro looks almost like typical *pusillus*.

From Niagara to Faradje we found it rather common, and especially fond of grassy marshes, where it would perch on the reed stems and circle out in pursuit of flying insects. Its note is a short weak chirp.

A young bird in the greenish juvenal plumage was taken in June; and a male in March had the testes somewhat enlarged, its bill being worn at the tip from digging the nest. We may count the months from March to May perhaps as the breeding season, this being the end of the drought and commencement of rains. Specimens taken from August to December were certainly in no condition to breed.

***Melittophagus pusillus meridionalis* Sharpe**

Melittophagus meridionalis SHARPE, 1892, 'Cat. Birds Brit. Mus.,' XVII, p. 45 (type locality: Natal). REICHENOW, 1900, O. Mb., pp. 86, 87; 1902, 'Vög. Afr.,' II, p. 307 (Kwango); 1911, 'Wiss. Ergeb. D. Z.-Afr. Exp.,' III, p. 291 (Rufua R. in Mpororo; L. Mohasi; Kisenyi; L. Edward; Semliki Plain; L. Kivu). LÖNNBERG, 1907, Arkiv f. Zool., III, No. 21, p. 9 (Mukimbungu); 1917, idem, X, No. 24, p. 21 (Kasindi; Rutshuru). SALVADORI, 1907, Boll. Mus. Zool. Anat. Torino, XXII, No. 570, p. 3 (Lukonzolwa). NEAVE, 1907, Mem. Proc. Manchester Lit. Phil. Soc., LI, No. 10, p. 37 (Ndola); 1910, Ibis, p. 112 (in part. Kambove). O.-GRANT, 1910, Tr. Z. S. Lond., XIX, p. 434 (Mubuku Valley, 5000 ft.; Mokia). SASSI, 1912, Ann. Naturh. Hofmus. Wien, XXVI, p. 370 (Urundi; Baraka; Uvira; Ruzizi Valley, Kisenyi; Rutshuru Plain). MOURITZ, 1914, Ibis, p. 33 (Kalonga). SCHOUTEDEN, 1918, Rev. Z. A., V, p. 250 (Beni; Lesse; Kongele; Lusaka; Mutum-Peke; Mboka; Bigoisagua; Dogodo; Molekera; old Mission St. Gustave; Mutiba; Kikomba; Mai-na-Kwenda).—*Merops erythropterus* LEACH, 1818, in Tuckey, 'Narr. Exp. R. Zaire,' p. 408 (Lower Congo). DUBOIS, 1886, Bull. Mus. Roy. Hist. Nat.

Belg., IV, p. 147 (L. Tanganyika). BÜTTIKOFER, 1888, Notes Leyden Mus., X, p. 211 (Banana).—*Merops pusillus* SHARPE, 1873, P. Z. S. Lond., p. 716 (Cabinda).—*Melittophagus pusillus* JOHNSTON, 1884, 'River Congo' p. 366 (up to Bolobo). MENEGAUX, 1918, Rev. Fr. O., V, p. 258 (Zambi).—*Merops cyanostictus* SCHALOW, 1886, J. f. O., pp. 417, 419, 423, 424 (Kauè R.; Lukumbi R.; L. Itambe).—*Melittophagus cyanostictus* MATSCHIE, 1887, J. f. O., p. 151. REICHENOW, 1887, J. f. O., pp. 305, 308 (Leopoldville; Kasongo). *Melittophagus angolensis* OUSTALET, 1893, Naturaliste, VII, p. 125 (Loango; Brazzaville).—*Melittophagus pusillus* var. *meridionalis* DUBOIS, 1905, Ann. Mus. Congo, Zool., I, f. 1, p. 34 (in part. Moliro; Kisantu; Lower Congo).—*Melittophagus pusillus meridionalis* PARROT, 1911, 'Wytzman's Genera Av.,' 14th pt., p. 12. C. H. B. GRANT, 1915, Ibis, p. 295 (L. Albert; Ruwenzori). SCHOUTEDEN, 1923, Rev. Z. A., XI, pp. 324, 393 (Basongo; Kabambaie; Kamaambi; Tshikapa; Kwamouth); 1924, idem, XII, pp. 266, 414 (Ikengo); 1925, idem, XIII, p. 10 (near Bolobo); 1926, idem, XIII, p. 192 (Moanda; Makaia-Ntete; Temvo); 1930, idem, XVIII, p. 282 (Kimilolo R. near Elisabethville); 1932, idem, XXII, p. 127 (Ngoma; Kisenyi); 1933, idem, XXII, p. 378; 1935, idem, XXVII, p. 401 (Gabirol). GYLDENSTOLPE, 1924, K. Svenska Vet. Akad. Handl., (3) I, No. 3, p. 266 (Ngoma; Kabare; Irumu). W. L. SCLATER, 1924, 'Syst. Av. Æth.,' pt. 1, p. 222. FRIEDMANN, 1930, Bull. 153, U. S. Nat. Mus., p. 363. BOWEN, 1931, Proc. Acad. Nat. Sci. Phila., LXXXIII, p. 276 (Bukama); 1933, Ecology, XIV, p. 266, Fig. 9D. BANNERMAN, 1933, 'Birds Trop. W. Afr.,' III, p. 301, footnote (Leopoldville). STONE, 1936, Proc. Acad. Nat. Sci. Phila., LXXXVIII, p. 562 (Kasenyi; near Bunia).

SPECIMENS.—Leopoldville, ♂, July 2; ♀, July 5. Kwamouth, ♂, ♀, July 14.

ADULTS.—Iris bright red, bill and feet black.

DISTRIBUTION.—Natal and Lake Ngami northward to Dar-es-Salaam, Uganda, and Lake Albert. On the west coast it reaches Landana, and in the Congo occupies all the southern and eastern savannas north to Kwamouth and Kasongo, the Kivu grasslands, the Semliki Valley, and the savannas west of Lake Albert.

They do not go in flocks, but about Leopoldville were common enough for a half-dozen to be seen in a few hours' walk. Not infrequently two will perch side by side on some dry branch, watching intently for insects. Even though they fly off from five to ten yards, they are apt to return to the same perch to eat their prize.

Dissection showed that they were breeding at Leopoldville and Kwamouth in July, the southern dry season. The nests of this bee-eater are small tunnels in banks or in the walls of ant-bear burrows. The glossy white eggs, four or five in number, measure 18.5–19.8 mm. × 15.3–17.

***Melittophagus variegatus variegatus* (Vieillot)**

Merops variegatus VIEILLOT, 1817, 'Nouv. Dict. Hist. Nat.,' XIV, p. 25 (type locality: Malimbe, Loango Coast).—*Merops angolensis* SHARPE AND BOUVIER, 1876,

Bull. Soc. Zool. France, I, p. 303 (Banana).—*Melittophagus variegatus* SHARPE, 1892, 'Cat. Birds Brit. Mus.,' XVII, p. 48 (Congo R.). OUSTALET, 1893, Naturaliste, VII, p. 125 (in part. Loango). REICHENOW, 1902, 'Vög. Afr.,' II, p. 304 (in part). DUBOIS, 1905, Ann. Mus. Congo, Zool., I, f. 1, p. 34 (Prov. Orientale; Equateurville; L. Leopold II). SASSI, 1912, Ann. Naturh. Hofmus. Wien, XXVI, p. 270 (in part. Ruzizi Valley). SCHOUTEDEN, 1918, Rev. Z. A., V, p. 250 (Baraka; Bigoisagua); 1926, idem, XIII, p. 191 (Vista).—*Melittophagus variegatus variegatus* C. GRANT, 1915, Ibis, p. 297, (in part. Congo R.). SCHOUTEDEN, 1923, Rev. Z. A., XI, pp. 324, 393 (Basongo; Luebo; Belenge; Kabambaie; Kwamouth); 1924, idem, XII, pp. 266, 414 (Kisantu; Kidada; Eala); 1925, idem, XIII, p. 10 (near Bolobo).

DISTRIBUTION OF THE SPECIES.—Cameroon east to the Kavirondo district, south to Lake Bangweolo, and west to Benguella and the Gaboon coast. Rare in the area of heavy forest, though occurring in large clearings, as at Bumba and near Coquilhatville. It lives mainly in the savannas bordering the forest area.

Melittophagus v. variegatus, usually with only a blue-green line above the eye, or none at all, is restricted mainly to the southern side of the forest belt, and extends from the Gaboon southward to Benguella, and eastward to the Ruzizi Valley. Its breast-band is deep blue.

M. v. loringi Mearns, with a bluer superciliary line, ranges from Uganda westward to the Cameroon. Southward this race probably extends to the Kivu highlands, but it differs very slightly from *variegatus*.

M. v. bangweoloensis Grant, without distinct superciliary line, and with blue-black chest-band, is known from Lake Bangweolo, the Kataranga, and possibly the middle Kwango River.

Typical *variegatus* seems to be fairly common near the Congo mouth, about Kunungu near Bolobo, and in the northern Kasai. Thence it extends to the Manyema, Uvira, and the Ruzizi Valley. Three specimens from near Eala have rather conspicuous bluish eyebrows, while those of the Lower Congo are the duldest and greenest there.

***Melittophagus variegatus loringi* Mearns**

Melittophagus variegatus loringi MEARNs, 1915, Proc. U. S. Nat. Mus., XLVIII, p. 393 (type locality: Butiaba, Uganda). GYLDENSTOLPE, 1924, K. Svenska Vet. Akad. Handl., (3) I, No. 3, p. 267 (Irumu). FRIEDMANN, 1930, 'Afr. Rep. Liberia Belg. Congo,' II, p. 755 (Bumba). SCHOUTEDEN, 1936, Ann. Mus. Congo, Zool., I, f. 2, p. 88 (Titule-Api; Niangara).—*Melittophagus variegatus* OUSTALET, 1893, Naturaliste, (2) VII, p. 125 (in part. Bangui). REICHENOW, 1902, 'Vög. Afr.,' II, p. 304 (in part); 1911, 'Wiss. Ergeb. D. Z.-Afr. Exp.,' III, p. 291 (Selters Spring, S. of Mt. Sabinyo; L. Mohasi). SASSI, 1912, Ann. Naturh. Hofmus. Wien, XXVI, p. 370 (in part. Rutshuru Plain; Irumu). LÖNNBERG, 1917, Arkiv f. Zool., X, No. 24, p. 21 (Rutshuru). SCHOUTEDEN, 1933, Rev. Z. A., XXII, p. 378 (Kisenyi-Ruhengere).—*Melittophagus variegatus variegatus* GRANT, 1915, Ibis, p. 297 (in part.

Uelle R.; L. Albert). SCLATER AND M.-PRAED, 1919, *Ibis*, p. 662. W. L. SCLATER, 1924, 'Syst. Av. Æth.,' pt. 1, p. 222 (in part). BANNERMAN, 1933, 'Birds Trop. W. Afr.,' III, p. 303. SCHOUTEDEN, 1935, *Rev. Z. A.*, XXVII, p. 401 (near Rutshuru R.). STONE, 1936, *Proc. Acad. Nat. Sci. Phila.*, LXXXVIII, p. 562 (Kasenyi).

DISTRIBUTION.—From the Kavirondo district and Uganda westward through the savannas just north of the Congo forest as far as the Cameroon, also southward along the eastern border of the Congo forest to Rutshuru and Ruanda. Cameroon specimens have a narrow stripe of blue over the eye, not quite so conspicuous as in those from Uganda. The validity of this race may certainly be debated. The differences are slight, the birds variable, but in a series of some fifty skins in the Congo Museum those of *variegatus* from the Lower Congo have very little blue-green on the supercilium. This strip becomes better marked toward the middle Congo River and Kasai, and specimens from Uvira are hard to distinguish from those taken just north of Lake Kivu. If a line can be drawn anywhere, it is best placed to the south of that lake. There is a slight average difference in wing-length, 82–89.5 mm. in birds from the Lower and Middle Congo, 88–93 mm. in those I have measured from the Uelle, Lake Edward, and northern Kivu.

The blue-banded bee-eater is not very common in the northern Congo. Alexander secured specimens in the vicinity of the upper Kibali River and it does occur here and there, westward to Bangui. I probably confused it with *M. pusillus* in life. But along the western shore of Lake Albert in 1926 I found it common at Kasenyi, especially near the water, perching on tall grass-stalks and darting out in pursuit of insects. It also lives in drier grassy spots near Irumu and Katwe, and was noted at Kasindi Landing, at Luofu, and along the Rutshuru River. Then at Lake Bunyoni (6700 feet) several were seen along the reedy shores. The white angle at the side of the neck enables one to distinguish it from *pusillus* in life. To confuse it with *M. l. oreobates* would be easy, but from my experience on the slopes of the mountains I feel sure that *M. variegatus* does not ascend above 5000 feet unless the vegetation is unusually open and grassy.

Its nesting habits have not been investigated. At Bumba, Christy obtained two young in complete juvenal dress on June 6, indicating that they breed toward the beginning of the rains.

Melittophagus variegatus bangweoloensis Grant

Melittophagus variegatus bangweoloensis C. GRANT, 1915, *B. B. O. C.*, XXXV, p. 55 (type locality: Luena distr., N. E. Rhodesia); 1915, *Ibis*, p. 297, Pl. IV. W. L. SCLATER, 1924, 'Syst. Av. Æth.,' pt. 1, p. 222.—*Melittophagus variegatus* DUBOIS,

1905, Ann. Mus. Congo, Zool., I, f. 1, p. 34 (in part. Pweto).—*Melittophagus meridionalis* NEAVE, 1910, Ibis, p. 112 (in part).—*Melittophagus pusillus meridionalis* LYNES AND SCLATER, 1934, Ibis, p. 38 (Nasondoye).

DISTRIBUTION.—From the country east of Lake Bangweolo to the Upper Katanga and probably the southern Lomami district. The British Museum has an adult female from Nasondoye. In the Congo Museum there are seven adults and two young from "Katanga," Bianco Plateau, Kando River near Tenke, and Mukula Gombe, as well as one from "Lomami," which agrees with the others. A young bird from Dilolo has an incomplete chest-band that seems a little bluer. Two examples from the middle Kwango River show considerable resemblance to Katanga birds.

M. v. bangweoloensis is best recognized by its very blackish chest-band and the lack of any bluish supercilium. The rufous just below the chest-band seems more restricted than in the other races, and the blackish tips of the outer rectrices likewise a little less extensive. The wings measure 81–87 mm. This race is probably not rare in the Katanga, but it is more easily mistaken for *M. pusillus* than is either of the others.

Melittophagus lafresnayii oreobates Sharpe

Melittophagus oreobates SHARPE, 1892, Ibis, p. 320 (type locality: Savé, Mt. Elgon). JACKSON, 1906, Ibis, p. 518 (Ruvenzori). O.-GRANT, 1910, Tr. Z. S. Lond., XIX, p. 434 (Luimi Valley, 5000 ft.; Mubuku Valley, 6000–7000 ft.). REICHENOW, 1911, 'Wiss. Ergeb. D. Z.-Afr. Exp.,' III, p. 291 (Mt. Karisimbi; N. W. of L. Tanganyika, 2000 m.). SASSI, 1912, Ann. Naturh. Hofmus. Wien, XXVI, p. 370. SCHOUTEDEN, 1918, Rev. Z. A., V, p. 250 (Biogo; Bigoisagua; Kibati; Dogodo; Tsisirongo; Mt. Kishasha; "Baraka").—*Melittophagus variegatus oreobates* PARROT, 1911, 'Wytzman's Genera Av., 14th pt., p. 13 (Kagera).—*Melittophagus lafresnayii oreobates* C. GRANT, 1915, Ibis, p. 296. FRIEDMAN, 1930, Bull. 153, U. S. Nat. Mus., p. 367.—*Melittophagus lafresnayei oreobates* GYLDENSTOLPE, 1924, K. Svenska Vet. Akad. Handl., (3) I, No. 3, p. 268 (Ngoma).—*Melittophagus lafresnayi oreobates* SCHOUTEDEN, 1932, Rev. Z. A., XXII, p. 127 (Lulenga; Burunga); 1933, idem, XXII, p. 378 (Kisenyi; Nyundo).

DISTRIBUTION OF THE SPECIES.—Eritrea and Abyssinia to Usambara and Lake Tanganyika. *M. l. lafresnayii* (Guérin), of the highlands of Northeast Africa, has an ultramarine chest-band and a great deal of blue on forehead and supercilium.¹ *M. l. oreobates*, with blackish chest-band and only a faint blue line above the eye, occupies the mountains of eastern Africa, from Lake Rudolf and Mt. Elgon to Kilimanjaro,

¹ Grant and M.-Praed, 1937, B. B. O. C., LVII, p. 129, regard *lafresnayii* as a race of *M. variegatus*, leaving *oreobates* as a distinct species.

Usambara, Ruwenzori, the Kivu district, and the highland northwest of Lake Tanganyika.

It is a bird of mountain forests, and especially their lower edges, where old clearings have grown up with bracken or elephant grass. Occasionally it has been taken as high as 8000 feet on Ruwenzori, but it is more common from 6000 to 7000 feet. Here it goes in pairs or small parties, perching on thin branches of trees, often dead ones, and flying out after insects. On the west slope of Ruwenzori 4950 feet was the lowest level at which they were observed. We found them feeding largely on bees similar to the ordinary honey bee.

In the mountains northwest of Lake Edward they were found as low as 4350 feet along the Biakobe River. On the Kivu Volcanoes the species seemed scarce, but it frequented the eucalyptus trees in the post of Kisenyi. The breeding season apparently commenced in March near Lake Edward, and a young bird in juvenal dress was taken at Kisenyi in July.

Near Phillipshof, at 5500 feet in the Usambara Mountains, Loveridge¹ found nests between December 20 and 30. They were tunnels in banks, making a sharp turn just before the nest-chamber, two to two and a half feet in. The eggs were in sets of three, white, but often stained by reddish earth, and measured 22×18 mm.

Melittophagus bullocki frenatus (Hartlaub)

Merops frenatus HARTLAUB, 1854, J. f. O., p. 257 (type locality: Sennar). SCHUBOTZ, 1921, 'Tageb. Emin Pascha,' VI, pp. 244, 256 (Dungu; Mbiambana).—*Melittophagus bullocki* SHARPE, 1892, 'Cat. Birds Brit. Mus.,' XVII, p. 51 (Langomeri).—*Melittophagus frenatus* SALVADORI, 1911, Ann. Mus. Civ. Stor. Nat. Genova, (3) V, p. 447 (Uelle). BERLIOZ, 1922, Bull. Mus. Paris, p. 344 (Gongo R.).—*Melittophagus bullocki frenatus* NEUMANN, 1905, J. f. O., p. 192. C. GRANT, 1915, Ibis, p. 298. SCLATER AND PRAED, 1919, Ibis, p. 663 (Meridi). W. L. SCLATER, 1924, 'Syst. Av. Æth.,' pt. 1, p. 223. SCHOUTEDEN, 1936, Ann. Mus. Congo, Zool., I, f. 2, p. 88 (Faradje; Mahagi Port). STONE, 1936, Proc. Acad. Nat. Sci. Phila., LXXXVIII, p. 562 (Kasenyi).

SPECIMENS.—Dungu, ♂, Feb. 2. Faradje, 12 ♂, Feb. 8, Mar. 3, 4, Aug. 11, 17, Dec. 25; 11 ♀, Feb. 13, Mar. 3, 4, Aug. 17, Dec. 18, 19, 25; 2 ♂ juv.; 3 ♀ juv., Mar. 3.

ADULTS.—Iris dark brown; bill black; feet dusky.

DISTRIBUTION OF THE SPECIES.—Senegal to Sennar and northern Uganda. *M. b. bullocki* (Vieillot) ranges from Senegal to northern

¹ 1928, P. Z. S. Lond., pp. 73, 74. See also Peters and Loveridge, 1936, Bull. Mus. Comp. Zool., LXXIX, pp. 165, 166.

Cameroon and the Shari River, while *M. b. frenatus*, with a blue line under the black stripe through the eye region, replaces it to the eastward. Both races live in savannas north of the forest belt, and do not quite reach the edge of the solid forest. We first saw *frenatus* at Nian-gara, and then found it common along the upper Uelle and Dungu rivers. It seemed to prefer the vicinity of watercourses, where it found suitable nesting sites and convenient places to hawk for insects. The ordinary call may be written "quip!" or "whip!"; but about the nest or when going to roost it gives several shorter, lower notes, rapidly repeated, "quip-p-p-p!" At Faradje the species is resident throughout the year.

Breeding takes place in the dry season, when the rivers are low. At different places on the Dungu River nesting colonies were seen from December to March, inclusive, some with upwards of 80 holes in a steep sandy bank. Sometimes only a quarter of them contained eggs, in sets of two to four, pure white, 19.6–21.1 mm. \times 17–17.2. These tunnels were about two feet in length with enlarged terminal chamber; and bee-eaters, like kingfishers, use no nesting material. Their feet wear two grooves in the floor; and before entering the birds often cling below the entrance, resting on their tails. Nestlings obtained at Faradje in March had heels with conspicuous swollen pads of translucent yellowish color, upon which they rest practically their whole weight.

Stomach examinations showed wasps, bees, and other insects. These included large wasps of the genus *Belonogaster*, which are beaten against the perch before being swallowed.

***Melittophagus bullockoides* (Smith)**

Merops bullockoides A. SMITH, 1834, S. Afr. Quart. Journ., II, p. 320 (type locality: South Africa). DE SOUSA, 1886, Journ. Sci. Lisboa, XI, p. 77 (Luapula); 1886, in Capello and Ivens, 'De Angola a Contra-Costa,' II, p. 444.—*Merops* BÖHM, 1886, J. f. O., p. 419 (Lukufui R.).—*Melittophagus* nov. sp. MATSCHIE, 1887, J. f. O., p. 151.—*Melittophagus bullockoides* (= *albifrons*) OUSTALET, 1893, Naturaliste, VII, p. 125 (Bassouni country near the Congo).—*Melittophagus bullockoides* REICHENOW, 1902, 'Vög. Afr.,' II, p. 311 ("Ubangi R."; Marungu). DUBOIS, 1905, Ann. Mus. Congo, Zool., I, f. 1, p. 34 (Katanga; Mayombe). SASSI, 1912, Ann. Naturh. Hofmus. Wien, XXVI, p. 371 (Ruzizi Valley). SCHOUTEDEN, 1918, Rev. Z. A., V, p. 251 (Kalembelembe; Luvungi; Plain Saint-Louis, at Kilewa; Risaci; Kamaniola; Assumba); 1924, Rev. Z. A., XII, p. 265 (Kidada); 1932, idem, XXII, p. 126 (Lulenga).—*Melittophagus bullockoides* LÖNNBERG, 1907, Arkiv f. Zool., III, No. 21, p. 10 (Mukimbungu).—*Melittophagus albifrons* NEAVE, 1910, Ibis, p. 112 (upper Lualaba R.).—*Melittophagus bullocki bullockoides* PARROT, 1911, 'Wytzman's Genera Av.,' 14th pt., p. 14 (Congo R.).

SPECIMEN.—Boma, ♀, Jan. 24.

ADULT FEMALE.—Iris dark brown, bill black, feet blackish.

DISTRIBUTION.—From Natal northward to the Mau Escarpment and the Turkwell River in East Africa, the Kivu district, savannas of the Manyema, the Lower Congo, the savannas of the Gaboon, and even Cape Lopez. In the Congo therefore, it inhabits the southern savannas, coming close to the border of the forest belt, except in the Kasai district. Reichenow (1902) was mistaken in listing this species from the Ubangi, and it is certainly very rare on the plateaus of the Katanga and Kivu. The Congo Museum has three skins from Kasenga on the Luapula River.

The specimen we collected at Boma in January was in non-breeding condition and fresh plumage. It was one of three perching on a baobab; the species was not abundant there. A male which I obtained in the Ruzizi Valley on July 18 showed only slight enlargement of the testes, and I believe the breeding season in the southern Congo to be in September. In the Zambesi district Millar collected two sets of four eggs, on October 4. They were pure white and glossy, 22.6–24.1 mm. \times 18.3–19.8.¹ The nests are in colonies, in tunnels in banks, and have also been found in Southern Rhodesia in September and in Kenya Colony in October.

Melittophagus gularis australis Reichenow

Melittophaga gularis australis REICHENOW, 1885, J. f. O., p. 222 ("Angola and Congo"; type in Berlin Mus. from Massadorf, Cameroon).—*Meropiscus gularis australis* REICHENOW, 1885, J. f. O., p. 468.—*Melittophagus gularis* SHELLEY, 1890, Ibis, p. 167 (Aruwimi R.). OUSTALET, 1893, Naturaliste, VII, p. 125; 1904, Bull. Mus. Paris, p. 436 (Moujimbo). EMIN, 1894, J. f. O., p. 168 (old Irumu; Bundeke, Uvamba). DUBOIS, 1905, Ann. Mus. Congo, Zool., I, f. 1, p. 34 (Kisantu; L. Leopold II).—*Melittophagus gularis* SHARPE, 1890, in Jameson, 'Story of Rear Column,' p. 407 (Yambuya).—*Melittophagus gularis australis* HARTERT, 1900, Nov. Zool., p. 34 (Kitima on Ituri R.). REICHENOW, 1902, 'Vög. Afr.,' II, p. 313 ("Ubangi R."; Luembo-Chissambo; Kitima; Stanley Pool); 1911, 'Wiss. Ergeb. D. Z.-Afr. Exp.,' III, p. 291 (Mawambi). LÖNNBERG, 1907, Arkiv f. Zool., III, No. 21, p. 10 (Kinyoyi). PARROT, 1911, 'Wytsman's Genera Av.,' 14th pt., p. 13, Pl., fig. 3. Beni; SASSI, 1912, Ann. Naturh. Hofmus. Wien, XXVI, p. 371 (Mts. E. of Rutshuru Plain; Ukaika). SCHOUTEDEN, 1914, Rev. Z. A., III, p. 265 (Kilo); 1918, idem, V, p. 251 (Lesse; Lamia; Ikanga; Assumba); 1923, idem, XI, p. 324 (Basongo; Luebo; Makumbi); 1924, idem, XII, pp. 266, 413 (Kidada; Eala; Bikoro); 1925, idem, XIII, p. 9 (Kunungu); 1926, idem, XIII, p. 191 (Lundu; Kisala; Kai Bumba); 1936, Ann. Mus. Congo, Zool., I, f. 2, p. 89 (Djamba; Kotili; Buta; Poko; Rungu; Medje). BANNERMAN, 1922, Rev. Z. A., X, p. 147; 1933, 'Birds Trop. W. Afr.,'

¹ Chubb, 1914, Ann. Durban Mus., I, p. 60.

III, p. 308 (Libokwa; Gwangi). GYLDENSTOLPE, 1924, K. Svenska Vet. Akad. Handl., (3) I, No. 3, p. 268. W. L. SCLATER, 1924, 'Syst. Av. Æth.,' pt. 1, p. 223. GROTE, 1925, J. f. O., p. 87 (Singa, on Ubangi R.). BLANCOU, 1933, Ois. R. F. O., (N. S.) III, p. 322 (Congo R.). STONE, 1936, Proc. Acad. Nat. Sci. Phila., LXXXVIII, p. 562 (Epulu R.).—*Melittophagus australis* SALVADORI, 1911, Ann. Mus. Civ. Stor. Nat. Genova, (3) V, p. 447 (Uelle).—*Mérops gularis* PETIT, 1926, 'Dix Années de Chasses,' p. 138 (Nzobe, in Mayombe).

SPECIMENS.—Boyulu, ♂, Sept. 22. Panga, ♂, Sept. 13. Avakubi, ♂, Nov. 5; ♀, Apr. 16. Gamangui, 2 ♂, Feb. 8. Medje, ♂, Jan. 18; 2 ♀, Jan. 18, Mar. 11. Penge, ♀, Apr. 19.

ADULTS.—Iris rather dark crimson; bill and feet black.

DISTRIBUTION OF THE SPECIES.—Sierra Leone to the eastern Congo and Angola. *M. g. gularis* (Shaw and Nodder) inhabits the Upper Guinea forests, east to Southern Nigeria, and *M. g. australis* those from the Cameroon to northern Angola and across the Congo to the Semliki Valley and the eastern side of the Rutshuru Plain. The latter race has only a faint green eyebrow or none at all, this stripe being blue in *gularis*.

The black bee-eater is a fairly common bird in the forests of the Lower and Upper Congo, and extends out farther into the gallery forests on the south than on the north. I have seen several specimens from Luluabourg. Nevertheless, it does not live in the depths of the forest, but is found in pairs usually sitting in tall trees near some open spot, partially cleared land, or the border of a plantation. Thence they fly out in pursuit of passing insects, but do not give any loud call. Among the insects eaten I noted one dragon-fly.

Dissections indicated that in the Ituri, just north of the equator, the breeding season lasts only from January to April. At Lukolela, just south of the equator, on September 19, I saw a bird fly from its nest, a tunnel sloping slightly downward into the base of an old termite hill. At Basongo, Dr. Schouteden obtained a well-grown nestling on July 19. In the southern Cameroon Bates¹ found two nests that were solitary holes in banks, containing two white eggs, 24–26 mm. × 20–21.

***Melittophagus mülleri mülleri* (Cassin)**

Meropiscus mülleri CASSIN, 1857, Proc. Phila. Acad. Sci., IX, p. 37 (type locality: River Muni, W. Africa).—*Melittophagus mulleri* DUBOIS, 1905, Ann. Mus. Congo, Zool., I, f. 1, p. 34 (Banalia).—*Melittophagus mülleri* REICHENOW, 1911, 'Wiss. Ergeb. D. Z.-Afr. Exp.,' III, p. 291 (Beni). SASSI, 1912, Ann. Naturh. Hofmus. Wien, XXVI, p. 371 (Moera; Beni-Mawambi; Ukaika). LÖNNBERG, 1917,

¹ 1909, Ibis, p. 24; 1927, idem, p. 25.

Arkiv f. Zool., X, No. 24, p. 21. SCHOUTEDEN, 1918, Rev. Z. A., V, p. 251 (Lumbia; Lesse). BEQUAERT, 1922, Bull. A. M. N. H., XLV, p. 311 (Bafwabaka). BLANCOU, 1933, Ois. R. F. O., (N. S.) III, p. 322 (Congo R.).—*Merops batesiana* BANNERMAN, 1919, B. B. O. C., XXXIX, p. 96 (Medje).—*Melittophagus mülleri mülleri* SCHOUTEDEN, 1923, Rev. Z. A., XI, p. 324 (Basongo; Luebo); 1924, idem, XII, p. 413 (Eala). GYLDENSTOLPE, 1924, K. Svenska Vet. Akad. Handl., (3) I, No. 3, p. 269 (Kartushi). W. L. SCLATER, 1924, 'Syst. Av. Æth.,' pt. 1, p. 223.—*Melittophagus mülleri mülleri* SCHOUTEDEN, 1925, Rev. Z. A., XIII, p. 9 (Kunungu).—*Melittophagus muelleri muelleri* BANNERMAN, 1933, 'Birds Trop. W. Afr.,' III, p. 309. SCHOUTEDEN, 1936, Ann. Mus. Congo, Zool., I, f. 2, p. 89 (Djamba; Kotili).

SPECIMENS.—Avakubi, ♂, Jan. 24; ♀, Oct. 26. Bafwabaka, ♂, Jan. 10. Medje, 5 ♂, July 2, Aug. 1, 2, 13, Sept. 17; 2 ♂ im., Aug. 2; ♀ im., Aug. 13.

ADULT MALE.—Iris rather dark red, bill and feet black.

DISTRIBUTION OF THE SPECIES.—Sierra Leone to the Congo and Kavirondo district. *M. m. mentalis* (Cabanis) is the Upper Guinea race, extending to coastal Cameroon and Fernando Po. *M. m. mülleri*, with paler bluish forehead and deeper maroon back, ranges from interior forested Cameroon and the Gaboon to the eastern margin of the Congo forest and south to Luluabourg in the Kasai. It is not known from the Mayombe. *M. m. yalensis* van Someren is supposedly a paler race from Elgon, Suk, and North Kavirondo; but two specimens from Kakamega look to me very like *mülleri* from the Ituri.

This dark-colored bee-eater from the forest region is a little less common than *M. gularis* in the Upper Congo, and likewise almost never found in the undergrowth of virgin forest. It prefers the edges of small openings in the forest, along roads or at the borders of old clearings. Three was the largest number I ever saw together, and no sound was heard from them. Rarely observed in the tops of high trees, they usually select lower perches on either dead or leafy branches. Adults taken at Medje from July to September were non-breeding, and the immature specimens indicate nesting there toward February or March, at the end of the dry period. In the Cameroon Bates obtained two nestlings from a two-foot tunnel in a bank.

***Meropogon breweri* Cassin**

Meropogon breweri CASSIN, 1859, Proc. Acad. Nat. Sci. Phila., XI, p. 34 (type locality: Ogobai R.). REICHENOW, 1902, 'Vög. Afr.,' II, p. 331 ('Ubangi R.'). CHAPIN, 1921, A. M. Nov., No. 17, p. 15 (Banalia). SCHOUTEDEN, 1923, Rev. Z. A., XI, p. 393 (Kwamouth); 1924, idem, XII, p. 266 (Leopoldville); 1933, Bull. C. Z. C., X, p. 10; 1935, idem, XI, p. 95 (Buta); 1936, Ann. Mus. Congo, Zool., I, f. 2, p. 89 (Djamba; Kotili; Titule). SCLATER, 1924, 'Syst. Av. Æth.,' pt. 1, p. 225 (Angu). GROTE, 1925, J. f. O., p. 86 (Nola-Mbaiki, Fr. Eq. Afr.).—*Merops breweri* SHARPE, 1892, 'Cat. Birds Brit. Mus.,' XVII, p. 86 (Shiloango). OUSTALET,

1893, *Naturaliste*, VII, p. 125.—*Merops brewer* DUBOIS, 1905, *Ann. Mus. Congo, Zool.*, I, f. 1, p. 34 (Prov. Orientale; Umangi).—*Meropogon braceri* SCHOUTEDEN, 1926, *Rev. Z. A.*, XIII, p. 192 (Moanda).—*Bombylonax breweri* BANNERMAN, 1933, 'Birds Trop. W. Afr.', III, p. 296, Fig. 82.

SPECIMEN.—Banalia, ♀, Sept. 21.

ADULT FEMALE.—Iris bright crimson, bill black, feet dark greenish gray.

DISTRIBUTION.—From the northern edge of the forest belt between the Sanga and Ubangi rivers south to the northern Kwango and central Kasai districts; westward to the Ogowe River in the Gaboon, and the coast south to the Congo mouth; eastward to Angu on the Uelle, Buta on the Itimbiri, and Banalia on the Aruwimi. Still unknown in the Cameroon proper, as it is in the whole eastern borderland of the Congo forest.

Evidently non-migratory, the species is mainly restricted to rivers. Father Callewaert sent us two males from Kabiseba on the Lulua River, 6° 30' S. The Congo Museum contains eight specimens from Buta, and in addition to those recorded by Dr. Schouteden, others from Kiniati in the Mayombe, Kunungu near Bolobo, Mongombo near Lisala, and the Kwilu River. Neither in the Ituri nor at Lukolela did I see this large black-headed bee-eater. Nowhere does it seem abundant, and perhaps it escapes observation because it so often perches in the trees along wooded rivers instead of flying out over the water. I have seen it only twice, first at a village just above Banalia and later on a wooded islet below Stanleyville. The voice is very weak, not apt to attract attention. Our specimen had eaten a beetle and a wasp. Wings of thirty-one skins from the Congo measure 117–125 mm. The sexes cannot always be distinguished by tail-length. Our female from Banalia has the attenuate median rectrices 171 mm. There may be an average difference, for six sexed as males in the Congo Museum have tails 151–179 mm. (next-to-median rectrices 42–64 mm. shorter) and five females 145–155 mm. (other rectrices 32–41 mm. shorter). In the juvenal plumage the crown-feathers are very broadly tipped with green. The nesting habits are unknown, but at Kotili, on January 3, Dr. Schouteden collected a female with an egg in her oviduct. At that time the river there would be low. The egg is white, not glossy, and measures 27.2×22.7 mm.

KEY TO THE SPECIES OF *AEROPS*

- 1.—Crown blackish, superciliary band and throat whitish, a black chest-band
 *A. albicollis*.
 Crown wholly light rufous, throat similar but paler, no breast-band....*A. boekmi*.

Aerops albicollis (Vieillot)

Merops albicollis VIEILLOT, 1817, 'Nouv. Dict. Hist. Nat.,' XIV, p. 15 (type locality: Senegal). REICHENOW, 1887, J. f. O., p. 306 (Stanleyville). SHELLEY, 1890, Ibis, p. 167 (Aruwimi R.). SHARPE, 1890, in Jameson, 'Story of Rear Column,' p. 411 (Yambuya). OUSTALET, 1893, Naturaliste, VII, p. 125 (Ubangi and Kemo R. districts). EMIN, 1894, J. f. O., p. 163 (Ndussuma). DUBOIS, 1905, Ann. Mus. Congo, Zool., I, f. 1, p. 34 (Prov. Orientale; Banalia; Umangi; L. Leopold II). BEQUAERT, 1922, Bull. A. M. N. H., XLV, p. 311 (Avakubi).—*Merops albicollis* SHARPE AND BOUVIER, 1877, Bull. Soc. Zool., France, II, p. 475 (Condé).—*Aerops albicollis* REICHENOW, 1902, 'Vög. Afr.,' II, p. 317 (Stanley Falls; Nyangabo). CHAPIN, 1916, A. M. Journ., p. 543; 1931, Nat. Hist., XXXI, p. 607 (Lukolela). LÖNNBERG, 1917, Arkiv f. Zool., X, No. 24, p. 21 (Rutshuru). SCHOUTEDEN, 1918, Rev. Z. A., V, p. 251 (Kilo; Zambo; Kongele; Kikanga; Karigi; Marissawa; Boga); 1920, idem, VII, p. 190 (Temvo). SCHUBOTZ, 1921, 'Tageb. Emin Pascha,' VI, p. 115 (Mangbetu country; Mswa). GYLDENSTOLPE, 1924, K. Svenska Vet. Akad. Handl., (3) I, No. 3, p. 270.—*Aerops albicollis major* PARROT, 1910, O. Mb., p. 12 (type locality: Bagamoyo, E. Africa. Also from Upper and Lower Congo). REICHENOW, 1911, 'Wiss. Ergeb. D. Z.-Afr. Exp.,' III, p. 292 (Mawambi).—*Aerops albicollis albicollis* PARROT, 1911, Wytsman's Genera Av., 14th pt., p. 9, Pl. fig. 2a. BANNERMAN, 1922, Rev. Z. A., X, p. 148; 1933, 'Birds Trop. W. Afr.,' III, p. 298, Fig. 83. SCHOUTEDEN, 1924, Rev. Z. A., XII, p. 414 (Ikengo); 1925, idem, XIII, p. 10 (Kunungu); 1926, idem, XIII, p. 192 (Ganda Sundi; Makaia Ntete). W. L. SCLATER, 1924, 'Syst. Av. Æth.,' pt. 1, p. 221. FRIEDMANN, 1930, Bull. 153, U. S. Nat. Mus., p. 360.—*Aerops albicollis major* PARROT, 1911, Wytsman's Genera Av., 14th pt., p. 9, Pl. fig. 2 (W. to centr. Africa and to Upper and Lower Congo). SCHOUTEDEN, 1914, Rev. Z. A., III, p. 265 (Kilo); 1935, idem, XXVII, p. 401 (Rutshuru bridge); 1936, Ann. Mus. Congo, Zool., I, f. 2, p. 88 (Kotili; Buta; Titule; Niangara; Mauda; Dungu; Mahagi Port). BANNERMAN, 1922, Rev. Z. A., X, p. 148 (Lower Belgian Congo).—*Merops (Aerops) albicollis* SASSI, 1912, Ann. Naturh. Hofmus. Wien, XXVI, p. 372 (Beni; Beni-Mawambi; Mawambi; Ukaika; Irumu).

SPECIMENS.—Boma, ♂, Jan. 25. Avakubi, 4 ♂, Nov. 25; ♀ im., Nov. 18. Bafwabaka, ♂, Jan. 2. Gamangui, 2 ♂, Jan. 28, Feb. 18. Medje, 2 ♂, Jan. 14, May 17; ♂ im., Jan. 17; ♀, Jan. 14. Niangara, ♂, Dec. 7.

ADULTS.—Iris bright red, bill black, feet light brownish green.

IMMATURE.—Iris brownish red, changing to dark brown on outer edge.

DISTRIBUTION OF THE SPECIES.—Senegal to Eritrea and southern Arabia, migrating southward to the Upper Guinea coast, Angola, Lake Leopold II, the Kivu district, and Tanganyika Territory to Dar-es-Salaam.

Specimens of the black-crowned bee-eater from East Africa and Southern Arabia have slightly longer wings than those from West Africa, the longest-winged specimen measuring 108 mm. The averages, as computed by Sclater and Mackworth-Praed¹ from 60 specimens evenly

¹ 1919, Ibis, p. 662.

distributed as to region, are: northern West Africa, 97.7; Sudan and Uganda, 99.7; northeast Africa and Arabia, 102.7. Our series of 10 adult males from the Ituri and Uelle gives an average wing-length of 100.25 mm., whereas the average for 8 adult males from the Mayombe, in the Congo Museum, is actually 101 mm. Friedmann (1930) finds the bill to be longer in eastern birds. Females have wings some 5 mm. shorter than the males. While it may be possible to distinguish between typical *albicollis*, breeding in the southern Sahara, and *A. a. major* Parrot, breeding in northeastern Africa and southern Arabia, the migrants to the Congo are mostly intermediates, and here the distinction becomes impractical.

This species nests nowhere in the Congo. Its old tunnels have been found by Bates in the southern Sahara, and its eggs were taken by Antinori in Abyssinia. It is a lowland bird, said to breed also near Khartoum and even in northern Kenya Colony.

Every year these bee-eaters revisit the greater part of the Congo except the southeast, in flocks composed of young and old. They become common in the Lower and Middle Congo, but seem not to reach the Kasai or Manyema districts. In the Uelle they make their appearance regularly soon after October 20, and at Avakubi in the Ituri forest were first observed on November 16 and 18 in two different years. There they very soon became numerous, and being fond of the large trees about clearings, were sure to be noticed. Toward nightfall they go to roost in large flocks, with pleasant twittering notes, composed mainly of a syllable sounding like "kleer" or "k-l-l-leer-r." The same calls are heard from birds migrating high overhead.

During the middle of the dry season they have all deserted the Uelle district for the moister forest to the south. In April they are still to be seen at Avakubi, and are common at Medje in mid-May. By the first week in June, however, the last have left the Uelle River. At Garamba I heard the unmistakable note of the last stragglers on June 12 and 15. I have seen a specimen collected at Berbera, Somaliland, on April 29, and there are others from the western border of Abyssinia on March 3 and 4. The breeding season is supposedly from July to September.

Like all bee-eaters, *Aerops albicollis* is entirely insectivorous. We examined five stomachs with such food, and noted winged ants in one of them.

Aerops boehmi (Reichenow)

Merops (Melittophagus) boehmi REICHENOW, 1882, Orn. Centralbl., p. 62 (type locality: Bumi, E. Africa).—*Merops boehmi* MOURITZ, 1914, Ibis, p. 34 (between Sakania and Mokambo Hills in Katanga).—*Aerops boehmi* PAGET-WILKES, 1926, S. Afr. Journ. Nat. Hist., VI, p. 65 (upper Kafue R. near Ndola).

DISTRIBUTION.—From Usambara and western Tanganyika Territory south to the lower Shire River and Tete on the Zambesi River. The one published record from Congo territory is that by Mouritz, possibly only a sight identification. But Rockefeller and Murphy secured three adult specimens in March, 1929, at Lake Suse, 3850 feet, in southern Marungu. They report the species as common there. Two adults were also collected by de Witte at Kakyelo on the Luombwa River.

Neave met with it only in the Lofu valley, south of Lake Tanganyika. "It has the habits of a *Melittophagus*," he wrote,¹ "rather than of a *Merops*, making short flights and constantly returning to the same perch. It haunts the edges of dense forests. I never saw it hawking high in the air as do *M. apiaster* and *M. natalensis*." Near Ndola, in Northern Rhodesia, Paget-Wilkes called it the commonest bee-eater in the district; but it evidently avoids the higher plateaus. Belcher stated that it nested in southern Nyasaland in October, laying four eggs.

KEY TO THE CONGO SPECIES OF **MEROPS**

- | | |
|--|---------------------------|
| 1.—Breast green or bluish..... | 2. |
| Breast pink or rose-color..... | 4. |
| 2.—Whole throat yellow, hind-neck rufous..... | <i>M. apiaster</i> . |
| Upper part of throat yellow or whitish, but lower portion reddish brown; hind-neck greenish..... | 3. |
| 3.—Crown green or bluish..... | <i>M. persicus</i> . |
| Crown olive-brown..... | <i>M. superciliosus</i> . |
| 4.—Back dark gray..... | <i>M. malimbicus</i> . |
| Back red..... | 5. |
| 5.—Throat bluish green or greenish blue..... | <i>M. nubicus</i> . |
| Throat rose-colored..... | <i>M. nubicoides</i> . |

Merops apiaster Linnæus

Merops apiaster LINNÆUS, 1758, 'Syst. Nat.,' 10th Ed., p. 117 (type locality: southern Europe). JOHNSTON, 1884, 'River Congo,' p. 366 (Lower Congo). DE SOUSA, 1886, Journ. Sci. Lisboa, XI, p. 77 (Tenke); 1886, in Capello and Ivens, 'De Angola a Contra-Costa,' II, p. 444. REICHENOW, 1887, J. f. O., p. 300 (Manyanga); 1902, 'Vög. Afr.,' II, p. 320; 1911, 'Wiss. Ergeb. D. Z.-Afr. Exp.,' III, p. 292 (Beni; Buyonde). SHARPE, 1892, 'Cat. Birds Brit. Mus.,' XVII, p. 63 (Congo R.). NEAVE,

¹ 1910, Ibis, p. 113.

1907, Mem. Proc. Manchester Lit. Phil. Soc., LI, No. 10, p. 39 (Msofu R.). O.-GRANT, 1910, Tr. Z. S. Lond., XIX, p. 435 (Luimi Valley, Ruwenzori, 6000 ft.). SASSI, 1912, Ann. Naturh. Hofmus. Wien, XXVI, p. 371 (Ukaika). MOURITZ, 1914, Ibis, p. 34 (Sakanika). LÖNNBERG, 1917, Arkiv f. Zool., X, No. 24, p. 22 (Rutshuru). SCHOUTEDEN, 1918, Rev. Z. A., V, p. 251 (Tsisirongo; Lisasa); 1930, idem, XVIII, p. 283 (Kafubu R.); 1933, idem, XXII, p. 378 (Kisenyi); 1936, Ann. Mus. Congo, Zool., I, f. 2, p. 88 (Dramba). DE RIEMAECKER, 1927, Rev. Z. A., XIV, p. 269 (Elisabethville). GROTE, 1930, Mitt. Zool. Mus. Berlin, XVI, p. 57. BANNERMAN, 1933, 'Birds Trop. W. Afr.', III, p. 283, Fig. 78. BERLIOZ, 1936, Bull. Mus. Paris, (2) VIII, p. 328 (Costermansville).

SPECIMENS.—Nzoro, ♂, 3 ♀, Apr. 7, 13.

ADULTS.—Iris red, bill black, feet brownish gray.

DISTRIBUTION.—Southern Europe and North Africa to central Asia, migrating southward to Cape Province and India. It is positively known to nest in South Africa, during the southern summer.¹ In most of the Congo area, especially the forest, the European bee-eater has not been reported, though the fact that it has been taken on the lower Congo makes it seem likely that some few individuals migrate across the equatorial forest. Many more of them, however, go around its eastern end, as proved by the far more numerous records from East Africa and the adjoining Congo border. In the southeastern Congo the species is fairly common, and there are unpublished records from Tembwe, Kabalo, Kinda, and Nieuwdorp.

I was at first unable to distinguish *M. apiaster* and *M. persicus* by their calls, and the general resemblance in size made it difficult to say just how common *apiaster* was in the Uelle. Only at Nzoro and Faradje did we identify it with certainty. From April 7 to 14, 1912, we found it common near Nzoro, and rather sociable, six or a dozen in a loose flock. On October 12 and 13 of the same year, many were again observed at Faradje, flying about over the station. Among the insects eaten by our specimens we noted a cicada.

From the published records, it would seem that some individuals remain during their winter sojourn as far north as Togoland, Ruwenzori, and Lake Kivu, although the great majority pass on farther to the south. On January 15, 1927, at the south end of the Ruwenzori Range I shot a female, and on February 12 saw another example on the Semliki River near Beni. In the highlands west of Lake Edward they were common in March, flocks of as many as 30 being noted. Here there was a chance to compare their notes with those of *M. persicus*, and the

¹ Selater, 1903, 'Birds S. Afr.', III, p. 59; Betham, 1927, Ibis, p. 93; Vincent, 1934, Ibis, p. 779.

latter proved to be recognizably hoarser. Our last specimen of *apiaster* was taken at Rutshuru on April 1.

Merops persicus persicus Pallas

Merops persica PALLAS, 1773, 'Reise Versch. Prov. Russ. Reichs,' II, p. 708 (type locality: Caspian Sea).—*Merops longicauda* HARTLAUB, 1850, 'Beitr. Orn. Westafr.,' p. 19 (Malimbe).—*Merops savignyi* HARTLAUB, 1857, 'Syst. Orn. Westafr.,' p. 39.—*Merops ægyptius* SHARPE, 1884, Journ. Linn. Soc. Lond., Zool., XVII, p. 434 (Semio).—*Merops savignii* DUBOIS, 1886, Bull. Mus. Roy. Hist. Nat. Belg., IV, p. 147 (L. Tanganyika).—*Merops persicus* SHARPE, 1890, in Jameson, 'Story of Rear Column,' p. 410 (Aruwimi R.); 1892, 'Cat. Birds Brit. Mus.,' XVII, p. 66 (Yambuya). REICHENOW, 1902, 'Vög. Afr.,' II, p. 322 (Kasongo; L. Upemba; L. Edward). DUBOIS, 1905, Ann. Mus. Congo, Zool., I, f. 1, p. 34 (Karema; L. Leopold II; Lower Congo). LÖNNBERG, 1907, Arkiv f. Zool., III, No. 21, p. 10 (Mukimbungu or Kingoyi). SASSI, 1912, Ann. Naturh. Hofmus. Wien, XXVI, p. 372 (Uvira; Baraka). MOURITZ, 1914, Ibis, p. 34 (between Sakania and Mokambo Hills). MENEGAUX, 1918, Rev. Fr. O., V, p. 258 (Zambi). SCHOUTEDEN, 1918, Rev. Z. A., V, p. 252 (in part. Lamia; Kikonga; Mai-na-Kwenda; Kabare); 1920, idem, VII, p. 190 (Malela). BERLIOZ, 1921, Rev. Fr. O., VII, p. 8 (region L. Kivu).—*Merops superciliosus* SHELLEY, 1890, Ibis, p. 167 (Yambuya).—*Merops persicus persicus* HARTERT, 1912, 'Vög. pal. Fauna,' II, p. 860, Fig. 114. SCLATER AND M.-PRAED, 1919, Ibis, p. 660 (Yambio). SCHOUTEDEN, 1923, Rev. Z. A., XI, p. 393 (Kwamouth); 1924, idem, XII, p. 266 (Kidada); 1925, idem, XIII, p. 10 (Bolobo). GROTE, 1930, Mitt. Zool. Mus. Berlin, XVI, p. 57. BANNERMAN, 1933, 'Birds Trop. W. Afr.,' III, p. 285.—*Merops persicus chrysocercus* SCHOUTEDEN, 1936, Ann. Mus. Congo, Zool., I, f. 2, p. 88 (Oka).

SPECIMENS.—Avakubi, 2 ♂, Oct. 31; ♀, Nov. 1; 2 ♂ im., Oct. 3, Nov. 1. Medje, ♂, Jan. 12. Faradje, 3 ♂, Mar. 22, 23. Garamba, ♀, July 3.

ADULTS.—Iris bright red, bill black, feet brownish.

IMMATURE MALE IN NOVEMBER.—Iris brownish red.

DISTRIBUTION OF THE SPECIES.—Southern Algeria to northwest India, migrating into Africa. *M. p. persicus* breeds from the Caspian Sea and Persia to Palestine, Egypt, Baluchistan, and northwest India. It migrates through northeastern Africa, crosses the whole of the Congo and reaches Cape Province. *M. p. chrysocercus*, differing from *persicus* by the more golden sheen of its upperparts and by the longer tips of its median rectrices, breeds from southern Tunisia to Morocco, as well as near Lake Chad. It migrates to Senegal, Sierra Leone, São Tomé, and the Cameroon. In adult males of *persicus* the median rectrices usually exceed the others by 45–65 mm., and in *chrysocercus* by 70–115 mm.

It may be that *persicus* does not visit Upper Guinea, but it certainly does occur commonly even in the Lower Congo. At Malela in December and January Lance collected four adult males with tail-tips of

average dimensions for *persicus*; and I have seen other adults of *persicus* from Kidada, Leopoldville, Bolobo, and Lake Leopold. All specimens from the eastern Congo belong to this same race.

These large green bee-eaters do not winter in any great numbers in the Ituri forest, and in the Uelle they are still more strictly birds of passage. In both districts they are commonly observed, often in large flocks, in September and October and again from the middle of March through April. The earliest date of arrival at Faradje was September 3, and at Avakubi September 16. At Faradje they were last seen on April 27 in the spring of 1911. An exceptional female was collected at Garamba in early July.

About Lake Edward, and from there to the eastern Katanga, these birds winter in numbers; yet none seem to have been collected in the Kasai district. I have seen specimens from the Sankuru district, Katobwe on the Lualaba, Kilwa on Lake Moero, and the Luombwa River. The calls of *M. apiaster* and *M. persicus* are very similar, and may be written "kweer!" though often rolled toward the end, "kweer-r-r!" That of *apiaster* is more resonant and pleasing, that of *persicus* hoarser.

In the eastern Congo savannas *Merops p. persicus* takes its departure about the first of April. A few weeks later *M. superciliosus* arrives from the southward, to remain almost until the return of *persicus* from the north.

Four stomachs of *persicus* were examined; and among the insects they contained we noted dragon-flies in two cases and winged termites once. The latter were being captured by a flock of bee-eaters at sunset, during their nuptial flight.

[*Merops persicus chrysocercus* Cabanis and Heine]

Merops chrysocercus CABANIS AND HEINE, 1860, 'Mus. Hein.,' II, p. 139 (type locality: Senegal).—*Merops superciliosus saharæ* PARROT, 1911, 'Wytzman's Genera Av.,' 14th pt., p. 7 ("Congo State").—*Merops persicus chrysocercus* W. L. SCLATER, 1924, 'Syst. Av. Æth.,' pt. 1, p. 219 ("Belgian Congo"). GROTE, 1930, Mitt. Zool. Mus. Berlin, XVI, p. 57 (Lower Congo?). BANNERMAN, 1933, 'Birds Trop. W. Afr.,' III, p. 286, Fig. 79 ("Northern Belgian Congo").

This long-tailed race might well be expected to reach the western Congo, since it migrates to southern Cameroon. But so far I have not been able to find a specimen from the Belgian Congo.

***Merops superciliosus* Linnæus**

Merops superciliosus LINNÆUS, 1766, 'Syst. Nat.,' 12th Ed., p. 183 (type locality: Madagascar). SCHALOW, 1886, J. f. O., pp. 431, 435 (Lulenge R.; L. Up-

emba). MATSCHIE, 1887, J. f. O., p. 151. REICHENOW, 1887, J. f. O., p. 308 (Kasongo); 1911, 'Wiss. Ergeb. D. Z.-Afr. Exp.,' III, p. 292 (Rutshuru Plain; Semliki Plain; Beni; Kasenyi). O.-GRANT, 1910, Tr. Z. S. Lond., XIX, p. 435 (Mokia, Uganda). W. L. SCLATER, 1924, 'Syst. Av. Æth.,' pt. 1, p. 219.—*Merops persicus superciliosus* SASSI, 1912, Ann. Naturh. Hofmus. Wien, XXVI, p. 372 (Uvira). LÖNNBERG, 1917, Arkiv f. Zool., X, No. 24, p. 22 (Rutshuru). SCHOUTEDEN, 1918, Rev. Z. A., V, p. 252 (Munié-Moboka; Kabemba; Mutum-Peke; Mawagongo; Lubilu).—*Merops persicus* SCHOUTEDEN, 1918, Rev. Z. A., V, p. 252 (in part. Mawagongo; Bigoisagua).

DISTRIBUTION.—Madagascar, Cormoro Islands, and eastern Africa from Portuguese East Africa northward to Eritrea, Lake Albert, and the Manyema district, west to southern Angola. This bee-eater is known to breed in Madagascar, on Pemba Island, and near Beira, on the mainland. In the eastern Congo it is clearly a migrant, spending its off-season there. I have supposed that birds found in the Congo came from Madagascar, but it is possible that they are those of the southeastern coast.

M. superciliosus is so closely allied to *M. philippinus* Linnæus of the Oriental Region and to *M. persicus* that many authorities regard them as races of one species.

The Madagascar bee-eater has been found in the Congo only in savanna countries from Lake Upemba and Lake Tanganyika to the Manyema, the Kivu district, and Lake Albert. I first saw it at Entebbe, Uganda, on July 21, then at Butiaba on August 9. At Kasenyi the species was numerous until early September, perching in the tops of the larger trees and flying gracefully in pursuit of insects. The voice is similar to that of *persicus*.

So partial is this bird to lake shores that I never saw it above the escarpment to the west of Lake Albert. Specimens all proved to be non-breeding, and by September 10 no more were to be seen. It was not until May 16 of the next year, at Rutshuru, that *superciliosus* reappeared.

Adults were now in fresh plumage, molting their primaries, with gonads reduced. They soon became numerous, and it was clear that they had just returned from their breeding grounds. At Uvira on July 23, I counted eight, and collected a non-breeding male, still molting its outermost primaries.

On Pemba Island *M. superciliosus* nests in August and September,¹ but farther south near Beira eggs have been found in late October.² In the region near Nyasaland Vincent and Belcher observed the species

¹ Vaughan, 1930, Ibis, p. 17.

² Grant, 1911, Ibis, p. 17.

only as a bird of passage in June and late September. Yet in Madagascar it has been collected by Rand in every month of the year.

***Merops malimbicus* Shaw**

Merops malimbicus SHAW, 1806, 'Naturalist's Miscell.,' XVII, Pl. DCCI (type locality: Malimba, Portuguese Congo). SHELLEY, 1890, Ibis, p. 166 (Lower Congo), SHARPE, 1890, in Jameson, 'Story of Rear Column,' p. 399 (Matadi—Stanley Pool). OUSTALET, 1893, Naturaliste, VII, pp. 125, 126 (Babembe country). REICHENOW, 1902, 'Vög. Afr.,' II, p. 327 ("Aruwimi"; "Ubangi R."). DUBOIS, 1905, Ann. Mus. Congo, Zool., I, f. 1, p. 34 (Equator Prov.; Umangi; Kisantu; Mayombe: L. Leopold II). BANNERMAN, 1922, Rev. Z. A., X, p. 145; 1933, 'Birds Trop. W. Afr.,' III, p. 290, Fig. 81. BEQUAERT, 1922, Bull. A. M. N. H., XLV, p. 310 (Monsembe). BERLIOZ, 1922, Bull. Mus. Paris, p. 344 (Junction of Congo and Irebu Rs.). SCHOUTEDEN, 1923, Rev. Z. A., XI, pp. 324, 393 (Luebo; Basongo; Mushie; Kwamouth); 1924, idem, XII, pp. 266, 414 (Leopoldville; Kidada; Eala; Ikengo; Bikoro); 1925, idem, XIII, p. 10 (Bolobo region); 1926, idem, XIII, p. 192 (Vista; Moanda); 1933, Bull. C. Z. C., X, p. 10. W. L. SCLATER, 1924, 'Syst. Av. Æth.,' pt. 1, p. 220.

SPECIMENS.—Coquilhatville, ♂, Dec. 16. Near Monsembe, on upper Congo, 3 ♂, 5 ♀, July 22.

ADULTS.—Iris bright crimson, bill black, feet dusky brown.

DISTRIBUTION.—Gold Coast Colony to northern and southern Nigeria, the Gaboon, Lower Congo, northern Kwango and Kasai districts, and the upper Congo to lower Itimbiri River and Basoko. It must occur on the lower Ubangi River, though Dybowski's specimen was not taken there; and none has been collected on the Aruwimi River. Unpublished localities from specimens in the Congo Museum are Dima, Lisala, Moenge, Barumbu, and Elisabetha.

The lack of a Cameroon record, thus far, shows that it is not a true forest bird. All the localities where it has been taken are in savannas or along sea-coasts or wide rivers. In ascending the Congo River, in July 1909, we first noticed this rosy-breasted bee-eater a little way above Kwamouth, and from there to the neighborhood of Monsembe we saw a few, at least, almost every day. They fly about gracefully over the water, dipping occasionally in it as swallows do. One evening at the village of Malele, near Monsembe, we found a flock of fully 175 sitting in the top of a large dead tree near the river bank. Of eight specimens secured on this occasion, every one had its gizzard well filled with large brown winged ants.

During my return trip down the Congo from Stanleyville in December, 1914, *Merops malimbicus* was seen commonly in flocks of 30 or more from Bumba to Kunzulu, just below Kwamouth. The call-

note has bee-eater characteristics, but is unusually hoarse and sounds to my ear like "chick-k."

Specimens taken by me on the Congo River between Lukolela and Monsembe in July, August, September, and December were all non-breeding. The behavior of the birds about shelving sand-bars during the low-water period from February to early April left no doubt that this was their breeding season. Examples in juvenal plumage are surprisingly few. One was taken at Lukolela as late as August 10; it must have been hatched about four months earlier, unless possibly a few pairs nest in July. Certainly this bee-eater is not migratory on the upper Congo River, but along the coast it may be. In the Fernand Vaz district of the Gaboon they are seen especially from September 15 to November, Aschemeier told me¹; whereas at Landana they arrive in May, and nest in the bluffs at Malimba a little later.² They remain in the region at least until August, but are said to be absent in February and March. North of the forest, in Nigeria, the breeding season is known to be in April and May. Large nesting colonies are the rule.

***Merops nubicus* Gmelin**

Merops nubicus GMELIN, 1788, 'Syst. Nat.,' I, pt. 1, p. 464 (type locality: Nubia). OUSTALET, 1893, *Naturaliste*, VII, p. 125; 1904, *Bull. Mus. Paris*, p. 436 (Krebedje). REICHENOW, 1902, 'Vög. Afr.,' II, p. 329 (Ubangi). DUBOIS, 1905, *Ann. Mus. Congo, Zool.*, I, f. 1, p. 34 (Uelle). SALVADORI, 1911, *Ann. Mus. Civ. Stor. Nat. Genova*, (3) V, p. 447. SCHUBOTZ, 1921, 'Tageb. Emin Pascha,' VI, p. 116 (Mangbetu and Niam-Niam countries).—*Merops nubicus nubicus* SCLATER AND M.-PRAED, 1919, *Ibis*, p. 661 (Tembura; Meridi; Mt. Baginzi). SCHOUTEDEN, 1936, *Ann. Mus. Congo, Zool.*, I, f. 2, p. 88.

SPECIMENS.—Faradje, 5 ♂, Jan. 5, Feb. 4, 21, Dec. 15, 23; 9 ♀, Jan. 5, Feb. 4, 21, Dec. 5, 22; ♂ im., Sept. 9.

ADULTS.—Iris crimson, bill black, feet dark brownish.

DISTRIBUTION.—Sudanese belt from Senegal to Abyssinia, south almost to the edge of the equatorial forests, and in East Africa to the Rufiji River. The breeding area is in the northern section of the range from West Africa to the Blue Nile and other parts of the eastern Sudan. Large nesting colonies tunneled in the banks of rivers are occupied mostly from April to June. After breeding, thought Heuglin, the birds of the more easterly regions first wandered northward; but later the majority migrate southward, although some go to the Abyssinian plateau.

¹ MacLachy, 1937, *Ois. R. F. O., (N. S.)* VII, pp. 323, 324, reports a nesting colony there in December.

² Pechuël-Loesche, 1888, 'Loango Expedition,' III, pt. 1, p. 266; Petit, 1899, *Mem. Soc. Zool. France*, XII, p. 72.

The southward movement brings numbers of Nubian carmine bee-eaters to the northern border of the Belgian Congo, and even down to the coastal region of East Africa. During most of the rainy season they desert the Upper Uelle district, but return usually in October and by December are very common there. An exceptional bird-of-the-year was once taken on September 9.

The carmine bee-eaters are among the most striking birds of the dry season in the Uelle. Their strong, direct flight changes to graceful swoops in pursuit of prey. The call is rather loud with something metallic about its single-syllabled "kimp!" Frequently seen along rivers in parties, they also range out over the grasslands and are quick to take advantage of any grass-fire, shooting in and out of the clouds of smoke in company with kites, swallows, and sometimes blue rollers, all catching bewildered grasshoppers and other insects fleeing the fire. "Oiseaux de feu," as our Belgian friends called them, seemed doubly appropriate for these highly colored birds.

They left the vicinity of the Dungu River in early March; and I do not believe they breed there, although a basketful of live individuals, on February 21, were said by natives to have been captured in nests. Our dissections showed no real evidence of breeding; and these birds may have been roosting in tunnels made by *Melittophagus bullocki*. The white eggs of *Merops nubicus* from the Sudan measure 24.5–26.5 mm. \times 20–21.

Insects were the sole food in the five stomachs I examined, and included grasshoppers, large wasps, and one dragon-fly.

***Merops nubicoides* Des Murs and Pucheran**

Merops nubicoides DES MURS AND PUCHERAN, 1846, Rev. Zool., Paris, p. 243 (type locality: Port Natal).¹ REICHENOW, 1887, J. f. O., p. 308 (Kasongo); 1902, 'Vög. Afr.', II, p. 328 (Kwango); 1911, 'Wiss. Ergeb. D. Z.-Afr. Exp.', III, p. 292 (Usumbura; Ruzizi Plain). SASSI, 1912, Ann. Naturh. Hofmus. Wien, XXVI, p. 372. SCHOUTEDEN, 1918, Rev. Z. A., V, p. 252 (Komba-Komba; Kabambare; Bigoisagua; Sanghé Camp, Lubilu); 1935, Bull. C. Z. C., XII, p. 35 (Buta).—? *Merops rubicoides* JOHNSTON, 1884, 'River Congo,' p. 366 (Vivi).—*Merops natalensis* NEAVE, 1910, Ibis, p. 113 (Lualaba R.).—*Merops nubicus nubicoides* PARROT, 1911, 'Wytzman's Genera Av.', 14th pt., p. 8. BANNERMAN, 1923, Ibis, p. 735. W. L. SCLATER, 1924, 'Syst. Av. Æth.', pt. 1, p. 220. SCHOUTEDEN, 1935, Bull. C. Z. C., XII, p. 62; 1936 Ann. Mus. Congo, Zool., I, f. 2, p. 88. CHAPIN, 1935, Bull. C. Z. C., XII, p. 71.—*Merops nubicoides* SCHOUTEDEN, 1932, Bull. C. Z. C., IX, p. 9 (Lomami distr.).

DISTRIBUTION.—From Damaraland, the Transvaal, and possibly

¹ Probably erroneous and should be Ouri R. in S. W. Transvaal, see Delagorgue 1847. 'Voyage Afr. Austr.', II, p. 504.

Natal northward to Nyasaland, the Ruzizi Valley, savannas of the Manyema, Lomami and Kwango districts. There are specimens in the Congo Museum from Mutumbo Mukulu (Lomami), Baaba and Chutes Guillaume (Kwango), in addition to those in publications cited above, but none from the Katanga plateaus. Not yet known from the Kasai or the Lower Congo, unless Johnston's reference to *M. "rubicoides"* from Vivi was really based on this species. More likely he meant *M. malimbicus*.

Although *nubicus* and *nubicoides* are very closely allied, and the young of *nubicoides* has at the very first a pale bluish throat, the adults of the two species differ not only in the color of the throat, but also that of the iris, which is dark brown in *nubicoides*, crimson in *nubicus*.

All the Congo records with dates fall within the months from April to August, inclusive. This is just the part of the year, according to Selater,¹ when the southern carmine bee-eater is absent from South Africa, so we may be certain that these birds are simply "winter" visitors to the southern Congo. They were found breeding by Alexander on the Zambesi River in early November, by Belcher in southern Nyasaland in late September, and by Millar in Portuguese East Africa in the first half of October.

In habits and voice this species is exactly like its northern counterpart. At Luvungi in the Ruzizi Valley I saw them in parties of four and six in early July, flying about high in the air, seemingly attracted by smoke from a grass-fire, and alighting on large acacia trees near a brook. My two specimens were non-breeding adults in fresh plumage, and had been eating beetles and other insects, including several grasshoppers. A beautiful adult male was collected at Buta in the Lower Uelle by Brother Hutsebaut on July 15, 1934, but its occurrence there is purely accidental.

FAMILY Upupidæ. HOOPES, WOOD-HOOPES

KEY TO THE GENERA OF UPUPIDÆ

- 1.—Tail square, shorter than wing; head with a conspicuous crest..UPUPA, p. 334.
Tail much rounded or graduated, longer than wing; no crest.....2.
- 2.—Wing longer than 120 mm., bill long and somewhat curved.PHENICULUS, p. 323.
Wing shorter than 120 mm.....3.
- 3.—Bill slender and strongly decurved, black, yellow, or orange.....
.....RHINOPOMASTUS, p. 332.
Bill stouter at base, only slightly decurved, usually gray in color.....
.....SCOPELUS, p. 329.

¹ 1903, 'Birds S. Afr.,' III, p. 63.

Subfamily **Phoeniculinae**KEY TO THE CONGO SPECIES OF **PHOENICULUS**

- Head and neck glossy green or bluish, like the body; white markings on primaries and rectrices.....*P. purpureus*.
 Head, or at least the facial plumage, whitish in adults; body black with metallic gloss; no white on wings or tail.....*P. bollei*.

Phoeniculus purpureus marwitzi (Reichenow)

Irrisor erythrorhynchus marwitzi REICHENOW, 1906, O. Mb., p. 171 (type locality: Makalama, Tanganyika Terr.).—*Irrisor erythrorhynchus* SCHALOW, 1886, J. f. O., pp. 413, 426 (Mpala; Lugoma R.); 1887, idem, p. 236. DUBOIS, 1886, Bull. Mus. Roy. Hist. Nat. Belg., IV, p. 147 (L. Tanganyika); 1905, Ann. Mus. Congo, Zool., I, f. 1, p. 34 (in part. Tanganyika; Katanga). MATSCHIE, 1887, J. f. O., p. 151. NEAVE, 1910, Ibis, p. 111 (Dikulwe R.). SASSI, 1912, Ann. Naturh. Hofmus. Wien, XXVI, p. 369 (Baraka). MOURITZ, 1914, Ibis, p. 31 (Inkosakapenda, in S. E. Katanga).—*Irrisor erythrorhynchus* REICHENOW, 1902, 'Vög. Afr.,' II, p. 338 (in part). SCHOUTEDEN, 1918, Rev. Z. A., V, p. 252 (Manakwa).—*Irrisor viridis* NEAVE, 1910, Ibis, p. 79 (Kambove).—*Irrisor erythrorhynchus marwitzi* C. GRANT, 1915, Ibis, p. 285.—*Phoeniculus purpureus marwitzi* W. L. SCLATER, 1924, 'Syst. Av. Æth.,' pt. 1, p. 233. SCHOUTEDEN, 1930, Rev. Z. A., XVIII, p. 283. FRIEDMANN, 1930, Bull. 153, U. S. Nat. Mus., p. 387. GRANVIK, 1934, Rev. Z. A., XXV, p. 37.—*Phoeniculus purpureus angolensis* PAGET-WILKES, 1926, S. Afr. Journ. Nat. Hist., VI, p. 64 (Upper Kafue R., near Ndola).—*Irrisor erythrorhynchus* DE RIEMAECKER, 1927, Rev. Z. A., XIV, p. 269 (Elisabethville).

DISTRIBUTION OF THE SPECIES.—Cape Province north to Angola and Lake Tanganyika, then through eastern Africa to the Sudan, and westward again to Senegal. Not found in the equatorial forests, or in the savannas from the Lower Congo east almost to the Lualaba River, or in the Kivu highlands. From Cape Province north to the Sudan the white bar across the primaries increases in width from 10 mm. to 31 mm. The tail, likewise, grows longer; but its white spots do not enlarge with the same regularity in eastern Africa. The largest white tail-spots are found in Angola.

P. p. purpureus (Miller) is restricted to eastern Cape Colony, and from Zululand Austin Roberts has recently described *P. p. zuluensis*.¹ *P. p. marwitzi* differs from the two foregoing by the larger spots on its wings and tail, the tail being longer and more purplish above. It ranges from Natal to Kenya Colony. *P. p. angolensis* is similar to *marwitzi*, but usually longer-winged, bluer on the crown, and with larger spots on the tail. *P. p. niloticus* is also like *marwitzi*, but with slightly smaller spots on the tail, which is less purplish above, and gloss on body a little less brassy green. It occupies most of the Anglo-

¹ 1936, Ann. Transvaal Mus., XVIII, p. 190 (Mkusi R.).

Egyptian Sudan and the savannas of the Uelle. *P. p. guineensis* is close to *niloticus* but a little more bluish green on nape and back and with more white on the tail. From French Equatorial Africa it extends to the Gold Coast hinterland. *P. p. senegalensis* (Vieillot), a duller bird, with bill never becoming entirely red, occupies the region west of Sierra Leone.

The distinctions between these races are often very slight, and individual variation considerable. My measurements of *marwitzi* from regions outside the Congo are: Wing in males, 141–145, in females, 138–142; tails 200–255. This race is usually stated to reach the southeastern Congo. The few specimens I have seen from Elisabethville and Lukafu are certainly very like *marwitzi*. A series of seven males and three females from Kiambi in the Congo Museum may also be placed here, though the wings of two of the males measure 148 and 151 mm. At Tembwe on Lake Tanganyika Dr. Schouteden collected three males and two females which have rather broader white bars on the tail, and one of the males has the wing 151 mm. Two males from Kabalo and a pair from Manakwa in the Manyema likewise show a great deal of white on the tail-feathers. The wings of the three males measure 154–156 mm., that of the female 141. None of these Congo specimens has a bluish crown, but their wing-length approaches that of *angolensis*.

In the Upper Katanga, according to Neave and De Riemaeker these wood-hoopoes are usually seen in parties in the savanna woods. They have loud chattering notes, emphatic when alarmed. Before taking flight they commonly go through a see-sawing motion on the bough. Nests of *marwitzi* have been found in Tanganyika Territory by Schuster¹ in May, September, and October, in old woodpecker holes or in a deep natural cavity in a dead tree. The eggs were green, one set of three measuring 26.5–27.2 mm. \times 17.7–18.5.

[*Phæniculus purpureus angolensis* (Reichenow)]

Irrisor erythrorhynchos var. *angolensis* REICHENOW, 1902, 'Vög. Afr.', II, p. 339 (type locality: Kakonda, Angola).

This well-marked subspecies is found in Angola, north at least to the River Dande and Malanje, and south possibly to Windhoek in Southwest Africa and even the Transvaal. Wings of males from Angola measure 154–159 mm., of females 138–153 mm.; tails of both sexes 203–241. Although Bowen² reported two specimens of *marwitzi* from Villa General Machado in Angola, I find that birds from just west of

¹ 1913, J. I. O., p. 542; 1926, *idem*, p. 539.

² 1931, Proc. Acad. Nat. Sci. Phila., LXXXIII, p. 277.

Lake Tanganyika show an approach to some of the characters of *angolensis*. It seems possible that *angolensis* may yet be found in the southern Kwango or the Lulua district.

***Phoeniculus purpureus niloticus* (Neumann)**

Irrisor erythrorhynchos niloticus NEUMANN, 1903, O. Mb., p. 181 (type locality: Goz abu Guma, White Nile). SCLATER AND M.-PRAED, 1919, Ibis, p. 663 (Mt. Baginzi; Yei).—*Irrisor erythrorhynchos* DUBOIS, 1905, Ann. Mus. Congo, Zool., I, f. 1, p. 34 (in part. "Ituri"). EMIN, 1919, in Stuhlmann, 'Tageb. Emin Pascha,' II, pp. 428, 495 (Kuterma; Tomaya).—*Irrisor viridis* O.-GRANT, 1910, Tr. Z. S. Lond., XIX, p. 432 (Mokia, Uganda).—*Irrisor erythrorhynchos ruwenzoræ* C. GRANT, 1915, Ibis, p. 286 (type locality: Southeast slopes of Ruwenzori, 3400 ft.).—? *Irrisor* sp. LÖNNBERG, 1917, Arkiv f. Zool., X, No. 24, p. 22 (Kasindi).—*Irrisor erythrorhynchos viridis* SCHOUTEDEN, 1918, Rev. Z. A., V, p. 253 (Karemi).—*Phoeniculus purpureus ruwenzoræ* W. L. SCLATER, 1924, 'Syst. Av. Æth.,' pt. 1, p. 233.—*Phoeniculus purpureus niloticus* SCHOUTEDEN, 1936, Ann. Mus. Congo, Zool., I, f. 2, p. 91 (Faradje; Aba; Niarembe; Mahagi Port).

SPECIMENS.—Niagara, ♂, Jan. 22; ♀, Nov. 12. Dungu, ♀ im., July 1. Faradje, ♂, Sept. 19; 4 ♀, Sept. 19, Nov. 29, Dec. 1, 22; 3 ♂ im., Apr. 26, July 2, Aug. 10. Aba, ♀, Dec. 16. Garamba, ♂, July 4; ♂ im., July 10.

ADULTS.—Iris dark brown, bill scarlet, feet scarlet with dusky claws.

IMMATURE.—Iris dark brown; bill dusky with pink base; feet orange-red, claws blackish.

DISTRIBUTION.—Anglo-Egyptian Sudan, south to the savannas of the Upper Uelle district and those near Lake Albert and Lake Edward. *P. p. ruwenzoræ* (Grant), based on a single female from Mokia, seems not to differ from the form found in the Uelle district. Two of our females from Faradje and Aba have spots on only two of the outer tail-feathers. Dr. Bayer's specimen from Karemi in the upper Semliki Valley, not yet adult and apparently a male, has a white spot on the third rectrix on the left side, none on that on the right.

Specimens from the Upper Uelle and Mahagi Port, as well as others from the vicinity of Mt. Elgon, differ from *marwitzi* in the smaller size of the white areas on the tail. The measurements of seven adult males and seven adult females from the Uelle and the vicinity of Mahagi are: wings of males, 131–151 mm., of females, 127–141; tails of males, 201–228 mm., of females, 193–214; exposed culmen of males, 47–54 mm., of females, 38–42. If these birds are not *niloticus*, then they may all be called *ruwenzoræ*.

This race is more common in the northern part of the Uelle savannas than close to the forest border. It frequents grasslands thickly grown up with trees, and crawls about on the boughs or even the trunks.

Pairs or small parties up to six are the rule, flitting from tree to tree, and often attracting attention by their calls. Besides a hoarse "kuck" they utter protracted chattering sounds of varying quality, like "kek-ek-ek-ek—" or "ka-k-k-k-k—" Both adults and young have a disgusting odor like that of asafoetida, due probably to the secretion of the oil-gland.

Dark-billed young seemed more numerous than adults from April to August, indicating that they had been reared in the dry season. At Niangara on November 12 a female had the ovary enlarged, while one from Faradje, December 22, seemed just to have laid. She was snared at dusk as she entered a deep narrow cavity in a small tree, but her eggs could not be found. Incubating females of this species are said to be very loath to abandon their eggs, a significant fact because of the close relationship of hoopoes and hornbills.

Eleven stomachs all contained insect remains, of beetles, termites, a few caterpillars, ants, hemiptera, and a grasshopper. One individual had eaten some small round millipedes, and three stomachs held stones from small fruits.

[*Phœniculus purpureus guineensis* (Reichenow)]

Irrisor erythrorhynchos guineensis REICHENOW, 1902, O. Mb., p. 78 ("Portuguese Guinea to Niger"; type from Kirikiri, Togo).—*Irrisor erythrorhynchus* OUSTALET, 1893, Naturaliste, VII, p. 126 (no exact locality); 1904, Bull. Mus. Paris, p. 436 (Beso).—*Irrisor erythrorhynchos* REICHENOW, 1902, 'Vög. Afr.', II, p. 338 (in part. "Ubangi").

Ranging from the interior of the Gold Coast Colony to Nigeria and the Lake Chad region, this subspecies has been reported from Bozum in French Equatorial Africa and may occur within our limits near the Ubangi River. On the upper Kemo River, just north of the Ubangi, Dybowski collected a male and a female, both not quite adult, and three young in juvenal plumage. The older specimens look somewhat like *niloticus* of the Uelle, perhaps because of their immaturity; the others do not help in determining the race. An adult male from Beso and an adult female from Kousri, both obtained by Decorse, differ from the birds of the Uelle and seem to represent *guineensis*. No specimen is yet known from the neighboring part of the Belgian Congo.

Phœniculus bollei bollei (Hartlaub)

Irrisor bollei HARTLAUB, 1858, J. f. O., p. 445 (type locality: Ashanti).—*? Irrisor bollei bollei* C. GRANT, 1915, Ibis, p. 288 (Molegbwe, Ubangi R.).—*Phœniculus bollei bollei* W. L. SCLATER, 1924, 'Syst. Av. Æth.', pt. 1, p. 234. BANNERMAN, 1933,

'Birds Trop. W. Afr.,' III, p. 233.—*Phoeniculus bollei* subsp. GROTE, 1925, J. f. O., p. 88 (Nola-Mbaiki, Fr. Congo).

DISTRIBUTION OF THE SPECIES.—From the Gold Coast eastward to the northern edge of the Cameroon forest, the Ituri, Uganda, and some of the forested highlands of Kenya Colony. *P. b. bollei* occupies the forests of the Gold Coast and Southern Nigeria, and extends westward at least to the Ubangi River. *P. b. jacksoni* of the highlands near Mt. Kenya is slightly larger, but only in average measurements, with longer bill, and supposedly purer white on the head. Specimens from the Mau Escarpment and Mt. Elgon are closely similar to those of Kenya, and those of the highlands of the eastern Congo differ only in having slightly shorter bills. So the range of *jacksoni* extends to the montane forests of the eastern Congo. Strangely enough this woodhoopoe seems not to ascend the slopes of Ruwenzori or the Kivu Volcanoes.

Thus far it has been customary to use the name *jacksoni* also for specimens from the lowlands of the northeastern Congo. These are all but indistinguishable from *P. b. bollei*, the wings of which, according to Bannerman, vary from 118 to 136 mm. In nineteen specimens from the Congo lowlands the wings vary from 116 to 134 mm.,¹ and in nineteen from the Congo highlands from 123–140 mm. The same measurement in *jacksoni* from Kenya Colony is 120–143 mm. While I shall call the lowland specimens from the Ituri *jacksoni*, further comparison may show this to be incorrect. The few that are known from the neighborhood of the Ubangi River are *P. b. bollei*. There they are found only near the northern edge of the forest belt, as they are in the Cameroon.

Phoeniculus bollei jacksoni (Sharpe)

Irisor jacksoni SHARPE, 1890, Ann. Mag. Nat. Hist., Lond., (6) VI, p. 503 (type locality: Kikuyu country, East Africa). REICHENOW, 1894, J. f. O., p. 168 (old Irumu; Bundeko in Uvamba); 1902, 'Vög. Afr.,' II, p. 343; 1911, 'Wiss. Ergeb. D. Z.-Afr. Exp.,' III, p. 293 (Kwidjwi Is.; N. W. foot of Ruwenzori; N. W. of Tanganyika, 1900 m.; L. Kivu). HARTERT, 1900, Nov. Zool., VII, p. 35 (Beni). O. GRANT, 1910, Tr. Z. S. Lond., XIX, p. 433 (Mpanga forest; 30 miles N. of Beni). SASSI, 1912, Ann. Naturh. Hofmus. Wien, XXVI, p. 369 (E. border of Rutshuru Plain; Moera). SCHOUTEDEN, 1918, Rev. Z. A., V, p. 252 (Kilo; "Baraka"; Lo-ashi).—*Irisor* sp. EMIN, 1894, J. f. O., p. 168 (Bundeko).—*Irisor sharpei* FLOWER, 1894, P. Z. S. Lond., p. 597 (Indekaru).—*Irisor jacksoni* SCHOUTEDEN, 1914, Rev. Z. A., III p. 265 (Kilo).—*Irisor bollei jacksoni* NEUMANN, 1905, J. f. O., p. 196. C. GRANT, 1915, Ibis, p. 287.—*Phoeniculus bollei jacksoni* W. L. SCLATER, 1924, 'Syst. Av.

¹ Those of the lowland forests of Uganda have wings 123–131 mm., according to van Someren, 1922, Nov. Zool., XXIX, p. 82.

Æth.,' pt. 1, p. 235. FRIEDMANN, 1930, Bull. 153, U. S. Nat. Mus. p. 397. SCHOUTEDEN, 1933, Rev. Z. A., XXII, p. 378 (Bigogo); 1936, Ann. Mus. Congo, Zool., I, f. 2, p. 91 (Arebi; Bondo Mabe). BERLIOZ, 1935, Bull. Mus. Paris, (2) VII, p. 160 (Mbwahi near L. Kivu); 1936, idem, (2) VIII, p. 329.

SPECIMENS.—Bafwabaka, ♀, July 25. Babonde, 2♂, July 16, 19; ♀, July 19. Medje, 2♂, Jan. 13, 17; ♀, Aug. 22; ♀ im., Jan. 13. Pawa, ♂, July 15.

ADULTS.—Iris dark brown, rim of eyelids and bill scarlet, with cutting edges of both mandibles blackish; feet scarlet, claws dusky brown.

DISTRIBUTION.—Forested highlands of Kenya Colony from the Kikuyu district and Mt. Kenya to the Mau, Elgeyu, Mt. Elgon, and the highlands of the eastern Congo from the plateau west of Lake Albert south to that on the northwest side of Lake Tanganyika. In the lowlands of the northeastern Congo and those of Uganda live similar but slightly smaller birds. They are found in the forested Semliki Valley and along the edge of the great forest from the new post of Beni to Kilo, Arebi, the vicinity of Medje, and probably farther west.

It is astonishing in how narrow a band this species ranges across the northern Congo. From north to south it seems not more than fifty miles wide and it extends but little beyond the limit of unbroken forest. The distribution in the Cameroon must be similarly restricted. Though frequenting heavy forest and keeping much higher above the ground, *P. bollei* resembles *P. purpureus* in behavior and voice. It travels in small parties, exploring the boughs and trunks of large trees, and has a prolonged chattering call not quite so loud as that of the savanna species. I wrote it "ch-k-k-k-k—" and noted that it sometimes became more resonant toward the end. Females seem to call like males, but more weakly.

Dissections indicated a prolonged and perhaps irregular season for reproduction, probably during the rains; but no specimen was actually breeding. The young are reared in cavities in trees. Granvik¹ found a nest in a decayed tree on Mt. Elgon, July 22, in which one nestling was still sitting. The juvenal plumage lacks all trace of white on the face, the crown and back being glossed with green.

Insects were noted by us in seven out of the eight stomachs inspected. These included naked caterpillars (in three cases), small beetles, a bug, and one earwig. A spider with its egg-cocoon had also been eaten, as well as small berries and seeds (probably from fruit) which we found in five of the stomachs.

¹ 1923, J. f. O., Sonderheft, p. 112.

KEY TO THE SPECIES OF *SCOTPELUS*

- A white band across the primaries, always well marked on their inner webs; head black in adult male, but facial region and throat dark brown in female. *S. aterrimus*.
 No white on primaries; head glossy black in some specimens, but more often rufous. brownish, or brownish white. *S. castaneiceps*.

***Scotpelus aterrimus aterrimus* (Stephens)**

Promerops aterrimus STEPHENS, 1826, in Shaw, 'Gen'l. Zool.,' XIV p. 257 (Africa; restricted type locality: Senegal).—*Scotpelus notatus* OUSTALET, 1893, Naturaliste, VII, p. 126 ("region of the Congo").—*Scotpelus aterrimus anchietæ* REICHENOW, 1902, 'Vög. Afr.,' II, p. 345 (in part. "Ubangi R.").—*Scotpelus aterrimus aterrimus* BANNERMAN, 1933, 'Birds Trop. W. Afr.,' III, p. 235, Fig. 69 (Ubangi R.).

DISTRIBUTION OF THE SPECIES.—Grasslands north of the equatorial forest, from Senegal to Abyssinia, Lake Albert, and Uganda. Also in grasslands south of the forest belt, from the lower Congo River to southern Angola. *S. a. aterrimus*, glossed with purple above, and with tail unspotted, ranges from Senegal to Lake Chad and the Ubangi River. *S. a. emini* of the Nile region differs only in having the luster of nape and back a little less purplish. *S. a. notatus* of Eritrea and Abyssinia is still more bluish than *emini*, and usually has white spotting on its outermost tail-feathers. These tail-spots are rare in *emini*, save in the young. *S. a. anchietæ* of the region south of the Congo forest has a longer, more graduated tail, with an irregular white band near the tips of two outer rectrices.

The typical race is believed to occur in savannas near the great bend of the Ubangi River. Dybowski's single female specimen, Mr. Berlioz writes me, was taken on the upper Kemo River, a little north of the Ubangi; and he cannot see that it differs from West African examples. Dr. Bannerman tells me that Alexander's immature specimen from the Ubangi River near Boduna likewise appears to be typical *aterrimus*.

***Scotpelus aterrimus emini* Neumann**

Scotpelus aterrimus emini NEUMANN, 1905, J. f. O., p. 197 (type locality: Nyangabo, W. of L. Albert). SCLATER AND M.-PRAED, 1919, Ibis, p. 664 (Mt. Baginzi). SCHOUTEDEN, 1936, Ann. Mus. Congo, Zool., I, f. 2, p. 92 (Mauda; Niarembe; Mahagi Port).—*Scotpelus aterrimus* REICHENOW, 1902, 'Vög. Afr.,' II, p. 344 (Nyangabo).

SPECIMENS.—Dungu, ♀, June 30. Nzoro, ♀, Apr. 21. Faradje, 2 ♂, Nov. 16, 23; 2 ♀, Mar. 18, Oct. 23; ♂ im., Mar. 10. Aba, ♂, Dec. 10; ♀, July 16.

ADULT MALE.—Iris dark brown; bill dark gray, corners of mouth yellow; feet blackish, soles green.

ADULT FEMALE.—Similar, but bill gray with dusky base and culmen.

DISTRIBUTION.—From Sennar and Kordofan south to the savannas of the Uelle and to lakes Albert and Chioga. We first observed this small wood-hoopoe between Niangara and Dungu, and then found it rather common from Faradje to the Sudan frontier. Later I saw it also at Kasenyi on Lake Albert.

It is a far less conspicuous bird than *Phæniculus purpureus*, and goes about in smaller groups, usually indeed in pairs, feeding amid the leafy branches of trees and bushes. The only notes I heard were a monotonous “whă, whă, whă, whă,—” repeated slowly by the males and most apt to be heard in the morning.

Practically all the adults taken from April to December showed a slight enlargement of the reproductive organs. A non-breeding female was examined in March, and I conclude that the breeding season in the Uelle may extend over a large part of the rainy season.

Every one of the seven stomachs examined contained insect-remains. These seemed often to be of beetles; but four small caterpillars were noted, as well as a chrysalis and a spider. One bird had also swallowed several berries.

Scotellus aterrimus anchietæ Bocage

Scotellus anchietæ BOCAGE, 1892, Journ. Sci. Lisboa, (2) II, p. 254 (type locality: Caconda, Benguela).—*Irrisor pusillus* REICHENOW, 1887, J. f. O., p. 305 (Leopoldville).—*Scotellus aterrimus anchietæ* REICHENOW, 1902, 'Vög. Afr.', II, p. 345 (in part). SCHOUTEDEN, 1923, Rev. Z. A., XI, p. 394 (Kwamouth); 1926, idem, XIII, p. 193 (Moanda; Makaia Ntete).—? *Scotellus* SCHOUTEDEN, 1923, Rev. Z. A., XI, p. 326 (Tshisika).

DISTRIBUTION.—From Benguela north to the savannas of the southern Congo, though known with certainty thus far only from Kwamouth to the Lower Congo. It is remarkable that no representative of this species has been found in the Manyema or Katanga districts. The voice of *anchietæ* is like that of *emini*.

Scotellus castaneiceps brunneiceps Sharpe

Scotellus brunneiceps SHARPE, 1903, B. B. O. C., XIV, p. 19 (type locality: Efulen, Cameroon). CHAPIN, 1921, A. M. Nov., No. 17, p. 15 (Avakubi). W. L. SCLATER, 1924, 'Syst. Av. Æth.', pt. 1, p. 236. BANNERMAN, 1933, 'Birds Trop. W. Afr.', III, p. 238.—*Scotellus castaneiceps brunneiceps* STRESEMANN, 1924, J. f. O., pp. 423, 424.

SPECIMENS.—Avakubi, 2 ♂ (black-headed), Jan. 17, Apr. 19; 1 ♂ (pale-headed), Jan. 26.

ADULT MALE (with black head).—Iris very dark brown; bill gray, shading to black at base, the yellow of the corners of the mouth running out along the sides of the bill; feet black.

DISTRIBUTION OF THE SPECIES.—Gold Coast and Southern Nigeria to Cameroon, northern Congo, and Uganda. *S. c. castaneiceps* (Sharpe), from Nigeria westward, has head and neck rufous in both sexes. Wings of males 100–107 mm., of females 99–101. Tails of males 165–170 mm., of females 154–160. Exposed culmen in males 31–31.5, in females 26.

S. c. brunneiceps, ranging from forested Southern Cameroon to the Ituri River, is dimorphic in color for adult males. Some have heads black glossed with green, others have them pale brown or whitish. Females are always brown-headed. Wings of males 94–105 mm., of females 92–95. Tails of males 141–165 mm., of females 130–142. Exposed culmen in males 26.5–30 mm., in females 22–25.3.

S. c. adolfi-friederici of Uganda and the borders of the Ituri forest is always pale brownish or whitish on the head in both sexes and apparently a little larger than *brunneiceps*. Wings of males 101–110 mm., of females 94–102. Tails of males 162–186 mm., of females 146–185. Exposed culmen in males 27–30 mm., in females 24.5–26.4. Not much importance can be attached to the exact shade of the head-feathering, for new feathers just growing out are darker and browner than the older worn ones.

Because of their dimorphism and smaller size I call my specimens from Avakubi *brunneiceps*. This race may be expected to the westward in the Congo forest, but no form of this species has been found along the southern margin of the forest.

In the vicinity of Avakubi these birds may be regular inhabitants of the tops of the tallest forest trees, but we never had an opportunity to see them save where some little clearing opened the field of vision. My first specimen, a black-headed adult male, sat alone in the upper branches of a large tree overlooking an abandoned plantation. Over and over it repeated its “whă, whă, whă, whă,—” very similar to the call of *S. aterrimus*. Later on we came across a small party in some forest trees still standing in a new clearing. Near Avakubi breeding probably begins about May.

One stomach that I examined held only insect-remains, another had some tiny fruits as well.

Scoptelus castaneiceps adolfi-friederici Reichenow

Scoptelus adolfi-friederici REICHENOW, 1908, O. Mb., p. 160 (type locality: Beni, eastern Ituri distr.); 1911, 'Wiss. Ergeb. D. Z.-Afr. Exp.,' III, p. 293. SASSI, 1912, Ann. Naturh. Hofmus. Wien, XXVI, p. 370 (Moera; Beni-Mawambi; Mawambi; Mawambi-Irumu). SCHOUTEDEN, 1914, Rev. Z. A., III, p. 265 (Kilo); 1918, idem, V, p. 253 (Zambo); 1936, Ann. Mus. Congo, Zool., I, f. 2, p. 92 (Bondo Mabe).—*Scoptelus brunneiceps adolfi-friederici* GYLDENSTOLPE, 1924, K. Svenska Vet. Akad. Handl., (3) I, No. 3, p. 271 (Molembe; Simbo).—*Scoptelus adolfi-friederici* W. L. SCLATER, 1924, 'Syst. Av. Æth.,' pt. 1, p. 236.—*Scoptelus castaneiceps adolfi-friederici* STRESEMANN, 1924, J. f. O., p. 424.

SPECIMENS.—Bafwabaka, 2 ♂, Jan. 3, July 21. Babonde, ♂, July 20.

ADULT MALE.—Iris dark brown; outer portion of bill light gray, base of mandible and sides of maxilla at base lemon-yellow, basal portion of culmen black; feet black.

DISTRIBUTION.—Northern and eastern margins of the Ituri forest, southward at least to Beni, and eastward through the forest patches of Uganda to the vicinity of Mt. Elgon and northern Kavirondo. In the Ituri we found this race far more common near Babonde than was *brunneiceps* near Avakubi.

Its voice, audible for several hundred yards, is like that of *brunneiceps*. This species is apt to call from a much more conspicuous perch, such as a dead branch in a tree-top, than *S. aterrimus* of the savannas. The specimens taken in July were noisy but not breeding. Along the eastern edge of the forest, between Irumu and the Semliki Valley, this wood-hoopoe is fairly numerous. Four specimens taken there from September 30 to October 11 were all non-breeding, and one female on November 8 showed only slight enlargement of the ovary. So nesting seems to take place either in the dry season or early in the rains.

Three stomachs of this wood-hoopoe all contained insect-remains, including winged ants. One bird had also eaten three berries.

KEY TO THE SPECIES OF RHINOPOMASTUS

- Bill entirely black, usually exceeding 40 mm. in adult males, or 31 mm. in females *R. cyanomelas*.
 Bill yellow or orange, with dusky tip, usually shorter than 40 mm. in males, or 31 mm. in females *R. minor*.

[*Rhinopomastus minor cabanisi* (Defilippi)]

Irrisor cabanisi DEFILIPPI, 1853, Rev. Mag. Zool., Paris, (2) V, p. 289 (type locality: White Nile, 3° and 4° N. Lat.).—*Rhinopomastus cabanisi* SALVIN, 1892, 'Cat. Birds Brit. Mus.,' XVI, p. 26 (Lado).

The yellow-billed wood-hoopoe is a species inhabiting relatively dry

country from southern Abyssinia to the Pangani River. One of its three races, *cabanisi*, has been reported from Lado, and ranges from there to the coast of East Africa. The only place where it might be expected to reach the Congo is in the neighborhood of Mahagi Port, and the probability of its occurrence there is slight.

Rhinopomastus cyanomelas schalowi Neumann

Rhinopomastus schalowi NEUMANN, 1900, J. f. O., p. 221 (type locality: Usandawe, Tanganyika Terr.).—? *Irrisor minor* SCHALOW, 1886, J. f. O., p. 426 (Lugoma R.).—*Irrisor cyanomelas* DUBOIS, 1886, Bull. Mus. Roy. Hist. Nat. Belg., IV, p. 147 (L. Tanganyika).—*Rhinopomastus cyanomelas schalowi* REICHENOW, 1902, 'Vög. Afr.,' II, p. 347 (L. Moero). NEAVE, 1910, Ibis, pp. 79, 112 (Kambove; Dikulwe R.). C. GRANT, 1915, Ibis, p. 290. LÖNNBERG, 1917, Arkiv f. Zool., X, No. 24, p. 22 (Kasindi). SCHOUTEDEN, 1918, Rev. Z. A., V, p. 253 (Molekera; Lisasa; old Mission St. Gustave); 1930, idem, XVIII, p. 283. W. L. SCLATER, 1924, 'Syst. Av. Æth.,' pt. 1, p. 236. DE RIEMAECKER, 1927, Rev. Z. A., XIV, p. 269 (Elisabethville). FRIEDMANN, 1930, Bull. 153, U. S. Nat. Mus. p. 400 (Ruanda; Urundi).—*Rhinopomastes cyanomelas schalowi* SASSI, 1912, Ann. Naturh. Hofmus. Wien, XXVI, p. 370 (Ruzizi Valley; Kasindi-Beni).—*Rhinopomastus cyanomelas* DE RIEMAECKER, 1927, Rev. Z. A., XIV, p. 269 (Munama R.).

DISTRIBUTION OF THE SPECIES.—From Natal north to the Juba River, Mt. Elgon, the upper Semliki Valley, and northern Angola. *R. c. cyanomelas*, with tail in males 121–145 mm., and in females 113–136, is found from Natal to Angola, while the longer-tailed *R. c. schalowi* replaces it from the northeastern Transvaal¹ through the greater part of Rhodesia and eastern Africa to Kenya Colony and the eastern Congo. In *schalowi* the tails of males measure 147–185 mm., those of females 137–175. Its white tail-spots are better developed. In both races females have distinctly shorter bills than males, and are brownish on head and chest.

In the Congo *schalowi* is found below 5000 feet in the Upper Katanga, along the shore of Lake Tanganyika, in the Kivu district, and about Lake Edward. Savannas with rather fine grass and numerous trees are its favorite haunts. There the birds are seen singly or in pairs, the males occasionally repeating a "wha, wha, wha, wha,—" almost exactly like the voice of *Scoptelus*. Calling continues at seasons when they are not breeding.

Even at the extremity of its range, in the upper Semliki Valley, this wood-hoopoe is common. Climbing about the boughs and tree-trunks in search of insects it shows surprising acrobatic skill. Neave noted

¹ Birds of intermediate dimensions from eastern South Africa may be taken to constitute a third race, *R. c. intermedius* Roberts.

that in the Katanga it was often a member of a mixed bird party. Its breeding season there is likely to be from September to December.

In Southern Rhodesia, on October 7, Priest found a nest in a natural cavity only four feet up in a tree. The three eggs, of a deeper blue-green than those of *Phœniculus purpureus* and more definitely pitted with fine whitish dots, measured 24×18 mm. The development of the young in *R. c. cyanomelas* has been described by Hoesch¹ from South-west Africa.

[*Rhinopomastus cyanomelas cyanomelas* (Vieillot)]

Falcinellus cyanomelas VIEILLOT, 1819, 'Nouv. Dict. Hist. Nat.,' XXVIII. p. 165 (type locality: Namaqualand).—? *Irrisor cyanomelas* JOHNSTON, 1884, 'River Congo,' p. 367 ("Cataract region").—*Rhinopomastus cyanomelas* REICHENOW, 1902, 'Vög. Afr.,' II, p. 346.

DISTRIBUTION.—From the Cuanza River in Angola south to Damara-land, Lake Ngami, and through the western part of southern Rhodesia and the Transvaal to Natal. Search should be made for it along the southern border of the Kasai and Kwango districts, but I feel sure that Johnston's record from the Cataracts of the Congo is erroneous. Possibly he saw *Scopeltes a. anchietæ* there.

Subfamily Upupinæ

KEY TO THE AFRICAN FORMS OF UPUPA

- 1.—Primaries entirely black..... *U. africana*.
 Primaries black with a conspicuous white band across them..... 2.
- 2.—Crest-feathers tipped with black, but with no subterminal white band, or at most only a trace of such whitish markings, at the rear of the crest.....
 *U. epops senegalensis*.
 Crest feathers have a well-marked white subterminal bar..... 3.
- 3.—Bill exceeding 62 mm. in ♂, or 55 mm. in ♀..... *U. epops major*.²
 Bill less than 61 mm. in ♂, or 55 mm. in ♀..... *U. epops epops*.

[*Upupa epops epops* Linnæus]

Upupa epops LINNÆUS, 1758, 'Syst. Nat.,' 10th Ed., p. 117 (Europe; restricted type locality: Sweden).—*Upupa epops epops* GROTE, 1930, Mitt. Zool. Mus. Berlin, XVI, p. 58 (Uganda).

The European hoopoe migrates in winter to Senegal, Northern Nigeria, the Anglo-Egyptian Sudan and Naivasha in Kenya Colony. It has been taken by Emin just east of the Bahr-el-Jebel, so there is

¹ 1933, O. Mb., pp. 33-37, Figs. 1-3.

² This race is resident in Lower Egypt, and does not migrate even to the Anglo-Egyptian Sudan.

a possibility of its reaching the northeastern border of the Congo, at least occasionally.

***Upupa epops senegalensis* Swainson**

Upupa senegalensis SWAINSON, 1837, 'Birds W. Afr.,' II, p. 114 (type locality: Senegal). CHAPIN, 1916, A. M. Journ., p. 543 (Uelle).—*Upupa somalensis* SALVADORI, 1892, 'Cat. Birds Brit. Mus.,' XVI, p. 13, Pl. I (type locality: Somaliland).—*Upupa epops senegalensis* SCLATER AND M.-PRAED, 1919, Ibis, p. 665 (Mt. Baginzi). SCHOUTEDEN, 1936, Ann. Mus. Congo, Zool., I, f. 2, p. 91 (Mauda; Faradje; Mahagi Port).—? *Upupa epops* SCHUBOTZ, 1921, 'Tageb. Emin Pascha,' VI, p. 116 (Mangbetu country; Tunguru).

SPECIMENS.—Faradje, 7 ♂, Mar. 12, 17, Nov. 15, 18, 21, Dec. 6; 4 ♀, Nov. 20, 27, Dec. 2, 6; ♂ juv., 3 ♀ juv., Mar. 12. Aba, 2 ♂, Dec. 10, 13; 2 ♀, Dec. 13, 20.

ADULTS.—Iris dark brown; bill dusky brownish with gray base, very pale on base of mandible; feet gray, a slight tinge of purplish on sides of metatarsi.

NESTLINGS.—Iris blackish; bill black, skin of corners of mouth much swollen and creamy white; feet gray.

DISTRIBUTION OF THE SPECIES.—Western Europe to eastern Asia, south to tropical Africa, Ceylon, and Indo-China. Seven races are commonly recognized, in addition to closely allied species in Madagascar and eastern and southern Africa. The only Palaearctic race which migrates to Africa is *U. e. epops*. It breeds from western Europe to western Asia and northern Africa with the exception of Egypt. Its southern limits in winter have been described above. Egypt has a resident race, *U. e. major*, and the representative of this species breeding in tropical Africa is *U. e. senegalensis*, found from Somaliland and Abyssinia across the Sudan and Guinean savannas to Senegal.¹ In western and central Africa its range is limited on the south by the forest, to the east it reaches northern Uganda and occasionally Nairobi in Kenya Colony. This race is distinguished from *epops* by its slightly smaller size, richer body-coloration, greater area of white on the secondaries, and the lack of any whitish subterminal band on the crest. Ten adult males from the Uelle have wings 133.5–145 mm., six females 127–136 mm.

The Sudanese hoopoe is found during part of the year in the savannas of the Uelle and doubtless also along the upper Ubangi. We saw it near Niangara in November, also at Dungu in February, while about Faradje we made certain that it disappeared completely during most of the rainy season. The first date of appearance there in 1911 was No-

¹ *U. waibeli* Reichenow, described from northern Cameroon, appears not to be even a valid race.

vember 9, in 1912, November 18. At that time the rains have ceased in the Sudan, but not in the Uelle. These hoopoes became more common in December, and departed again to the northward in April, at the first sign of the rains. During their stay they nested.

In appearance and behavior these hoopoes are like the European race, and they perch on the small trees, although their food is taken mainly on the ground. Bare spots in pastures, cultivated land, and roadsides attract them, as well as freshly burned grassland. Their flight is often undulating like a woodpecker's, the crest meanwhile depressed, though it is more often elevated when they perch. Males utter a soft "hoo-poo" or "hoo-poo-poo," very like the call of *Cuculus gularis*, and a hoarse "hawing" noise.

Egg-laying probably begins in the latter half of December, and nests are either in holes in trees or in cavities in banks or termite hills. The eggs are usually in sets of six or seven, according to Sir Geoffroy Archer, varying from pale blue or light sage-green to olive-brown, and measuring 23-26 mm. \times 17-18. Three eggs, apparently of this species, which Lang found to the north of Faradje on March 16, were whitish. The nest was in a deep crack in a termite hill. At Faradje on January 29, four rather large nestlings were brought by natives from a hollow in a tree, and on March 12 I found a nest with four half-grown young in a hollow limb of a savanna tree. A half egg-shell remaining in this nest was grayish in color with a slight tinge of green. The nestlings held their crests erect most of the time and their tails pointing upward, like young hornbills.

In four of the eight stomachs examined I found ant-lions, apparently one of this hoopoe's favorite foods during the dry season. Six spiders and a cocoon full of their young had been eaten by one bird. Beetles and beetle-larvae were found in three of the stomachs, crickets also in three and just one small caterpillar. In Asben, Captain Buchanan found that caterpillars were their principal food during May.

Upupa africana Bechstein

Upupa africana BECHSTEIN, 1811, 'Kurze Uebers.,' IV, p. 172 (type locality: Congo and Cape of Good Hope). SCHALOW, 1886, J. f. O., p. 426 (Lugoma R.). OUSTALET, 1893, Naturaliste, VII, p. 126 [Brazzaville]. REICHENOW, 1902, 'Vög. Afr.,' II, p. 336; 1911, 'Wiss. Ergeb. D. Z.-Afr. Exp.,' III, p. 292. DUBOIS, 1905, Ann. Mus. Congo, Zool., I, f. 1, p. 34 (L. Tanganyika; Katanga; L. Dilolo; Kisantu). NEAVE, 1910, Ibis, p. 111 (upper Lufira R.). O.-GRANT, 1910, Tr. Z. S. Lond., XIX, p. 432 (Mokia, Uganda). MOURITZ, 1914, Ibis, p. 31 (Inkosakapenda in S. E. Katanga). MENEGAUX, 1918, Rev. Fr. O., V, p. 258 (Paso-Konité). SCHOUTEDEN, 1918, Rev. Z. A., V, p. 252 (Rutshuru); 1923, idem, XI, pp. 326, 394

(Luebo; Tshisika; Kwamouth); 1924, idem, XII, p. 266 (Kisantu; Kidada); 1926, idem, XIII, p. 193 (Moanda); 1930, idem, XVIII, p. 283; 1932, idem, XXII, p. 126 (Ngoma); 1932, Bull. C. Z. C., IX, p. 14 (Moba; Kiambi; Kansenia); 1933, idem, X, p. 42; 1933, Rev. Z. A., XXII, p. 378 (Kisenyi). W. L. SCLATER, 1924, 'Syst. Av. Æth.,' pt. 1, p. 232. DE RIEMAECKER, 1927, Rev. Z. A., XIV, p. 269 (Elisabethville). FRIEDMANN, 1930, Bull. 153, U. S. Nat. Mus., p. 386. BANNERMAN, 1933, 'Birds Trop. W. Afr.,' III, p. 227. GROMIER, 1936, 'Vie Animaux Sauvages Afr.,' p. 289 (near Rutshuru Valley).—*Upupa epops* LEACH, 1818, in Tuckey, 'Narr. Exp. R. Zaire,' p. 408 (Lower Congo). HARTLAUB, 1850, 'Beitr. Orn. Westafr.,' p. 19.—*Upupa nana* (?) JOHNSTON, 1884, 'River Congo,' p. 367 (Cataract region).—*Upupa senegalensis* HARTLAUB, 1884, J. f. O., p. 8. DUBOIS, 1886, Bull. Mus. Roy. Hist. Nat. Belg., IV, p. 147 (L. Tanganyika).—*Upupa decorata* ? SCHALOW, 1886, J. f. O., p. 416 (Manda, Marungu); 1887, idem, p. 236 (Mpala).—*Upupa decorata* MATSCHIE, 1887, J. f. O., p. 151 (Mpala; Lufuku R.; "Lualaba" = Luvua R.).—*Upupa epops africana* HARTERT, 1912, 'Vög. pal. Fauna,' II, p. 869. BOWEN, 1933, Ecology, XIV, p. 261, Fig. 7 D.

DISTRIBUTION.—From Cape Province to Landana, the lower and middle Congo River, Kasai district, Lake Tanganyika, Lake Kivu, the plains around Lake Edward, Kenya Colony, and occasionally to southern Abyssinia.

Thus it occurs widely in the southern and eastern grasslands of the Congo, and I have seen specimens taken in every month except March. In Southern Rhodesia Priest saw very few hoopoes during the months from April to July, and farther south they are believed to be partially migratory.

Though often regarded as a race of *U. epops*, and only a little more rufous than brightly colored examples of *senegalensis*, *U. africana* lacks the white bar across the primaries and is not known to interbreed with the more northern form. On the west they are separated by the equatorial forest, but in the eastern Congo their ranges do not meet, and *africana* is scarce near Lake Edward.

In habits the South African hoopoe is exactly like *senegalensis*, feeding largely on the ground and flying with lightness and grace. Its call is usually of three syllables, but two or four notes may also be given together. In the Katanga Neave called it a rather shy bird, generally most in evidence during June and July, when fires have passed through the savanna woods. It seems to nest there in July. A pair which I collected on the northeast shore of Lake Tanganyika, July 26, seemed almost ready to breed, so nesting probably begins there in the latter part of the dry season. In the Congo Museum there are well-grown nestlings from Kitobola (February) and Paso-Konité (August). In the Lower Congo, at least, they would seem to breed twice a year.

Nests have been found in Natal and eastern Cape Province between late September and January, and in Nyasaland toward the end of September. Four to six eggs, bluish white, bluish green, or pale fawn-brown, are laid in cavities of trees or in crevices in termite mounds or stone walls. Nesting material is not used. Dimensions of eggs are 24.6–26.7 mm. \times 16.2–18.3.

Incubating birds, according to Captain Priest, often sit so tight that they can be caught in the hand. This characteristic of hoopoes and wood-hoopoes is of special interest in view of their close relationship to the hornbills.

FAMILY Bucerotidæ. HORNBILLS

KEY TO THE AFRICAN GENERA OF BUCEROTIDÆ

- 1.—Metatarsus more than 120 mm. long; plumage entirely black save for primaries and primary-coverts, which are white. BUCORVUS, p. 366.
Metatarsus less than 60 mm. long; coloration never exactly as above. 2.
- 2.—Tail long and graduated, nearly twice as long as wing; color largely black, but crown whitish, and rectrices tipped with white. TROPICRANUS, p. 351.
Tail square or rounded, sometimes shorter than wing, never reaching $1\frac{1}{2}$ times length of wing. 3.
- 3.—A large area of naked skin on side of head, a naked median neck-wattle; plumage largely black, but that of head rufous in females. . . . CERATOGYMNA, p. 364.
No wattle beneath neck, sides of head partially or wholly feathered. 4.
- 4.—Males usually with pronounced "casque," wide posteriorly, but even in females the culmen is broad at rear; plumage black-and-white, wing never less than 220 mm. long. BYCANISTES, p. 353.
Casque wanting or only slightly developed, whole bill compressed laterally; a few species are black-and-white, but many have browns and grays; wing never longer than 280 mm. LOPHOCEROS, p. 338.

Subfamily Bucerotinæ

KEY TO THE SPECIES OF LOPHOCEROS EXPECTED IN THE CONGO

- 1.—A white or brownish-white line along the middle of the upper back, or along whole back. 2.
No light line down the middle of the upperparts. 3.
- 2.—Coloration largely black-and-white, with a little brown or gray; lesser wing-coverts spotted with white; shafts of middle tail-feathers blackish.
. *L. erythrorhynchus*.
Coloration largely brown and gray, soiled whitish beneath; wing-coverts margined with buff or whitish, shafts of middle tail-feathers buffy white.
. *L. nasutus*.
- 3.—Wing less than 170 mm. long. 4.
Wing more than 200 mm. long. 5.

- 4.—Coloration mainly gray; outer rectrices at least 25 mm. shorter than longest ones; bill reddish at tip and on culmen, but blackish basally below nostril. *L. hartlaubi*.
 Coloration largely brown, with belly white; tail nearly square; bill largely or entirely red. *L. camurus*.
- 5.—Wing-coverts margined laterally with whitish or pale buff, bill largely buff and gray, back brownish gray. *L. pallidirostris*.
 Wing-coverts uniform black or brown. 6.
- 6.—Head, back, and wings black; sides of bill largely buff, with reddish at tip and along edges. *L. fasciatus*.
 Head, back, and wings brown to blackish, with whitish stripes on temporal region; bill largely red, with only a little buff at base. *L. melanoleucos*.

[*Lophoceros hartlaubi hartlaubi* (Gould)]

Toccus hartlaubi GOULD, 1860, P. Z. S. Lond., pp. 380, 381 (type locality: "West Africa").—*Buceros hartlaubi* REICHENOW, 1877, J. f. O., p. 18 (Loango Coast).—*Tockus nagtglasii* BOCCAGE, 1881, 'Orn. Angola,' p. 541.—*Lophoceros hartlaubi* REICHENOW, 1902, 'Vög. Afr.,' II, p. 256 (Chinchoxo).

DISTRIBUTION OF THE SPECIES.—Heavy forests of Upper and Lower Guinea. *L. h. hartlaubi* ranges from Liberia to southern Cameroon, Gaboon, and Portuguese Congo. It was collected at Chinchoxo, near Landana, by Falkenstein; and is practically certain to occur in the Mayombe forest of the Lower Congo.

Grote¹ has reported this same subspecies from Gaza in the Upper Sanga district, but we do not know whether to expect the typical race on the forested Ubangi, or *L. h. granti*, which inhabits most of the Upper Congo forests. This eastern race differs in having conspicuous white spots on greater, middle, and many lesser wing-coverts.

Lophoceros hartlaubi granti Hartert

Lophoceros granti HARTERT, 1895, Nov. Zool., II, p. 55 (type locality: Aruwimi R.); 1924, idem, XXXI, p. 114 (Kindu forest; 340 km. W. of Baraka). REICHENOW, 1902, 'Vög. Afr.,' II, p. 257; 1911, 'Wiss. Ergeb. D. Z.-Afr. Exp.,' III, p. 288 (Avakubi). DUBOIS, 1905, Ann. Mus. Congo, Zool., I, f. 1, pp. 9, 33, Pl. v (L. Leopold II). SALVADORI, 1909, Ann. Mus. Civ. Stor. Nat. Genova, (3) IV, p. 322 (Buta-Dungu); 1911, idem, (3) V, p. 447 (Uelle). SASSI, 1912, Ann. Naturh. Hofmus. Wien, XXVI, p. 368 (Moera; Beni; Mawambi; Ukaika).—*Lophoceros hartlaubi* var. *granti* DUBOIS, 1911, Wytzman's Genera Av., 13th pt., p. 20.—*Horizoceros hartlaubi granti* SCHOUTEDEN, 1923, Rev. Z. A., XI, p. 325 (Basongo; Kamaiembi; Luebo; Kabambaie); 1925, idem, XIII, p. 10 (Kunungu).—*Lophoceros hartlaubi granti* W. L. SCLATER, 1924, 'Syst. Av. Æth.,' pt. 1, p. 230. SCHOUTEDEN, 1936, Ann. Mus. Congo, Zool., I, f. 2, p. 90 (Djamba; Kotili; Buta; Mauda).—*Lophoceros hartlaubi* CHAPIN, 1926, Bull. C. Z. C., III, p. 11; 1931, Nat. Hist., XXXI, p. 603 (Lukolela).

¹ 1925, J. f. O., p. 89.

SPECIMENS.—Batama, ♂, ♀, Sept. 18. Avakubi, 3 ♂, Jan. 29, Aug. 26, Oct. 8; ♀, June 8; ♂ im., Nov. 9; ♀ im., Jan. 29. Bafwabaka, ♂, Jan. 6. Rungu, ♂, June 24. Niangara, 2 ♂, May 9, Nov. 9.

ADULT MALE.—Iris grayish brown or dark brown, naked orbit dark grayish blue; tip of beak and upper half of maxilla brownish red, rest of beak black; feet bluish gray, with soles yellowish gray, claws blackish. Beneath the angle of the jaw is a triangular patch of naked, purplish-pink skin, which hangs rather loosely.

ADULT FEMALE.—Bill blackish save for a brownish-red line on culmen, and skin at angle of jaw grayer, less noticeable. Young birds have no red on beak, which is dark gray, with buff at tip, and sides of mandible whitish below.

DISTRIBUTION.—Lowland forests from the vicinity of Bolobo east to the Semliki Valley, north to the Upper Uelle, and south to Luluabourg in the Kasai. It is a fairly common bird in the unbroken forest area, and not rare in the heavier forest galleries on the north and south.

The dwarf hornbill is usually found amid the boughs of the forest trees, never very close to the ground. Once I saw an adult female in the center of the post of Avakubi, but as a rule it does not venture beyond the shade of the forest. This is the most silent as well as the smallest of African hornbills, and seldom are more than two or three seen together. The youngest bird collected, with tail not yet fully grown, was sitting with one of its parents close to some trees where a band of monkeys (*Cercopithecus*) was feeding. According to natives with me, the dwarf hornbill accompanies monkeys, but much less often than *Tropicranus*.

The breeding season is during the rains. Only two of the specimens listed above were in condition for reproduction: at Rungu, June 24, and at Avakubi, August 22. Near Avakubi on August 3 I saw an adult bird fly to a knot-hole in a dead limb high in a forest tree and cling there as though feeding its mate. The young bird taken at Avakubi on November 9 could not have left the nest more than two weeks before.

South of the equator, at Lukolela, I found a nest on January 30, likewise in a knot-hole high up in a limb of a tree in heavy forest. The male bird made frequent but very brief visits to the nest, carrying what seemed to be insects, not fruit. It appeared to be gathering all its food within 100 yards of the nest, and I have seen it visit the nest twice within a quarter of an hour.

Fruit forms but a very small part of the food of this species. Only two out of twelve stomachs contained fruits, and not more than one or two in each. The others held only insects: beetle-remains in eight, caterpillars in four, grasshoppers in three, and mantises likewise in three. Winged termites, winged ants, a cicada, and a spider were each noted in only one case.

Lophoceros camurus camurus (Cassin)

Tockus camurus CASSIN, 1857, Proc. Acad. Nat. Sci. Phila., VIII (1856), p. 319 (type locality: Cape Lopez, Gaboon).—*Lophoceros camurus* SHELLEY, 1888, Ibis, p. 62 (lower Congo R.). O.-GRANT, 1892, 'Cat. Birds Brit. Mus.,' XVII, p. 404 (Sassa). EMIN, 1894, J. f. O., pp. 164, 167 (Bumanja; old Irumu). FLOWER, 1894, P. Z. S. Lond., pp. 597, 598, 605 (Indekaru; Ipoto; Ituri R. near Urumbi; Muyoméma or Kinnene). REICHENOW, 1902, 'Vög. Afr.,' II, p. 255; 1911, 'Wiss. Ergeb. D. Z.-Afr. Exp.,' III, p. 288 (Irumu). SASSI, 1912, Ann. Naturh. Hofmus. Wien, XXVI, p. 368 (Beni; Moera; Beni-Mawambi; Mawambi; Ukaika; Mawambi-Irumu). LÖNNBERG, 1917, Arkiv f. Zool., X, No. 24, p. 20. SCHOUTEDEN, 1918, Rev. Z. A., V, p. 247 (Lesse; Kitobe).—*Lophoceros camurus camurus* W. L. SCLATER, 1922, B. B. O. C., XLII, p. 46 (Uelle distr.); 1924, 'Syst. Av. Æth.,' pt. 1, p. 230. BANNERMAN, 1922, Rev. Z. A., X, p. 139; 1933, 'Birds Trop. W. Afr.,' III, p. 339. SCHOUTEDEN, 1923, Rev. Z. A., XI, p. 325 (Basongo; Luebo; Kamaiembi); 1924, idem, XII, p. 414 (Bikoro; Tondou); 1925, idem, XIII, p. 10 (Kunungu); 1926, idem, XIII, p. 192 (Ganda Sundi; Kai Bumba; Lundu); 1936, Ann. Mus. Congo, Zool., I, f. 2, p. 90 (Kotili; Buta; Poko; Nava R.). GYLDENSTOLPE, 1924, K. Svenska Vet. Akad. Handl., (3) I, No. 3, p. 272 (Kartushi).—*Leophoceros camurus camurus* SCHOUTEDEN, 1923, Rev. Z. A., XI, p. 393 (Kwamouth).

SPECIMENS.—Avakubi, 2 ♂, Jan. 8, Aug. 22; ♂ im., Jan. 8. Bafwabaka, 3 ♂, Jan. 3, 7, Dec. 29; ♀, Jan. 7. Niangara, ♀, May 26. Okondo, near Niangara, ♂, Jan. 9; ♂ juv., ♀ juv., Nov. 18. Between Denge and Dungu, ♂, Jan. 23.

ADULT MALE.—Iris light yellowish gray, or light yellow, naked orbit dull brown; bill red; feet dark brown, light greenish or yellowish on soles.

ADULT FEMALE.—Similar, but with a black stripe along anterior half of culmen, and tip of mandible black.

DISTRIBUTION OF THE SPECIES.—Forests of Upper and Lower Guinea, from Liberia to the Semliki Valley. From Southern Nigeria westward it is represented by *L. c. pulchrirostris* (Schlegel), which is darker brown above, particularly on the crown, than *L. c. camurus* of Lower Guinea. The range of the latter race extends from the Cameroon southward to the Mayombe forest and eastward to the Uelle district, the Semliki Valley, and no doubt the Manyema. In the Kasai district it has been taken near Luebo, but not at Luluabourg.

Specimens of *camurus* from the Cameroon, Gaboon, and western Congo are a little more apt to have small light spots on the lesser wing-coverts than are those from the eastern Congo. This is especially true of females.

We found this small brownish hornbill much less common near Avakubi in the central Ituri forest than in the border regions of the forest, as at Nala or at Lukolela. It is seen most often in groups of three or four, especially in second-growth woods and near the borders of clearings. It would be a very inconspicuous bird if it did not have a surprisingly loud

voice, audible for a quarter of a mile. It repeats a descending series of rather mournful notes which I would write "kwarru." There is a slight quaver in the tone, and the number of notes is sometimes as many as ten.

Breeding may be carried on through a large part of the year during the rains. Near Niangara two nestlings were secured through natives in November, toward the end of the rains; and at Lukolela I collected a breeding male on October 10, at the beginning of the rains there. Dry-season specimens are non-breeding. The nest is undoubtedly in a hole in a tree. Young nestlings have the body-skin pale flesh-color, the iris gray, and the skin of the orbit grayish white, the bill being reddish orange.

In eleven stomachs examined there was not a trace of fruit, only insect-remains. Beetles were noted in at least four, grasshoppers in three, wasps twice, hemiptera twice, and caterpillars twice. There were also one mantis and a cocoon containing a pupa.

Lophoceros fasciatus (Shaw)

Buceros fasciatus SHAW, 1811, 'Gen'l. Zool.,' VIII, pt. 1, p. 34 (type locality: Angola) HARTLAUB, 1857, 'Syst. Orn. West-Afr.,' p. 163.—*Buceros* LEACH, 1818, in Tuckey, 'Narr. Exp. R. Zaire,' p. 408 (Lower Congo).—*Tockus semifasciatus* JOHNSTON, 1884, 'River Congo,' p. 367 (Congo R.).—*Tockus fasciatus* HARTLAUB, 1884, J. f. O., p. 127 SHARPE, 1884, Journ. Linn. Soc. Lond., Zool., XVII, p. 435 (Semio; Ndoruma). REICHENOW, 1887, J. f. O., pp. 300, 308 (Manyanga; Kasongo). PETIT, 1926, 'Dix Années de Chasses,' p. 137 (Nzobe in Mayombe).—*Lophoceros fasciatus* SHELLEY, 1888, Ibis, p. 59 (Kubbi; Tingasi); 1888, P. Z. S. Lond., p. 41. O.-GRANT, 1892, 'Cat. Birds Brit. Mus.,' XVII, p. 402 (Chinchoxo; Ivando); 1908, Ibis, p. 313 (below Kasongo); 1910, Tr. Z. S. Lond., XIX, p. 432 (Beni). OUSTALET, 1893, Naturaliste, VII, p. 61 (Ubangi). HARTERT, 1900, Nov. Zool., VII, p. 34 (Tambue near Avakubi). REICHENOW, 1902, 'Vög Afr.,' II, p. 248 (Kwango R.; Kinyawanga); 1911, 'Wiss. Ergeb. D. Z.-Afr. Exp.,' III, p. 288 (N. W. and N. of Beni; W. foot of Ruwenzori). DUBOIS, 1905, Ann. Mus. Congo, Zool., I, f. 1, p. 34 (Uelle; Prov. Orientale; Banalia; Umangi; Cataracts; Kisantu; Mayombe; L. Leopold II); 1911, Wytzman's Genera Av., 13th pt., p. 20. LÖNNBERG, 1907, Arkiv. f. Zool., III, No. 21, p. 9 (Mukimbungu); 1917, idem, X, No. 24, p. 20. SALVADORI, 1909, Ann. Mus. Civ. Stor. Nat. Genova, (3) IV, p. 322 (Buta-Dungu). SASSI, 1912, Ann. Naturh. Hofmus. Wien, XXVI, p. 368 (Moera; Mawambi). SCHOUTEDEN, 1914, Rev. Z. A., III, p. 265 (Kilo); 1918, idem, V, p. 247 (Kalumendo; Zambo; Kilo; Kivu; Lesse); 1920, idem, VII, p. 190 (Malela); 1923, idem, XI, pp. 325, 393 (Basongo; Luebo; Kamaiembi; Kabambaie; Ngombe in Kasai; Kwamouth); 1924, idem, XII, pp. 266, 414 (Leopoldville; Kisantu; Eala); 1926, idem, XIII, p. 192 (Moanda; Ngoyo near Banana; Makaia Ntete; Ganda Sundi; Tshela); 1936, Ann. Mus. Congo, Zool., I, f. 2, p. 90 (Djamba; Kotili; Buta; Poko; Bomili; Rungu; Niangara; Mauda; Dungu). BOUET AND MILLET-HORSIN, 1916, Rev. Fr. O., No. 90, p. 374, note. BERLIOZ, 1922, Bull. Mus. Paris, p. 345 (Uelle R., Rubi R.). BANNERMAN, 1922, Rev. Z. A., X, p. 138, 1933, 'Birds Trop. W

Afr.,' III, p. 333, Fig. 93. W. L. SCLATER, 1924, 'Syst. Av. Æth.,' pt. 1, p. 229. CHAPIN, 1926, Bull. C. Z. C., III, p. 13 (Medje). STONE, 1936, Proc. Acad. Nat. Sci. Phila., LXXXVIII, p. 563 (Ekibondo).—*Lophoceros semifasciatus* FLOWER, 1894, P. Z. S. Lond., p. 597 (Ituri R. near Manyuema). EMIN, 1894, J. f. O., p. 167 (old Irumu).—*Lophoceros fasciatus fasciatus* GYLDENSTOLPE, 1924, K. Svenska Vet. Akad. Handl., (3) I, No. 3, p. 272 (Simbo).

SPECIMENS.—Bumba, ♂, July 27. Batama, ♂, Sept. 19. Bafwasende, ♀, Sept. 25. Avakubi, ♂, Oct. 17; 3 ♀, Sept. 28, Oct. 8, 17. Medje, 2 ♂, June 26, July 13; 2 ♀, Jan. 15, July 13. Okondo, 2 ♂, Nov. 20; ♀, Nov. 18. Niangara, 2 ♂, May 18, 29. Between Aba and Faradje, ♀, Oct. 6. Aba, ♂, Dec. 31.

ADULT MALE.—Iris dark brown, bare orbit and skin at angle of jaw black. The greater part of the bill is covered with a horny layer of cream-buff. At the tip of both mandibles the deeper coloration of the bill is exposed, dark red, and this color often runs backward beneath the lower mandible and along each side of the culmen. The tomia are largely blackish, mingled with dark red. Feet blackish, under surface of toes gray.

ADULT FEMALE.—Differs only in having the basal half of the gonys black instead of red, and the skin at the angle of the jaw orange.

DISTRIBUTION.—From the Lower Guinea Coast eastward across the Cameroon, Gaboon, and Congo to Jinja in Uganda. From the northern edge of the Congo at Semio and Doruma it extends south to northern Angola, the upper Kwango River, and Kinda in the Lulua district. On the borders of its range it keeps very much to gallery forests, so that its abundance varies locally. Close to the post of Faradje we did not encounter it, yet toward Aba it is not uncommon. Similarly along the lower Congo it is generally rare, save where there are considerable woods.

In the central parts of the Congo these common hornbills are not found in the undergrowth of the virgin forest, but usually amid second growth and about clearings. They gather in flocks often of five to ten individuals, and roam especially about old plantations. The flight is slow, several hard wing-beats raising the bird a little, only to be followed by a descending swoop. In such alternating fashion an adjacent tree is reached, where a short stop may be made. Members of the party will leave a tree one at a time, often proceeding in single file, and are not at all wary. The flight is practically noiseless, unlike that of the large hornbills. The voice is shrill but weak, and the short notes intermediate between a whistle and a yelp are repeated rapidly. They are imitated in the Mangbetu name, "Nakwéakwéa."

The majority of specimens were found to be non-breeding, and nesting takes place during the rains. A nestling with tail not half-grown was brought to Lang at Akenge in the southern Uelle in September, and

a nest was examined near Medje on July 13, At Aba a breeding male was taken as late as December 31.

The nest at Medje was discovered by watching the male bringing food to a knot-hole in a tall tree standing in an old plantation. The hole was about 90 feet up, and from it a native climber removed the female and one egg. The female had not yet shed any of her remiges; and her tail, though badly worn, had only some of the outer rectrices growing in. Dissection showed that she would probably have laid three more eggs. The one collected was white, with slightly roughened surface, 40.1×28.6 mm.

The entrance to the nest was just large enough to admit the female, and from around it our climber removed some pieces of dried dung. Examination of the foliage below showed that fecal matter was being ejected from the hole.¹ The stomach of the female contained some large beetles, brought to her by the male.

The food of this hornbill is approximately half fruit, half insects. Of sixteen stomachs, nine contained fruits of various sorts; and four more held palm-nuts, usually of small size. Eight had remains of hard-bodied insects, including beetles; four more, grasshoppers; and caterpillars and hemiptera were each noted once.

Lophoceros melanoleucos geloensis Neumann

Lophoceros melanoleucos geloensis NEUMANN, 1905, J. f. O., p. 187 (type locality: Schekho on upper Gelo R., S. W. Abyssinia). W. L. SCLATER, 1924, 'Syst. Av. Æth.', pt. 1, p. 228 (Ruwenzori); 1930, idem, App., p. 854. SCHOUTEDEN, 1932, Rev. Z. A., XXII, p. 126 (Burunga). VINCENT, 1934, B. B. O. C., LV, p. 78.—*Buceros melanoleucus* DUBOIS, 1886, Bull. Mus. Roy. Hist. Nat. Belg., IV, p. 147 (L. Tanganyika). SCHALOW, 1886, J. f. O., pp. 412, 413, 427, 431 (Mpala; E. Marungu; Lufuku R.; Lugoma R.; Lulenge R.); 1887, idem, p. 235. HARTLAUB, 1891, Abhandl. Naturwiss. Verein Bremen, XII, p. 34 (Buguera).—? *Lophoceros melanoleucus* EMIN, 1894, J. f. O., p. 167 (old Irumu).—*Lophoceros melanoleucus* MATSCHIE, 1887, J. f. O., p. 150 (Lufua R.). SHELLEY, 1901, Ibis, p. 166 (Karungwesi R.). DUBOIS, 1905, Ann. Mus. Congo, Zool., I, f. 1, p. 34 (in part. Mpala). NEAVE, 1910, Ibis, p. 110 (Dikulwe R.; Lualaba R.). O.-GRANT, 1910, Tr. Z. S. Lond., XIX, p. 432 (Mubuku Valley, 6500 ft.; Mokia). MOURITZ, 1914, Ibis, p. 35 (Musoshi R.; Sibokwa). SALVADORI, 1915, Ann. Mus. Civ. Stor. Genova, (3) VI, p. 279 (Kasai). LÖNNBERG, 1917, Arkiv f. Zool., X, No. 24, p. 20 (Kasindi).—*Lophoceros melanoleucus* REICHENOW, 1902, 'Vög. Afr.', II, p. 249; 1911, 'Wiss. Ergeb. D. Z.-Afr. Exp.', III, p. 288 (Beni; N. W. foot of Ruwenzori; N. W. of Tanganyika, 2000 m.; Tshingogo forest; S. Bugoie forest). SALVADORI, 1907, Boll. Mus. Zool. Anat. Torino, XXII, No. 570, p. 2 (near Lukonzolwa). SASSI, 1912, Ann. Naturh. Hofmus. Wien, XXVI, p. 367 (N. W. of L. Tanganyika). SCHOUTEDEN, 1918, Rev. Z.

¹ An excellent summary of the breeding habits of the genus *Lophoceros* is given by Moreau, 1937, P. Z. S. Lond., (A) pt. 3, pp. 331-346.

A., V, p. 247 (Beni; Kivu; Sibatwa and Maganga forests; Baraka; Kabambaré; Molekera; old Mission St. Gustave; Dogodo; Boga).—*Lophoceros melanoleucos stegmanni* NEUMANN, 1923, O. Mb., p. 75 (type locality: Tshingogo forest near L. Kivu). SCHOUTEDEN, 1930, Rev. Z. A., XVIII, p. 283 (near Elisabethville). FRIEDMANN, 1930, Bull. 153, U. S. Nat. Mus., p. 427.—*Lophoceros melanoleucos suahelicus* SASSI, 1924, Ann. Naturh. Mus. Wien, XXXVIII, p. 74 (N. W. of L. Tanganyika).—*Lophoceros melanoleucus* DE RIEMAECKER, 1927, Rev. Z. A., XIV, p. 270 (Lubumbashi R.).—*Lophoceros melanoleucus geloensis* BERLIOZ, 1936, Bull. Mus. Paris, (2) VIII, p. 328 (Mbwahi).

DISTRIBUTION OF THE SPECIES.—From southwestern Abyssinia through eastern Africa to eastern Cape Province, and to Angola and the Portuguese Congo. *L. m. melanoleucos* (Lichtenstein)¹ of South Africa, north to the Zambesi Valley, is rather dark and large. *L. m. suahelicus* Neumann, ranging from southern Tanganyika Territory to the Tana River, is somewhat smaller, with wings of males 235–245 mm., those of females 205–232. *L. m. geloensis*, extending from southern Abyssinia to the Katanga, is the blackest of all the races, and has the wings of males 239–270 mm., of females 220–251. *L. m. alboterminatus* of western Angola and the Lower Congo is lighter and more brownish than any of the foregoing, with wings of males about 226–232, and of females 215–220.

Neumann's *stegmanni* is supposedly synonymous with his *geloensis*, though specimens from the vicinity of Mt. Elgon seem to have wings averaging slightly longer than those from the eastern and southeastern Congo. Within our limits *geloensis* is a rather common bird in savannas from the west shore of Lake Albert and the Semliki Valley to the Kivu district, the Upper Katanga, and west to the Sankuru district, Lulua-bourg, and Dilolo. It frequents open savannas with fair-sized trees, in the eastern Congo, and while it does not ascend the western slopes of Ruwenzori, it may be seen in the Kivu district at 6700 feet near the bases of the volcanoes. On the mountains west of the Ruzizi Valley I have noted one individual as high as 7500 feet. In the Upper Katanga it makes its home in the savanna woods.

In life this pied hornbill resembles *L. fasciatus*, but it less sociable, going usually in pairs, and is more silent. Its alarm note is said to be shrill and rather squeaky. The buoyant, undulating flight also resembles that of *fasciatus*.

The nesting of *L. m. melanoleucos* has been observed frequently in South Africa where the eggs, three to five in number, are laid in Decem-

¹ Austin Roberts (1936, Ann. Transvaal Mus., XVIII, p. 268) believes that Lichtenstein's description was not based on a bird of this species. In that case the species will have to be called *L. suahelicus* Neumann, and the South African race *australis* (Roberts).

ber or January. They are creamy-white, rather rough, and measure 39.8–40.9 mm. \times 29.2–30.4. The nest is in a hollow tree, and the entrance is plastered up with dung—probably that of the female—so as to leave only a narrow slit for the delivery of food by the male. The female molts while incubating, but remains fat during her voluntary imprisonment, which may last seven or eight weeks. It is believed that the female may leave the nest after the young are partly fledged, and that they are again walled in until ready to fly.¹ Such a procedure has recently been observed with nests of *L. erythrorhynchus* in the Frankfort Zoological Garden.

In the Upper Katanga nesting takes place toward October, for in the following month Mouritz saw a female which had been taken from her nest, and which had nearly finished molting. An adult male which I collected near Elisabethville in August had gonads undeveloped. Near Lake Edward I suspect that the breeding season commences about September.

Lophoceros melanoleucos alboterminatus Büttikofer

Lophoceros alboterminatus BÜTTIKOFER, 1889, Notes Leyden Mus., XI, p. 67 (type locality: Gambos, Angola).—*Tockus melanoleucus* JOHNSTON, 1884, 'River Congo,' p. 367 (Congo R.).—*Lophoceros melanoleucos* var. *angolensis* REICHENOW, 1902, 'Vög. Afr.,' II, p. 250 (type locality: Angola). NEUMANN, 1905, J. f. O., p. 188 (Loango Coast).—*Lophoceros melanoleucus* DUBOIS, 1905, Ann. Mus. Congo, Zool., I, f. 1, p. 34 (Cataracts; Lower Congo).—*Lophoceros melanoleucus angolensis* SCHOUTEDEN, 1926, Rev. Z. A., XIII, p. 192 (Vista).

DISTRIBUTION.—Western Angola north to the Lower Congo and Landana. Specimens from northern Angola and the Lower Congo are much lighter brown than the other races, but a male from Mombolo on the Benguela Plateau is only a little lighter than most South African specimens and has the wing markedly longer than in birds from the Lower Congo. Perhaps *angolensis* would be the correct name for the paler birds of northern Angola. Büttikofer described *alboterminatus* as similar in general coloration to typical *melanoleucos*, and the white tips on the median rectrices of three of his specimens are not a racial character.

In the Lower Congo this lighter brown subspecies is rather common. I have seen it near Matadi and Boma about patches of woods, singly or in pairs. In that region it lives almost side by side with *L. fasciatus*.

¹ Schönland, 1897, Trans. S. Afr. Phil. Soc., IX, pp. 1–7. See also Cowles, 1926, S. Afr. Journ. Nat. Hist., XI, pp. 20–24, 3 photos.

Lophoceros pallidirostris pallidirostris (Finsch and Hartlaub)

Buceros pallidirostris FINSCH AND HARTLAUB, 1870, 'Vög. Ost-Afr.,' pp. 870, 871 (type locality: Caconda, Benguella).—*Buceros dubia* DUBOIS, 1886, Bull. Mus. Roy. Hist. Nat. Belg., IV, p. 147 (L. Tanganyika).—*Lophoceros pallidirostris* DUBOIS, 1905, Ann. Mus. Congo, Zool., I, f. 1, p. 34; 1911, 'Wytzman's Genera Av.,' 13th pt., p. 20. NEAVE, 1910, Ibis, p. 111 (Lufira R.). DE RIEMAECCKER, 1927, Rev. Z. A., XIV, p. 270 (Elisabethville; R. Kalule Sud; source of Mimbulu R.; Lubumbashi R.). SCHOUTEDEN, 1930, Rev. Z. A., XVIII, p. 283.—*Lophoceros pallidirostris pallidirostris* SCHOUTEDEN, 1923, Rev. Z. A., XI, p. 325 (Tshisika). W. L. SCLATER, 1924, 'Syst. Av. Æth.,' pt. 1, p. 229.

DISTRIBUTION OF THE SPECIES.—From Angola and Northern Rhodesia to Nyasaland and Tanganyika Territory, north to Taveta. The typical race extends from the Kwango River, Malanje, and Mossamedes east to the Katanga, Lake Bangweolo, and the southwest corner of Lake Tanganyika. *L. p. neumanni* Reichenow¹ is smaller, more whitish on the throat, and has a little dull reddish near the tip of the bill when adult. It ranges from eastern Tanganyika Territory to the Rovuma River and Nyasaland.

L. p. pallidirostris seems scarcely to enter the Kasai, although Dr. Schouteden secured two specimens at Tshisika, in the southern part of the district. In the Upper Katanga it is found commonly, in pairs, in the savanna woods. The male repeats a shrill whistled note, not so thin and high-pitched as that of *L. nasutus*. Nesting takes place during the dry season; a male shot near Elisabethville on August 13 was in condition to breed, but still accompanied by its mate. From Chitau, Angola, I have seen two females, taken on September 6 and 10, evidently from nests. Their remiges and rectrices are all growing in.

Lophoceros nasutus nasutus (Linnæus)

Buceros nasutus LINNÆUS, 1766, 'Syst. Nat.,' 12th Ed., I, p. 154 (type locality: Senegal).—*Lophoceros nasutus* OUSTALET, 1893, Naturaliste, VII, p. 61 (Ubangi). REICHENOW, 1902, 'Vög. Afr.,' II, pp. 257, 259.—*Lophoceros nasutus nasutus* C. GRANT, 1915, Ibis, p. 270 (Uelle R.). CHAPIN, 1926, Bull. C. Z. C., III, pp. 12, 20 (Uelle distr.). SCHOUTEDEN, 1936, Ann. Mus. Congo, Zool., I, f. 2, p. 90 (Mauda; Faradje; Niarembe; Mahagi Port).

SPECIMENS.—Okondo, near Niangara, ♂, Dec. 18. Dungu, ♂, Jan. 24. Gangura, near Nzoro, ♂, Apr. 8. Faradje, ♀, Jan. 31. Garamba, ♂ juv., Mar. 14.

ADULT MALE.—Iris dark brown, orbit and skin at sides of throat dark gray. Bill black with a pale yellow patch on each side of maxilla near base, and three oblique lines of the same color on each side of the mandible. Feet dusky.

ADULT FEMALE.—The tip of the beak is dark red, and the skin at the angle of the jaw very light green, instead of gray.

¹ 1894, 'Vög. Deutsch-Ost-Afr.,' p. 128 (Mgera, Tanganyika Terr.).

NESTLING.—Iris gray, orbit yellowish white. Bill dusky with greenish tip and streaks on maxilla.

DISTRIBUTION OF THE SPECIES.—Senegambia and Nigeria to the eastern Sudan and Arabia, southward through eastern Africa to Zululand, and westward again to Angola.

L. n. nasutus, without raised casque and with outer secondaries usually tipped with white, ranges from Senegal to Abyssinia, northern Uganda, and northern Kenya Colony. In the eastern part of the range, the bill seems to grow longer than in West Africa. *L. n. forskalii* (Hemprich and Ehrenberg) of western and southwestern Arabia is slightly larger and has whitish edgings on the feathers of the whole back. *L. n. ephrinus* is distinguished in the males by having a higher ridge to the culmen, pointed or truncate anteriorly so as to form a slight casque. The bill of the female differs little from that of *nasutus*, but the secondaries are darker at their tips. This last race occupies most of southern tropical Africa.

Within our limits *L. n. nasutus* is restricted to the northern savannas, from the Ubangi east to Mahagi Port, and it has not been found in the vicinity of Lake Edward or Lake Kivu. Thus in the Congo it is a lowland bird, though plentiful in Abyssinia at 4000 to 6000 feet. In the Upper Uelle we found *nasutus* a rather solitary bird, perching in the larger trees of the upland savannas. It owes its Azande names, "Swanga" and "Piänga," to its piping voice, often heard during the dry season. The notes are uttered from a perch, the bird raising its beak, opening it slightly, and commencing with a weak, high-pitched "pee, pee, pee—" After a while the syllables become longer and louder, "piäng-a, piäng-a, piäng-a—," until the performance ends, perhaps twenty seconds from the start. Though hardly loud enough to attract much attention, these notes can be heard for several hundred yards.

This hornbill spends only the drier months in the Uelle, withdrawing thereafter to the Sudan. Lynes¹ noted a northward migration in Darfur during the latter half of June, though some remained there throughout the year. In 1911 we noted its return near Faradje on November 22, and during two years there found that they disappeared about the first of May.

Before that, nesting had been completed in holes in trees. A brood of four nestlings was brought to Lang at Garamba on March 14; and a young bird, about large enough to leave the nest, was shown to us be-

¹ 1925, *Ibis*, p. 380.

tween Faradje and Nzoro on April 25. At Mauda Dr. Schouteden obtained two very young birds on March 22.¹

Fruit is a small item in the diet of this species, for it was found in but one of the five stomachs examined. All of them contained insect-remains, which included nine large grasshoppers, some beetles, and a large bug. One old male bird had even eaten a chameleon.

***Lophoceros nasutus epirhinus* (Sundevall)**

Buceros epirhinus SUNDEVALL, 1850, *Cefv. K. S. Vet.-Akad. Förh.*, VII, p. 108 (type locality: Caffraria superiore, lat. 24° S.).—*Buceros nasutus* SCHALOW, 1886, *J. f. O.*, pp. 413, 420, 433 (Lufuku R.; Lukumbi R.; Likulwe R.); 1887, *idem*, p. 235 (Luapula R.).—*Lophoceros nasutus* MATSCHIE, 1887, *J. f. O.*, p. 150 (Mpala).—*Lophoceros nasutus epirhinus* REICHENOW, 1902, 'Vög. Afr.', II, p. 258. SASSI, 1912, *Ann. Naturh. Hofmus. Wien*, XXVI, p. 368 (Kisaka). SCHOUTEDEN, 1918, *Rev. Z. A.*, V, p. 247 (Baraka). W. L. SCLATER, 1930, 'Syst. Av. Æth.', App., p. 854. BERLIOZ, 1936, *Bull. Mus. Paris*, (2) VIII, p. 328 (Luvungi).—*Lophoceros nasutus* var. *epirhina* DUBOIS, 1905, *Ann. Mus. Congo, Zool.*, I, f. 1, p. 34 (Katanga); 1911, 'Wytzman's Genera Av.', 13th pt., p. 21.—*Lophoceros epirhinus* NEAVE, 1910, *Ibis*, p. 110 (Bunkeya R.). MOURITZ, 1914, *Ibis*, p. 35 (Musoshi R.).

DISTRIBUTION.—From the vicinity of Mombasa in East Africa, and the region west of Lake Victoria, southward to Zululand and Bechuanaland, westward to Mossamedes. The range extends to the Ruzizi Valley, down the west shore of Lake Tanganyika, and across the Katanga; but I know of no record from the Kasai or Lower Congo.

This southern race, with a better developed ridge surmounting the culmen, has a shorter bill than the typical form. In males of *L. n. nasutus* the culmen varies from 86 to 105 mm., in females from 75 to 83 mm. A series of measurements by Austin Roberts² shows that the culmen of *epirhinus* in South Africa varies from 82.5 to 88.5 mm. in males, and from 66 to 70.5 mm. in females. Five adult males from the southeastern Congo have the culmen 78–86 mm. In one male from the Ruzizi Valley this measurement is 93 mm., yet the rudimentary casque is a little more developed than in males from the Uelle. Secondaries and inner primaries are narrowly tipped with white. It is thus somewhat intermediate between *epirhinus* and *nasutus*. Berlioz has reported another example of *epirhinus* from the same locality. Two females from Tembwe have the culmen 70 and 75 mm. long.

In the region of Lake Tanganyika the period of reproduction comes evidently in the southern dry season, for my Ruzizi Valley male on July

¹ The female molts all her wing- and tail-quills while in the nest. Records of nesting in other regions will be found in Millet-Horsin, 1923, *Rev. Fr. O.*, XV, p. 234; Pitman, 1930, *Ool. Rec.*, X, pp. 75, 76; and Cheesman, 1935, *Ibis*, pp. 316, 317.

² 1917, *Ann. Transvaal Mus.*, V, p. 250.

18 was in condition to breed. In western Tanganyika Territory a brood of four young of *L. n. epirhinus*, taken by a black from the inclosed nest, was brought to Böhm on September 26. The nesting habits are similar to those of *L. n. nasutus*.¹

[*Lophoceros erythrorhynchus erythrorhynchus* (Temminck)]

Buceros erythrorhynchus TEMMINCK, 1823, 'Planches Coloriées,' livr. 36, sp. 19 (type locality: Senegal).—*Torvus erythrorhynchus* SCHWEINFURTH AND RATZEL, 1888, 'Emin Pascha,' German Ed., p. 19 (Kirota, E. of L. Albert).—*Lophoceros erythrorhynchus* O.-GRANT, 1892, 'Cat. Birds Brit. Mus.,' XVII, p. 409 (Dembo in Bahr-el-Ghazal).—*Lophoceros erythrorhynchus erythrorhynchus* C. GRANT, 1915, Ibis, p. 272 ("through northern Belgian Congo").

The range of *L. erythrorhynchus* encircles the Congo, but thus far I know of no specimen taken within our limits. *L. e. erythrorhynchus* extends from Senegal across Nigeria and the Sudan to Abyssinia, Somaliland, Kenya Colony, and Tanganyika Territory. Captain Grant's inclusion of the northern Belgian Congo in its range must be erroneous. It is a bird of rather drier country than the Uelle district, and so far as I am aware does not extend much south of Wau in the Bahr-el-Ghazal Province, though reported from Lado and east of Lake Albert.²

L. e. rufirostris, with a complete dark bar across the outer tail-feathers, less white on secondaries, and chest with dusky lateral margins on feathers, extends from the neighborhood of Lake Tanganyika to western Transvaal and southern Angola. Birds from Damaraland, purer white on face and chest, have been separated as *L. e. damarensis* Shelley; and a fourth race has been described by Roberts³ from Ngamiland.

[*Lophoceros erythrorhynchus rufirostris* (Sundevall)]

Buceros rufirostris SUNDEVALL, 1850, Æfv. K. S. Vet.-Akad. Förh., VII, p. 108 (type locality: Upper Caffraria).—*Allophus erythrorhynchus* DUBOIS, 1886, Bull. Mus. Roy. Hist. Nat. Belg., IV, p. 147 (region of L. Tanganyika).—*Lophoceros erythrorhynchus* DUBOIS, 1905, Ann. Mus. Congo, Zool., I, f. 1, p. 33 (Tanganyika; "Umangi").—*Lophoceros erythrorhynchus caffer* W. L. SCLATER, 1924, 'Syst. Av. Æth.,' pt. 1, p. 227 ("Katanga").—*Lophoceros erythrorhynchus rufirostris* FRIEDMANN, 1930, Bull. 153, U. S. Nat. Mus., p. 413.

It seems almost certain that Dubois's specimen did not come from the western side of Lake Tanganyika, and I know of no authentic record from within our limits. Sclater included the Katanga in its range, but

¹ See Paget-Wilkes and Sladen, 1930, Ibis, p. 450; and Priest, 1934, 'Birds S. Rhodesia,' II, pp. 369-371.

² Nesting habits described by Shuel, 1938, Ibis, p. 470, and Moreau, 1938, Ibis, pp. 533-536.

³ 1932, Ann. Transvaal Mus., XV, p. 25 (Maun).

the Congo Museum has none from that district, and Neave¹ did not find it nearer than the upper Loangwa Valley.

***Tropicranus albocristatus cassini* (Finsch)**

Ortholophus cassini FINSCH, 1903, Notes Leyden Mus., XXIII, p. 201 (type locality: Victoria, Cameroon). REICHENOW, 1903, 'Vög. Afr.,' II, pp. 718, 719 (Lower Guinea). SASSI, 1912, Ann. Naturh. Hofmus. Wien, XXVI, p. 369 (Beni; Mawambi; Mawambi-Irumu). CHAPIN, 1915, A. M. Journ., p. 282, Fig. SCHOUTEDEN, 1918, Rev. Z. A., V, p. 247 (Beni).—*Berenicornis* sp.? JOHNSTON, 1884, 'River Congo,' p. 367 (lower Congo R.).—*Berenicornis albocristatus* SHELLEY, 1888, Ibis, p. 69 ("Louembe" [= Luemba]; "Chikambo" [= Chissambo]).—*Ortholophus albocristatus* O.-GRANT, 1892, 'Cat. Birds Brit. Mus.,' XVII, p. 425 (N. bank lower Congo R.). OUSTALET, 1893, Naturaliste, VII, p. 61 (Congo R.; Ubangi R.). REICHENOW, 1902, 'Vög. Afr.,' II, p. 267. DUBOIS, 1905, Ann. Mus. Congo, Zool., I, f. 1, p. 34 (Prov. Orientale; Banalia; Mayombe).—*Berenicornis* sp. EMIN, 1894, J. f. O., p. 167 (old Irumu).—*Ortholophus albocristatus* var. *leucolophus* DUBOIS, 1905, Ann. Mus. Congo, Zool., I, f. 1, p. 34 (L. Leopold II).—*Ortholophus* LANG AND CHAPIN, 1918, A. M. Journ., p. 275, upper Fig., p. 276.—*Tropicranus albocristatus cassini* BANNERMAN, 1922, Rev. Z. A., X, p. 141; 1933, 'Birds Trop. W. Afr.,' III, p. 343 (Poko). SCHOUTEDEN, 1923, Rev. Z. A., XI, pp. 325, 393 (Basongo; Luebo; Makumbi; Ngombe; Tshikapa; Kwamouth); 1924, idem, XII, p. 414 (Eala; Tondu); 1925, idem, XIII, p. 10 (Kunungu; Mongende); 1936, Ann. Mus. Congo, Zool., I, f. 2, p. 90 (Kotili; Buta; Kondolole; Panga; Poko; Doruma). W. L. SCLATER, 1924, 'Syst. Av. Æth.,' pt. 1, p. 231. GYLDENSTOLPE, 1924, K. Svenska Vet. Akad. Handl., (3) I, No. 3, p. 274 (Kampi na Mambuti). CHAPIN, 1926, Bull. C. Z. C., III, pp. 11, 12, 16, 17, 18, 20, 1 Fig. (Avakubi).—*Tropicranus albocristatus* DE WITTE, 1930, Bull. C. Z. C., VII, p. 6. CHAPIN, 1931, Nat. Hist., XXXI, p. 605 (Lukolela).

SPECIMENS.—Bafwasende, ♂, ♂ juv., Sept. 24. Avakubi, 4 ♂, Aug. 3, 18, Nov. 26; ♀, Aug. 3; ♂ im., Oct. 9; ♂ juv., ♀ juv., Aug. 3. Ngayu, ♂ juv., Dec. 14. Gamangui, ♂, Feb. 9. Medje, 3 ♂ juv., Sept. 14, 15, 21; ♀ juv., Oct. 9. Niangara, 2 ♂, May 10, 16; 2 ♀, May 20, Dec. 8; ♀ juv., May 20.

ADULT MALE.—Iris yellowish white, often with dark brown inner rim, orbit blackish. Bill black with a creamy line along the middle part of the cutting edge of maxilla, and another light stripe tinged with rufous, running forward from the nostril to meet it. Skin at angle of jaw flesh-color or reddish, colored by the blood in it. Feet light blue, claws black.

ADULT FEMALE.—Differs in lacking the light stripe on the bill in front of the nostril, though it does have the whitish lower edge to the maxilla. Skin at angle of jaw as in male.

NESTLINGS.—Have the iris at first light brownish, the bill pale greenish gray, feet whitish faintly tinged with yellow, and the skin of whole body flesh-color. Half-grown young show bluish-gray or grayish-white irises.

DISTRIBUTION OF THE SPECIES.—Whole forest area of Upper and Lower Guinea. *T. a. albocristatus* (Cassin) of Sierra Leone, Liberia, and

¹ Ibis, 1910, p. 110.

the Ivory Coast has throat black and wing-quills without white tips. *T. a. macrourus* (Bonaparte) of the Gold Coast has the chin white and a mixture of white on the throat, and its primaries are sometimes narrowly tipped with white. *T. a. cassini* of the Lower Guinea forest differs from both of the preceding by the conspicuous white tips on all its remiges, and all the greater wing-coverts show spots at their tips. Chin and throat are black.

This race of the long-tailed hornbill ranges from the vicinity of Lagos in Southern Nigeria eastward to the Upper Uelle district and the Semliki Valley, southward to Banana, the Mayombe forest, Kasanga near the Kwango River, and the southern Kasai district. It inhabits the larger gallery forests north and south of the solid forest belt, and is a rather common bird in the area of solid forest. While not restricted to the virgin growth, it is less conspicuous than one might expect, and does not come out into clearings.

In the Uelle and Ituri districts, as in West Africa, the natives all tell of its habit of following bands of monkeys. The comradeship is shared by a large squirrel, *Protoxerus stangeri*. One might assume that the monkeys and the hornbills were simply attracted to the same trees by fruit, but this is not borne out by our stomach examinations. Insects compose the greater part of the birds' food. More probably the monkeys drive insects from their concealment, and these are preyed upon by the hornbills. Such a habit is attributed by Ridley¹ to a drongo of Borneo, *Dissemurus paradiseus*, which follows macaques. H. C. Raven tells me that in Celebes *Dicruropsis leucops* accompanies *Cynopithecus* in the same manner.

Usually found in pairs or family parties, the long-tailed hornbills haunt the lower boughs of forest trees, frequently coming close to the ground. When they pursue each other the long rectrices flutter as they dodge and turn, yet the birds are agile enough to catch insects habitually on the wing. One of their usual notes is a peculiar "û û û—ah!," not loud, but suggesting a human imitation of a hyæna's wail. The same hollow quality characterizes the birds' other shorter notes.

In the Ituri district the breeding season appears to last from July to December, while at Niangara on May 20 we found an adult female accompanied by a young bird with tail but half-grown. They could not have left the nest more than a week before. At Lukolela I was shown a

¹ 1901, Straits Branch Journ. Roy. Asiatic Soc., No. 36, p. 105. See also Shelford, 1917, 'A Naturalist in Borneo,' p. 56.

nest on January 15, and at Luluabourg in the Kasai Father Callewaert secured a young bird, about ready to leave the nest, on November 6.

The nest found near Avakubi on August 3 was about 35 feet from the ground in the hollow trunk of a fair-sized tree along the border of a banana patch. The male bird was catching insects on the wing in the vicinity and carrying them to the minute aperture, where he clung against the bark, supported by his tail. A native climber broke out the little dung-like material which had been stuck to the edges of the hole, and pulled out two young birds, still nearly naked, with eyes closed. To secure their mother we had to cut down the tree. During her confinement she had shed all her wing and tail-quills. These littered the nest, and her new rectrices were still less than half their full length. She was well fed, actually fat; and while there were few stones from fruit in the nest, remains of insects were numerous, especially the wings of a large cicada, *Ugada grandicollis*. There were also a few feathers of a small bird, evidently eaten by the hornbills.

Of the twenty-two stomachs examined, only eleven contained any remains of fruit. Four of them held a half dozen small palm-nuts, and seven others wild fruits. Every stomach disclosed some remains of insects, while one shrew and a young passerine bird like a weaver were found in addition. Beetles were present in 13 stomachs, grasshoppers in 6, caterpillars in 3, cicadas in 2, a large leaf-hopper once, and a large bug once. Several insect-larvæ other than caterpillars were noted, and the insects in 6 stomachs were not identified. The shrew had been eaten by an immature hornbill, and the small bird by a female imprisoned in her nest.

KEY TO THE CONGO SPECIES OF *BYCANISTES*

- 1.—Lower breast and belly white; wing usually less than 290 mm. long. 2.
 Breast black, belly wholly or in part white; wing usually longer than 290 mm. . . . 3.
- 2.—Outer tail-feathers wholly white, or nearly so; casque whitish, but not always well developed in males; naked orbits blackish. *B. sharpii*.
 Outer tail-feathers mostly black, white only at tips; with large blackish casque in the male; naked orbit light reddish. *B. bucinator*.
- 3 —All wing-quills black, with white only at base; tail largely black, but with white at very base and on tips of all but median rectrices; ear-coverts and neighboring feathers marked with gray. *B. cristatus*.
 Tips of the secondaries white. 4.
- 4.—Middle rectrices black, white only at very base and sometimes narrowly at tip, outer rectrices with at least distal half white; casque very large in male, whitish above and behind; sides of head broadly margined with silver-gray. *B. subcylindricus*.
 Middle tail-feathers with distal third white, like the outer ones, and all of them

white at the base, a broad black band crosses the tail; sides of head with no gray markings. *B. albotibialis*.

***Bycanistes sharpii sharpii* (Elliot)**

Buceros sharpii ELLIOT, 1873, Ibis, p. 177 (type locality: Angola).—*Buceros fistulator* REICHENOW, 1887, J. f. O., pp. 299, 304 (Manyanga; Leopoldville).—*Bycanistes sharpii* O.-GRANT, 1892, 'Cat. Birds Brit. Mus.,' XVII, p. 422 (Congo).—*Bycanistes sharpei* OUSTALET, 1893, Naturaliste, VII, p. 61; 1904, Bull. Mus. Paris, p. 434 (in part. Congo). REICHENOW, 1902, 'Vög. Afr.,' II, p. 245 (in part. Manyanga; Leopoldville; Kwango R.). LÖNNBERG, 1907, Arkiv f. Zool., III, No. 21, p. 8 (Mukimbungu).—*Bycanistes leucopygius* DUBOIS, 1905, Ann. Mus. Congo, Zool., I, f. 1, p. 7 (in part. Mayombe).—*Bycanistes fistulator* DUBOIS, 1905, Ann. Mus. Congo, Zool., I, f. 1, pp. 9, 34 (Vivi; Mayombe; "L. Leopold II"); 1909, Bull. Soc. Zool. Paris, XXXIV, p. 133 ("Senegal to Angola").—*Bycanistes leucopygius* DUBOIS, 1905, Ann. Mus. Congo, Zool., I, f. 1, p. 34 (in part. Mayombe).—*Bycanistes sharpii sharpii* W. L. SCLATER, 1922, B. B. O. C., XLII, p. 45. BANNERMAN, 1933, 'Birds Trop. W. Afr.,' III, p. 319, Fig. 86.—*Bycanistes sharpei duboisi* SCHOUTEDEN, 1924, Rev. Z. A., XII, p. 266 (Leopoldville; Kisantu).—*Bycanistes sharpei sharpei* SCHOUTEDEN, 1926, Rev. Z. A., XIII, p. 192 (Makaia Ntete).—*Bycanistes buccinator sharpii* GROTE, 1927, Mitt. Zool. Mus. Berlin, XIII, p. 202.

DISTRIBUTION OF THE SPECIES.—Forests of Lower Guinea, from the vicinity of Lagos to the Semliki Valley, and south to northern Angola, the Kasai district, and probably the Manyema. *B. s. sharpii* ranges from Southern Nigeria to western Cameroon, Lower Congo, and northern Angola. Males of this race have at most only a suggestion of a casque, and in both sexes at least six outer primaries are nearly or quite black. *B. s. duboisi* of southeastern Cameroon and the Upper Congo has a fairly well developed casque in males, and the outer primaries with a considerable amount of white. Females have the mandible less deeply corrugated than those of *sharpii*. *B. fistulator* (Cassin) of Upper Guinea is closely allied to *B. sharpii*, but has much more black on secondaries and rectrices.

Within our limits *B. s. sharpii* occurs rather commonly in the Lower Congo, and probably up to Leopoldville. Intermediates between *sharpii* and *duboisi* are found along a line running from the vicinity of Stanley Pool to the middle Kwango River and Luluabourg in the Kasai district. A specimen from Luluabourg may be referable to *sharpii*, though having some white on the outer primaries.

In habits this typical race is exactly like *duboisi*.

***Bycanistes sharpii duboisi* Selater**

Bycanistes sharpii duboisi W. L. SCLATER, 1922, B. B. O. C., XLII, p. 45 (type locality: Niam-Niam, or Azande country, Upper Uelle distr.); 1924, 'Syst. Av. Æth.,' pt. 1, p. 225. GYLDENSTOLPE, 1924, K. Svenska Vet. Akad. Handl., (3) I,

No. 3, p. 273 (Kartushi). CHAPIN, 1926, Bull. C. Z. C., III, p. 15 (Niagara). BANNERMAN, 1933, 'Birds Trop. W. Afr.,' III, p. 321, Fig. 87 (lower Ubangi R.). STONE, 1936, Proc. Acad. Nat. Sci. Phila., LXXXVIII, p. 562 (Ekibondo).—*Pholidophalus sharpii* SHARPE, 1884, Journ. Linn. Soc. Lond., Zool., XVII, p. 436 (Ndoruma).—*Buceros leucopygius* SHELLEY, 1888, Ibis, p. 55.—*Bycanistes leucopygius* O.-GRANT, 1892, 'Cat. Birds Brit. Mus.,' XVII, p. 418 (Niam-Niam country). DUBOIS, 1905, Ann. Mus. Congo, Zool., I, f. 1, p. 7, Pl. iv (in part. L. Leopold II; central and eastern Congo; Niam-Niam).—*Bycanistes sharpei* REICHENOW, 1902, 'Vög. Afr.,' II, p. 245 (in part. "Ubangi R."; Ndoruma); 1911, 'Wiss. Ergeb. D. Z.-Afr. Exp.,' III, p. 287 (near Beni). OUSTALET, 1904, Bull. Mus. Paris, p. 434 (in part. Krebedje). O.-GRANT, 1908, Ibis, p. 314 (below Kasongo; Ponhierville).—*Bycanistes leucopygius* DUBOIS, 1905, Ann. Mus. Congo, Zool., I, f. 1, p. 34 (in part. Uelle; Prov. Orientale; Umangi; Nouvelle-Anvers; L. Leopold II).—? *Bycanistes buccinator* DUTTON, TODD, AND TOBEY, 1907, Ann. Trop. Med. and Parasit., p. 300 (Coquilhatville).—*Bycanistes leucopygius* DUBOIS, 1909, Bull. Soc. Zool. Paris, XXXIV, p. 133; 1911, Wytsman's Genera Av., 13th pt., p. 11. SASSI, 1912, Ann. Naturh. Hofmus. Wien, XXVI, p. 369 (Mawambi). SCHOUTEDEN, 1918, Rev. Z. A., V, p. 247 (Mutiba).—*Bycanister leucopygius* RODHAIN ET AL., 1913, 'Rapp. Miss. Sci. Katanga,' p. 142 (Congo R.).—*Bycanistes sharpei duboisi* BANNERMAN, 1922, Rev. Z. A., X, pp. 137, 138 (middle Congo R.; Uelle R.). SCHOUTEDEN, 1923, Rev. Z. A., XI, p. 393 (Kwamouth); 1924, idem, XII, p. 414 (Eala); 1925, idem, XIII, p. 10 (Mongende); 1936, Ann. Mus. Congo, Zool., I, f. 2, p. 89 (Kotili; Buta; Bambili; Mauda; Niangara; Rungu). BATES, 1930, 'Handbook Birds W. Afr.,' p. 250.—*Bycanistes buccinator duboisi* GROTE, 1927, Mitt. Zool. Mus. Berlin, XIII, p. 203 (Upper Uelle).

SPECIMENS.—Avakubi, 2 ♂, Feb. 23, Apr. 3. Gamangui, ♂, Jan. 29. Niangara, 4 ♂, Apr. 8, 25, June 7; 2 ♀, Apr. 8, May 25; ♂ juv., May 27.

ADULT MALE.—Iris dark brown, sometimes slightly reddish, orbit black. Bill generally whitish, shading to dull light yellowish at base, with large areas of blackish on the mandible and on the lower portion of the sides of the maxilla. Claws and large scales on feet greenish black, softer skin blue-gray.

ADULT FEMALE.—Iris dark brown, orbit and skin near base of beak greenish gray. Bill without any black patches, its sheath more deeply corrugated basally than the male's.

MALE NESTLING.—Iris light gray exteriorly, blackish on inner edge, orbit dark gray. Bill light greenish, feet bluish gray, claws black.

DISTRIBUTION.—Lowland forests from the neighborhood of Stanley Pool and the River Ja, Cameroon, eastward to the Upper Uelle, the valley of the Semliki, the vicinity of Kasongo, and southward to the northern Kasai. In the Uelle its range extends out along the gallery forests to the border of the Sudan, though we never saw it close to Faradje. Males from Kwamouth and Kunungu have casques averaging shorter than those of the northeastern Congo.

At Niangara, where two species of *Bycanistes* occur, this one was commoner than *B. subcylindricus*. In the Ituri forest it is not unusual,

going in pairs or trios, but far more difficult to secure than *B. albotibialis*; and on the Congo River we noted it but a few times, whereas *albotibialis* was seen frequently flying across the stream. The flight of *Bycanistes sharpii* produces only a slight swishing, and its voice differs from that of *albotibialis*, being usually a loud "kah-k-k-k-k-," almost like raucous laughter. Both *sharpii* and *albotibialis* have shorter and less mournful calls than those of *Ceratogymna atrata* or *Bycanistes subcylindricus*.

The nesting season, in the northern Ituri, probably commences in January, for the male taken at Gamangui was in condition to breed; but at Niangara it may be retarded by the drought until March. On May 27, a native brought us a nestling of *duboisii*, with wing-quills scarcely two-thirds grown, which he had taken from a hollow in a tall tree, discovered through the visits of the male, bearing food. As the man climbed the tree, the female bird heard him and flew out, leaving her single offspring. That the female had molted during her confinement was shown by the presence of more than 20 of her large flight-feathers in the nest. The young bird did not hold its tail erect, hopped awkwardly on the ground, and flew with great effort a couple of yards.

At Lukolela, on July 29, I visited a nest in a hollow of a live forest tree. The entrance was a knot-hole some 28 feet up, and natives had already captured the female and cracked her two white eggs. These were partially incubated, and seemed to have measured about 50×35 mm. The hole was said to have been walled in with clay, but I saw none of the material.

When brought to me the incubating female lacked all her rectrices. They may have been pulled out, and none was yet being renewed. A gradual molt of the remiges had just begun, for the two innermost primaries of each wing were growing out, while the third had just been shed.

Adult female birds may also molt wing- and tail-quills in the open, for one I collected at Niangara on May 25, and which seemed from the condition of ovary and oviduct to have finished breeding recently, was renewing the middle and outer rectrices, and a gradual molt was taking place in the wings. Perhaps she had just left a nest.

Every one of the nine stomachs examined contained fruit of some sort. In 3 cases there were also insects: a large beetle, about 30 very large winged ants, and 2 small black wasps (*Polybioides melaina*). On one occasion, toward sundown, I watched three hornbills of this species catching termites on the wing.

Bycanistes bucinator (Temminck)

Buceros bucinator TEMMINCK, 1824, 'Planches Coloriées,' III, pt. 48, Pl. CCLXXXIV (type locality: Cape of Good Hope).—*Bycanistes buccinator*, NEAVE, 1907, Mem. Proc. Manchester Lit. Phil. Soc., LI, No. 10, p. 35 (near Kapopo, N. W. Rhodesia); 1910, Ibis, p. 111. DE RIEMAECKER, 1927, Rev. Z. A., XIV, p. 270 (Lubumbashi R.; Makobo R.).—*Bycanistes buccinator buccinator* GROTE, 1927, Mitt. Zool. Mus. Berlin, XIII, pp. 202, 203, map (southernmost Congo).—*Bycanistes bucinator* SCHOUTEDEN, 1930, Rev. Z. A., XVIII, p. 283 (Kafubu R.).

DISTRIBUTION.—From eastern Cape Province north to the coastal area of East Africa as far as the Tana River, the interior of Tanganyika Territory, the Katanga, Angola, and the middle Kwango River, near 7° 30' S. latitude. There are specimens in the Congo Museum from Pweto on Lake Moero, Elisabethville, Kinda in the Lulua district, and the falls of the Kwango River. At Sankisia Dr. J. Bequaert shot an example and preserved careful notes of its coloration.

The Kwango River specimens are smaller in every way than those from the region of the Katanga. The adult males from Wilhelm Falls have wings 273 and 275 mm., culmen to base 120 mm. in both, length of casque 93 and 89.5 mm. Three males from the southeastern Congo have wings 283, 290, 299 mm., culmen 124, 130, 133 mm., casque 111, 112, 128 mm. Females differ in much the same degree. An adult male from the Lumi River, Kenya Colony, has a larger casque than those of the southeastern Congo, 133 mm. long, and is much more streaked with silvery on malar region and ear-coverts. The Kwango birds would certainly deserve separation from the typical form if it were possible to define geographic limits for such a race.

Of the habits of *B. bucinator* in Northwest Rhodesia, Neave said that it is almost invariably to be found in dense woods in the neighborhood of water, where the number of fruit trees would appear to be the attraction. In life the pinkish-red orbital skin is very conspicuous, even when the birds are flying over. Belcher described their varied cries as suggesting the bray of some animal, or perhaps the noise of a toy trumpet, or even the crying of a child.

From Gazaland Swynnerton¹ reported a nest in a large hollow tree-trunk, at a height of 25 feet, entered through a narrow slit which was further walled in with a mixture of red forest earth and the bird's own droppings. It was located in the last days of December, and held four unfledged young. Evidently the eggs were laid at intervals, for one of the nestlings was far more advanced than its fellows. In Natal, A. G.

¹ 1908, Ibis, pp. 405, 406.

Millar¹ found that sets of two pale cream-colored eggs were laid, and that the same hollows in trees were used from year to year, the entrance being plastered up completely during the time that it was vacant. There can be no doubt that the male does gather wet clay to plaster up the sides of the opening, for I have seen this in a film taken in the London Zoo.

Nesting may be expected to begin in the Katanga toward October. Mouritz² had two young *Bycanistes* from a nest brought to him at Sibokwa's kraal in November, and there is good reason to suppose that they were of this species.

***Bycanistes albotibialis* (Cabanis and Reichenow)**

Buceros albotibialis CABANIS AND REICHENOW, 1877, J. f. O., pp. 19, 103 (type locality: Chinchoxo, Loango Coast).—*Bycanistes albotibialis* OUSTALET, 1893, Naturaliste, VII, p. 61 (Ubangi). REICHENOW, 1902, 'Vög. Afr.', II, p. 242; 1911, 'Wiss. Ergeb. D. Z.-Afr. Exp.', III, p. 287 (near Beni). DUBOIS, 1905, Ann. Mus. Congo, Zool., I, f. 1, pp. 6, 34 (Prov. Orientale; Ituri; L. Leopold II). SALVADORI, 1909, Ann. Mus. Civ. Stor. Nat. Genova, (3) IV, p. 322 (Buta-Dungu). SASSI, 1912, Ann. Naturh. Hofmus. Wien, XXVI, p. 369 (Moera). SCHOUTEDEN, 1914, Rev. Z. A., III, p. 265 (Kilo); 1918, idem, V, p. 247 ('Kivu'; Buwissa; Bolovet; Lesse; Assumba; Penge); 1923, idem, XI, pp. 325, 394 (Luebo; Makumbi; Ngombe in Kasai; Tshikapa; Kwamouth); 1924, idem, XII, p. 414 (Eala); 1925, idem, XIII, p. 10 (Kunungu; Mongende), 1932, idem, XXII, p. 126; 1936, Ann. Mus. Congo, Zool., I, f. 2, p. 90 (Ibembo; Djamba; Kotili; Buta; Panga; Medje; Poko; Rungu). LÖNNBERG, 1917, Arkiv f. Zool., X, No. 24, p. 19 (Beni). LANG AND CHAPIN, 1918, A. M. Journ., p. 277 (Ituri and Aruwimi rivers). BANNERMAN, 1922, Rev. Z. A., X, p. 138, 1933, 'Birds Trop. W. Afr.', III, p. 322 (Angu). GYLDENSTOLPE, 1924, K. Svenska Vet. Akad. Hand., (3) I, No. 3, p. 273 (Kartushi). W. L. SCLATER, 1924, 'Syst. Av. Æth.', pt. 1, p. 226 (Upper Uelle). CHAPIN, 1926, Bull. C. Z. C., III, p. 11 (Avakubi); 1931, Nat. Hist., XXXI, pp. 603, 606, 607, Figs. (Lukolela). BATES, 1930, 'Handbook Birds W. Afr.', p. 248. STONE, 1936, Proc. Acad. Nat. Sci. Phila., LXXXVIII, p. 563 (Saidi; Ekibondo).—*Buceros (Pholidophalus) kethullei* DUBOIS, 1900, O. Mb., VIII, p. 69 (type locality: Nouvelle-Anvers).—*Bycanistes cylindricus albotibialis* GROTE, 1927, Mitt. Zool. Mus. Berlin, XIII, p. 204.

SPECIMENS.—Lukolela, ♂, July 18. Risimu, near Stanleyville, ♂, Sept. 8. Bafwaboli, ♂, Sept. 12. Bafwasende, ♂, Sept. 24. Avakubi, 4 ♂, Jan. 21, 22, Oct. 1, Nov. 16; 5 ♀, Jan. 22, Feb. 24, Aug. 8, Sept. 4, Oct. 2. Ngayu, ♂, Dec. 17. Bafwabaka, 2 ♀, Dec. 31; ♀ im., Dec. 30. Gamangui, ♂, Jan. 29. Medje, ♂, ♀, Apr. 26; ♂ juv., Oct. 2. Nala, ♂, July 14. Rungu, ♂, June 30.

ADULT MALE.—Iris dark brown, rim of eyelids blackish, but naked orbit creamy or yellowish white. Bill largely blackish brown, but with the tips of both mandibles, and most of the casque, light greenish gray. Larger scales on feet, like the claws, greenish black, but the softer skin bluish gray.

¹ 1921, S. Afr. Journ. Nat. Hist., III, pp. 217-219.

² 1914, Ibis, p. 35.

ADULT FEMALE.—Iris grayish brown, feet often lighter than male's: **greenish gray**, and tip of bill may be greenish white.

MALE NESTLING.—Iris bluish gray with dusky inner rim; bill **grayish green**; feet bluish gray, with larger scales and claws blackish.

DISTRIBUTION.—From the district just north of Lagos in Southern Nigeria, eastward across the Cameroon to the Upper Congo, and southward to Landana, middle Kwango River, and southern Kasai. There is no published record from the Belgian Mayombe, and during my own brief visit there I never saw it. In the Congo its range coincides in general with the area of heavy forests, extending northward to the Bomo-kandi River, eastward to the Semliki, and southward to Tshikapa in the Kasai. The southernmost point at which we noted it on the Congo River was a telegraph post just below Lukolela. Only in the Kasai and Kwango districts does it range far out into gallery forests.


Specimens from the eastern Congo forest average slightly larger, in wing, tail, and beak, than those from Kunungu, Lukolela, and Eala. In the central Upper Congo and the Kasai the size is more or less intermediate. With such gradual intergradation it is hopeless to recognize any races.

On the upper Congo, between Lukolela and Stanleyville, this is the commonest large hornbill seen from the steamer. The flight is not at all swift, but gives the impression of extreme lightness. Their course is a leisurely undulation, for several beats of the wings are followed by a descending glide, and before alighting the birds often sail for a considerable distance. The wing-beats produce a loud "ch-ch-ch—" In the Ituri the species is very common, as it appears to be in nearly all areas of unbroken lowland forest.

They seek the highest trees, and attract attention by their raucous voices, as well as by the commotion when they take wing. Flocks of five or six are common, gathering in trees that bear their favorite fruits. A descending series of harsh notes, "Rack, kack, kak-kak-kak- . . .," is given frequently, or a single "kack!"

Among the Wabali and the Bandaka of the Ituri forest, *Bycanistes albotibialis* is of prime importance in their superstitious customs. It might be called their totem, for although the natives of the Congo usually have no scruple against eating any bird whatever, these tribes hold the black-and-white hornbill (called by them "Nasasa") in such reverence that none of the tribe save young boys may eat it. The taboo is further extended to all hornbills, large and small, each species of which bears its distinctive name. The large black *Ceratogymna*, for instance,

is known as "Ambumbu." For some obscure reason the black-and-white monkey (*Colobus abyssinicus ituricus*) is likewise not eaten by men of the tribe, although monkeys of the genus *Cercopithecus* are highly esteemed, and continually hunted.

The importance of the hornbill was explained by Fariala, a Mobali chief near Avakubi, as follows: The bird cannot be eaten because of its connection with the peculiar scars which decorate the chest and abdomen of almost every Mobali man, crescentic marks usually placed symmetrically in two vertical lines.  These decorations denoting manhood are acquired at about the age of fifteen, after an elaborate ceremony.¹

A nest of the "Nasasa" must first be found, and the female taken out and placed in a basket. No other hornbill will do. A great reunion is now held, and the boys to be initiated receive a prolonged thrashing from the grown men of the community, who are provided with switches eight feet long. After this test of courage, they are taken out into the forest, the hornbill is brought forth, and is alleged to bite the marks on the skin of their bodies. To hide the wounds from the sight of women, they are covered with leaves, and the boys return to their village. The rite has no relation with that of circumcision, usually undergone at a much earlier age.

All this is as Fariala told it. One cannot believe that the bird, however vigorous its bite, can actually cut such regular wounds, and other Wabali have admitted that they are made with a knife. Yet all show the same respect for the hornbill, and refuse to eat it. After the "Mambela" the boys wear a heavy collar made of raphia fibre and pieces of wood, which is only discarded when completely frayed out. It must then be cast into a river.

In a village on the Ituri River, I witnessed the whipping portion of the "Mambela" on January 2; but at that time of year we found no proof of the birds' nesting. Specimens with enlarged gonads were taken at Medje on April 26, and at Rungu, June 30; and at Poko Dr. Christy collected a half-grown nestling on July 8. Nesting must last through a still greater period of the year, for at Medje on October 2 we also secured from natives a young bird with tail but half grown. It was hardly big enough to have left the nest.

At Lukolela, just south of the equator, I have collected males in

¹ The rite is known as "Mambela," and a good description of it will be found in T. A. Barns, 1922, "Wonderland of the Eastern Congo," pp. 196-203. See also F. W. H. Migeod, 1923, "Across Equatorial Africa," pp. 191, 199, 200.

breeding condition on July 18 and August 24, and found a nest on December 12, in heavy forest not far from my house. This was in the hollow trunk of a large, rough-barked tree (*Petersia africana*), opening by a knot-hole 81 feet above the ground. For thirty-four days we watched the male bringing food to the opening, which had been closed in to a slit just the size of his beak. On December 22 he made eighteen visits in less than ten and a half hours, on January 12 fourteen in about ten and three-quarters hours.

Finally on January 14 the tree was felled, and the adult female with her single offspring captured. The mother was molting her wing- and tail-quills gradually, so that at any time she would have been able to fly. The nestling's wings and tail were not fully grown, and it made no attempt to fly. The partition at the entrance to the nest was composed entirely of dung. The nest was perfectly clean, so I suppose that both female and young defecate toward the opening, and the beaks of both male and female model the edge of the slit that remains open.

At this same season another pair of *B. albotibialis* had a nest in one of four large trees standing well out in a clearing, a mile and a half away from the first nest. By January 4 the female seemed already to have emerged, leaving a young bird in the nest. On February 14, I visited still another nest which had been despoiled the day before by natives. It was also in a hollow *Petersia* tree, 72 feet from the ground, and the partition at the entrance was still intact. Here again it was of dung, without any clay. The single well-grown nestling was brought to me, but its mother had been eaten. By comparing the quills plucked from her with the old ones found in the nest I was able to see that she too had been molting gradually, and that her power of flight had not been lost. *B. albotibialis* either has two periods of reproduction at Lukolela, or it nests during at least six months.¹

Of eighteen stomachs, all contained fruits but one, which held some indeterminate vegetable matter. In one case the fruit was that of the parasol tree (*Musanga Smithii*), a yellowish pulp filled with small seeds; the other birds had eaten a great variety of forest fruits. Insects are not altogether disdained, they were found in four of the stomachs, and comprised 2 mantises, 1 large green orthopter, 1 dragon-fly, and a large ant. At Avakubi I have watched this hornbill, as well as *B. sharpii duboisi*, hawking for winged termites.

¹ For an excellent comparative study of the breeding habits of African hornbills, see Moreau 1937, P. Z. S. Lond., (A) pt. 3, pp. 331-346.

[*Bycanistes cristatus brevis* Friedmann]

Bycanistes cristatus brevis FRIEDMANN, 1929, Proc. N. Eng. Zool. Cl., XI, p. 32 (type locality: Mt. Lutindi, Usambara).—? *Bycanistes cristatus* MOURITZ, 1914, Ibis, p. 35 (Musoshi escarpment in Katanga).

DISTRIBUTION OF THE SPECIES.—East Africa from Abyssinia to the Zambesi. *Bycanistes c. cristatus* (Rüppell), with wings of males usually 380 mm. and longer, may be restricted to Abyssinia and the region of Lake Rudolf. In *B. c. brevis*, ranging from Mt. Kenya southward, the wings of males are said to measure 345–377 mm. This difference has however been denied by Grant and Mackworth-Praed.¹

This species of hornbill is known from the northern end of Lake Nyasa, in the highlands, and might perhaps be expected to reach the Katanga. Thus far, however, I know of no satisfactory record. Mouritz mentioned it as noticed near the Musoshi escarpment in the Upper Katanga, but no one has yet collected a specimen in that region. *B. cristatus* should easily be recognized in life by the blackness of its wing-quills, which are whitish only at the very base. In East Africa it prefers heavy forest with large trees, and this type of vegetation is scarce in the Katanga.

***Bycanistes subcylindricus subquadratus* Cabanis**

Bycanistes subquadratus CABANIS, 1880, J. f. O., p. 350, Pl. I (type locality: Mona Hongola, Angola). O.-GRANT, 1892, 'Cat. Birds Brit. Mus.,' XVII, p. 419 (Talla-Mogongo in Angola; Niam-Niam country). OUSTALET, 1893, Naturaliste, VII, pp. 60 (Fig.), 61 (Ubangi).—*Bycanistes subcylindricus* REICHENOW, 1902, 'Vög. Afr.,' II, p. 241; 1911, 'Wiss. Ergeb. D. Z.-Afr. Exp.,' III, p. 287 (near Beni). DUBOIS, 1905, Ann. Mus. Congo. Zool., I, f. 1, p. 34; 1911, Wytzman's Genera Av., 13th pt., p. 12. SASSI, 1912, Ann. Naturh. Hofmus. Wien, XXVI, p. 368 (N. W. of L. Tanganyika). LÖNNBERG, 1917, Arkiv f. Zool., X, No. 24, p. 19 (Rutshuru). SCHOOTEDEN, 1918, Rev. Z. A., V, p. 246 (Beni; Sibatwa forest; Mutiba; Bolovet; Lesse); 1936, Ann. Mus. Congo, Zool., I, f. 2, p. 90 (Mahagi Port). SCLATER AND M.-PRAED, 1919, Ibis, p. 667 (Upper Uelle). GYLDENSTOLPE, 1924, K. Svenska Vet. Akad. Handl. (3) I, No. 3, p. 272. W. L. SCLATER, 1924, 'Syst. Av. Æth.,' pt. 1, p. 226. CHAPIN, 1926, Bull. C. Z. C., III, p. 16 (Niagara). GROTE, 1927, Mitt. Zool. Mus. Berlin, XIII, p. 205, map. BANNERMAN, 1933, 'Birds Trop. W. Afr.,' III, p. 327, Fig. 90. BERLIOZ, 1936, Bull. Mus. Paris, (2) VIII, p. 328 (Mbwah).—*Bycanistes aloysii* DUBOIS, 1911, Wytzman's Genera Av., 13th pt., p. 12 ("Ruwendzori").—*Bycanistes subcylindricus subquadratus* BANNERMAN, 1935, B. B. O. C., LV, p. 130, Fig. 2.

SPECIMENS.—Niagara, ♂, Mar. 28; ♀, ♂ juv., May 26. Between Faradje and Aba, 3 ♂, Nov. 30, Dec. 2, 25; 4 ♀, Nov. 27, 30, Dec. 2, 25.

ADULT MALE.—Iris brown, orbit dusky; bill and anterior half of casque black,

¹ 1937, B. B. O. C., LVI, pp. 137, 138.

basal half of casque whitish above; soft skin of feet blue-gray, larger scales and claws blackish, soles yellowish.

ADULT FEMALE.—Iris medium brown, lighter around outer edge, orbit whitish; bill brownish black, rudimentary casque without white patch; feet as in male.

MALE NESTLING.—Iris rather light gray, changing to blackish on inner edge, rim of eyelids greenish yellow, orbit gray; bill greenish gray, shading to blackish at tip, and to whitish at top; feet bluish gray, soles yellowish, claws black.

DISTRIBUTION OF THE SPECIES.—From the forests of the Gold Coast and Southern Nigeria east to the Uelle district, Mt. Elgon, and the eastern edge of the Congo forest; also in northern Angola. Instead of extending across the Congo forest, it is found only around the borders. *B. s. subcylindricus* (Sclater) is restricted to the Gold Coast and Southern Nigeria. *B. s. subquadratus* is larger than the typical race, with more white on the base of the casque in males, and ranges from the northern edge of the Cameroon forest eastward to the Ubangi, the Uelle, Uganda, Mt. Elgon, the Yala River, and Bukoba. In the eastern Congo it occurs in the Semliki Valley, near the Rutshuru River, and on the mountains west of Lake Kivu and northwest of Lake Tanganyika. On Mt. Elgon it is a bird of mountain forest between 6800 and 8500 feet, but on west Ruwenzori I saw it no higher than 4000 feet. Absent from the Kivu Volcanoes, it reappears at 6000 or 6500 feet to the west of Lake Kivu. Along the southern edge of the Congo forest it is unknown, yet it occupies forest patches in northern Angola.

In the Upper Uelle this hornbill is decidedly local, restricted to rather small wooded areas with giant trees. At Niangara it was uncommon. More were seen near Gangura's, to the southwest of Faradje, and most of our specimens were collected at Madrapili's, midway between Faradje and Aba. During a week's stay there I saw about eight individuals. They kept near the forest, going usually in pairs and perching in high trees. The flight is noisy, and both sexes utter a loud mournful note, slowly repeated and like that of *Ceratogymna atrata*, or a shorter, hoarser, reiterated call. From their actions and the condition of the females' ovaries, I thought laying would start there by early January.

At Niangara on May 26 a female and her nestling (with tail half grown) were brought to us alive by a native, who had taken them from a hole high up in a large tree. The opening was almost closed with mud or some similar material, and there was only a single young bird.¹

Nearly all the remiges and rectrices of the mother had been pulled out, split down the middle and tied in a bunch to adorn her captor's hat.

¹ The breeding habits are probably very similar to those of *B. cristatus*, well described by Moreau, 1936, Journ. E. Afr. Ug. N. H. Soc., XIII, pp. 1-28.

According to his story, most or all of these feathers had been freshly renewed, and were still surrounded with a sheath at the base. I could still make sure that at least six of the rectrices, as well as some of the remiges, were being renewed. The wings seem to undergo a gradual molt.

However, she was far from "wasted and enfeebled." In spite of two days' confinement without food in a basket, there was considerable fat inside the skin of the abdomen, as well as a good layer beneath the muscular abdominal wall; and fat is scarce in hornbills. She bit vigorously when handled. The young bird did not hold its tail vertically, as we noted with the young of *Ceratogymna*, though no doubt it could. The flexible base of hornbills' tails is a family characteristic, and most advantageous in the nest.

At 8000 feet on Mt. Elgon Granvik¹ saw a nest in July, placed between two rocks. The single young bird had escaped after a native destroyed the protecting partition.

Of the six stomachs we examined, every one contained fruit, with no trace of insects or any other animal food.

KEY TO THE SPECIES OF CERATOGYMNA

- Casque blackish; outer tail-feathers black with white tips.....*C. atrata*.
 Casque, even in its less developed condition in the female, partly yellowish white;
 outer tail-feathers white.....*C. elata*.

Ceratogymna atrata (Temminck)

Buceros atratus TEMMINCK, 1834, 'Planches Coloriées,' V, livr. 94, Pl. DLVIII (type locality: Ashanti).—*Sphagolobus atratus* SHARPE, 1884, Journ. Linn. Soc. Lond., Zool., XVII, p. 436 (Semio).—*Ceratogymna atrata* O.-GRANT, 1892, 'Cat. Birds Brit. Mus.,' XVII, p. 389 (Semio); 1910, Tr. Z. S. Lond., XIX, p. 431 (Irumu). OUSTALET, 1893, Naturaliste, VII, p. 61 (Ubangi). EMIN, 1894, J. f. O., p. 167 (old Irumu). FLOWER, 1894, P. Z. S. Lond., p. 598 (Indekaru village; Ituri near Urumbi). REICHENOW, 1902, 'Vög. Afr.,' II, p. 239 (Luemba); 1911, 'Wiss. Ergeb. D. Z.-Afr. Exp.,' III, p. 287 (W. Ruwenzori, 2500 m.). DUBOIS, 1905, Ann. Mus. Congo, Zool., I, f. 1, p. 34 (Prov. Orientale; Umangi; Mayombe); 1911, 'Wytzman's Genera Av.,' 13th pt., p. 10. LÖNNBERG, 1907, Arkiv f. Zool., III, No. 21, p. 8 (Mukimbungu); 1917, idem, X, No. 24, p. 19 (Beni). SASSI, 1912, Ann. Naturh. Hofmus. Wien, XXVI, p. 367 (Ukaika). LANG AND CHAPIN, 1918, A. M. Journ., pp. 274, 276, Pls. on pp. 272, 273, and lower fig., p. 275 (Medje). SCHOUTEDEN, 1918, Rev. Z. A., V, p. 246 (Kibole); 1923, idem, XI, pp. 325, 394 (Basongo; Luebo; Makumbi; Ngombe in Kasai; Kwamouth); 1924, idem, XII, p. 414 (Eala; Ikengo; Bikoro-Tondu); 1925, idem, XIII, p. 11 (Kunungu; Mongende); 1926, idem, XIII, p. 192 (Temvo); 1936, Ann. Mus. Congo, Zool., I, f. 2, p. 91 (Kotili; Buta; Bambili; Panga; Bomili). BANNERMAN, 1923, Ibis, p. 733; 1933, 'Birds Trop. W. Afr.,' III, p. 348, Fig. 100. W. L. SCLATER, 1924, 'Syst. Av. Æth.,' pt. 1, p. 231. CHAPIN, 1926, Bull. C. Z. C., III, pt. 10, 11, 12, 14, 18, 19, 4 Figs.; 1931, Nat. Hist., XXXI, p. 603 (Lukolela).—

¹ 1923, J. f. O., Sonderheft, pp. 98-101.

Ceratogymna astrata DE RIEMAECKER, 1927, Rev. Z. A., XIV, p. 270 (Mofinje R. near Kongolo).

SPECIMENS.—Batama, ♂, Sept. 18. Avakubi, 2 ♂, Feb. 5, Sept. 27; 2 ♀, Jan. 24, Oct. 1; ♂ im., Dec. 17. Bomili, ♂, Sept. 10. Gamangui, ♂, Feb. 2; 2 ♀, Feb. 13, 18. Medje, ♂, Aug. 20; ♀, Aug. 21; ♀ juv., Aug. 24. Niangara, 4 ♂, 3 ♀, Dec. 8, 11.

ADULT MALE.—Iris crimson; orbit and gular wattle light blue, other skin of throat black; bill black, its rougher portions brownish; large scales on feet black, softer skin grayish.

ADULT FEMALE.—Iris dark brown to reddish brown; orbit and wattle light blue, skin at sides of throat whitish; feet as in male.

DISTRIBUTION.—From Liberia to the Cameroon, then eastward to the Mbomu River and the Semliki Valley, and southward to the Cuanza River in Angola and Kinda in the Lulua district of the Congo. Found throughout the heavy forest of the Congo, and even in gallery forests to the north and south. Usually a lowland bird. I did not see it above 1250 meters on west Ruwenzori, nor is it known from the Kivu Volcanoes.

Along the Congo River between Kwamouth and Stanleyville the great black hornbill is only rarely noticed from the steamers, but throughout the whole area of solid lowland forest it is common enough. While keeping to the high trees and shunning the clearings about villages, it advertises its presence with a loud, mournful bellowing. The number of syllables varies, but the notes usually sound like "wha-o, wha-o, wha-o, wha-a-a-aw, whaaaaw." The tone is nasal and the bird seems deeply distressed. The loudest calling comes from males, very often in flight, and carries certainly for half a mile. A loud swishing of the wings always accompanies their wing-beats and the flight is less gliding than that of *Bycanistes albotibialis*. Three or four birds are the most one ever sees in a party.

Some ten miles east of Medje on August 20 the natives showed Lang a nest from which they had already taken the female and a single nestling. The old bird had been eaten, while the youngster was brought to us alive. This nest was in a hollow opening by a knot-hole seventy feet up in a large forest tree (*Macarobium Dewevrei*). When cut down the tree was found to measure 145 feet in total height, and its base was 10 feet in circumference. Pieces of the earthy material which had protected its entrance showed that the exterior surface had been of grayish dirt and sand, while inside it was darker in color and plainly composed of excrement, containing stones of fruit and bits of insects.

The floor of the nest, only a few inches lower than the entrance, was composed of rotten wood. Only a half-dozen large feathers of the fe-

male were found inside; and while others may have been thrown out by the bird or by the men who opened the nest, it seems probable that the female molted gradually during her confinement. In the nest were the remains of at least eight different kinds of fruit, as well as pieces of crab. Most of the seeds were those of *Ricinodendron Heudeloti*, a large tree.

The young male nestling was partially feathered, much darker rufous on the crown than an adult female, and with neck black save for a rufous border along the naked throat-area. We kept it alive for a week. The stubby tail was often bent up close against the back, so that it could easily accommodate itself to a cramped nesting hole. Its beak was light greenish, with no sign of a casque; the skin of body and head grayish violet. As yet there was no trace of the gular wattle, and the skin of the throat could be inflated with air, recalling the throat-sac of *Bucorvus*.

I doubt whether *C. atrata* has any definite breeding season in the central Congo forest. Almost all our adult specimens were found to be non-breeding. A single egg is probably all they lay, and it seems likely that the female remains in the nest about three months.

Out of sixteen stomachs examined, all but one contained fruits. Four of them were whole palm-nuts. The other fruits were of various kinds and sizes, one so large that it almost filled the bird's stomach. Insects were found in six of the examinations, large winged ants being present twice, and beetles about four times. One hornbill had swallowed sixty-six green caterpillars, and another a single millipede.

[*Ceratogymna elata* (Temminck)]

Buceros elatus TEMMINCK, 1831, 'Planches Coloriées,' II, livr. 88, p. 75, Pl. DXXI, fig. 1 (type locality: Sierra Leone, after Hartlaub, 1854, J. f. O., p. 126). MÜLLER, 1887, Zeitschr. Ges. Orn., Budapest, IV, p. 427 (Landana).

The yellow-casqued hornbill is largely a bird of Upper Guinea, ranging from Portuguese Guinea to the neighborhood of the Cameroon River, and the supposed record from the Loango Coast is certainly erroneous. No specimen has been taken in recent years in the Gaboon, and the specimen from Landana identified by Müller as *elata* was a young female, probably of *atrata*. There is also an old record from the Gaboon attributed to Verreaux, but his localities have too often proved unreliable.

Subfamily **Bucorvinæ**

KEY TO THE SPECIES OF **BUCORVUS**

Casque remaining closed and rounded anteriorly; bill entirely black, without a light patch below nostril; orbital skin wholly red. *B. cafer*.

Casque, in adults of both sexes, truncate and "open" in front; sheath of bill with a distinct patch of pinkish or buff just beneath nostril; orbital skin mainly or entirely blue.....*B. abyssinicus*.

***Bucorvus cafer* (Schlegel)**

Buceros carunculatus cafer SCHLEGEL, 1862, Mus. des Pays Bas, I, p. 20 (type locality: "Cafrérie").—*Tmetoceros* SCHALOW, 1886, J. f. O., pp. 422, 426, 428 (Luvule R.; Lugoma R.).—*Tmetoceros abyssinicus* SCHALOW, 1886, J. f. O., p. 422 ("Lualaba" [= Luvua R.]). MATSCHIE, 1887, J. f. O., p. 150.—*Bucorvus cafer* REICHENOW, 1902, 'Vög. Afr.', II, p. 236 (Kambo R.). W. L. SCLATER, 1924, 'Syst. Av. Æth.', pt. 1, p. 231 (south-central Belgian Congo). CHAPIN, 1926, Bull. C. Z. C., III, p. 11 (Kasai; Katanga).—*Bucorax cafer* MOURITZ, 1914, Ibis, p. 35 (Musoshi escarpment). BARNS, 1923, 'Across the Great Craterland to Congo,' p. 260 (Lukafu).—*Bucorax cafer* PAGET-WILKES, 1926, S. Afr. Journ. Nat. Hist., VI, p. 65 (Upper Kafue R. near Ndola).—*Bucorvus abyssinicus cafer* DE RIEMAECKER, 1927, Rev. Z. A., XIV, p. 269 (Lubumbashi R.; Karavia R.).

DISTRIBUTION.—From eastern Cape Colony through southeastern Africa to central Kenya Colony, the northeast shore of Lake Tanganyika, and the savannas of the southern Congo. On the west it reaches northern Angola and northern Damaraland. Unknown in the Lower Congo, and apparently uncommon in the Kasai district, though there is a female in the British Museum collected by Torday near Lusambo. In the Upper Katanga and Marungu it appears to be numerous, and the Congo Museum has a female from Funda Biabo. Mr. Lestrade tells me that this hornbill is seen and heard regularly near Makamba Mission inland from Nyanza on Lake Tanganyika.

Adult males have the whole orbit, chin, and throat bright scarlet, while in females the bare skin of chin and anterior throat are dusky gray with a pearly bluish lustre, the orbit and remainder of bare throat-skin being scarlet. The iris of the male is said to be pale sea-green, that of the female is grayish cream-color. The skin of the throat can be inflated in much the same way as the sac of the marabou stork. There is no intergradation in East Africa between *B. cafer* and *B. abyssinicus*.

The southern ground-hornbill makes its home in open savanna country, and is found in pairs or small parties, up to seven or eight, walking about in search of food. They are fond of spots where the grass has been burned, and roost at night in trees. Their flight is noisy and labored, and when disturbed they may take to the trees. The food is most varied, including insects and their larvæ, frogs, reptiles, and even small mammals. When reared in captivity they make most amusing pets.¹

The voice is a reiterated booming or humming sound, and male and

¹ See W. L. Sclater, 1911, Avicul. Mag., (3) II, pp. 120-123, and Swynnerton, 1913, Journ. S. Afr. Orn. Union, IX, pp. 83-100.

female answer each other with a distinct difference in tone. The calls carry afar—a mile and a half, perhaps—and often are heard before day has fully broken. Nesting begins in Natal in October, and not more than a month later in the southern Congo, for newly fledged young are seen with their parents from January to April. Dr. van Someren thinks the young may continue to accompany their parents for two or three years.

The nest is usually in a hollow in a large tree, but there are also accounts of their rearing young in stick nests. Sets consist of one or two eggs, elongate oval, and plain white or very pale bluish, with roughened texture, measuring 66.7–79 mm. \times 45.7–54.¹ Whether the entrance to the nest is plastered up seems not to be definitely known. Near Lake Naivasha in Kenya Colony, a pair nested in a hole in a cliff-side year after year, one young being raised each time.²

***Bucorvus abyssinicus* (Boddaert)**

Buceros abyssinicus BODDAERT, 1783, 'Tabl. Planches Enluminées,' p. 48 (type locality: Abyssinia).—*Tmetoceros abyssinicus* SCHWEINFURTH, 1874, 'Heart of Africa,' II, p. 205 (16 miles N. W. of Mt. Baginze).—*Bucorvus pyrrhops* ELLIOT, 1877, Ann. Mag. Nat. Hist., (4) XX, p. 171 ("Region of the Congo").—*Tmetoceros abessinicus* JUNKER, 1890, 'Reisen in Afr.,' II, p. 193 (Uere R.).—*Bucorvus* CHAPIN, 1915, A. M. Journ., p. 285 (Uelle distr.). LANG AND CHAPIN, 1918, idem, p. 275.—*Bucorvus abyssinicus* SCHOUTEDEN, 1930, in Franck, 'Le Congo Belge,' II, p. 373 (N. W. shore L. Albert); 1936, Ann. Mus. Congo, Zool., I, f. 2, p. 91 (Niagara; Mahagi Port).

SPECIMENS.—Garamba, ♀, July 1. Faradje, ♂, Aug. 8; 2 ♀, Sept. 25, Oct. 12. Aba, ♂ im., July 15.

ADULT MALE.—Iris brown; lores and orbit bluish gray and dark blue, respectively; throat indigo blue; cheeks and lower portion of throat rose-madder. Casque and bill black, with a pink-and-gray patch beneath nostril. Feet black.

ADULT FEMALE AND IMMATURE MALE.—Naked skin of orbits and throat entirely blue.

DISTRIBUTION.—Across the whole continent from Senegal to Anglo-Egyptian Sudan, Abyssinia, and Eritrea; south in the west to the edge of the Guinean forests, in the east to Gallaland and Uganda. Within our limits the northern ground-hornbill is found only in the northern savannas, eastward to the northern shores of Lake Albert. We did not see it south of the Uelle and Kibali rivers, though de Calonne collected a female at Niagara and we noted a party of three at Gangura's village near Nzoro.

¹ See especially Carlisle, 1923, S. Afr. Journ. Nat. Hist., IV, pp. 121, 122; and Monard, 1932, Bull. Soc. Neuchâtel. Sci. Nat., LVI, p. 316.

² van Someren, 1922, Nov. Zool., XXIX, p. 74.

In the Uelle district there was no indication of migration, a few being seen at all times of year. Sometimes they were single or in pairs, but never more than three together. Such trios probably represented a family, for only one had the red on the throat which distinguishes the adult male. When perching in a tree, with throat-sac inflated, and standing upright on its long legs, the ground-hornbill almost suggests



Fig. 25. *Bucorvus abyssinicus*, male. $\times 1/2$, approximately

some large wading bird. On the wing, however, it again looks like a hornbill, the flight being buoyant, with the usual alternation of flapping and gliding, and not noisy except when the bird is rising from the ground.

In my experience they are exceedingly wary, and feed in cultivated fields, pastures, or newly cleared land, wherever the grass is not too high. Taking wing far out of range, they sometimes pause for a moment on

some low tree to look around. All across the Sudan a stuffed ground-hornbill's head is tied on that of native hunters, who crawl through the grass when stalking game. The apparent proximity of the bird reassures the unsuspecting victim.¹

The voice of the northern ground-hornbill is like that of the southern species, a deep "hoo" or "hum" repeated at short intervals, and heard especially toward dusk. From this comes the Logo name, "Bu-luku."

The nesting is surrounded by mystery. A. Brehm² is said to have had a nestling taken from a hollow tree that was not walled up. A. L. Butler³ was told by Gorringer that he took a single egg from a hole in a baobab at Roseires on June 3. In Darfur Lynes⁴ received a newly fledged youngster on September 20, said to have been taken from a hollow tree. At Wadelai on April 23 Emin⁵ obtained a fledgling, with tail-feathers still short, which his soldiers claimed they had taken from a stick-nest in the crown of a tree. Large hollow trees must be hard to find, but they are surely the ordinary nesting place.

Dissections as well as the behavior of live birds led me to expect the breeding season to begin near Faradje shortly after November. This is supported by Emin's observations at Wadelai, though farther north, in the Sudan, nesting seems to take place in June or July. In northern Nigeria nests have recently been reported in hollow trees at heights of only ten to fifteen feet, on March 21, April 4 and 17.⁶ Two eggs are the normal set. There seems to be no plastering of the entrance. An egg laid in captivity was described by Reichenow as whitish with rough surface, 71 × 48 mm. Shuel gives measurements of six eggs as 61-72.5 mm. × 47-51.5.

The omnivorous propensities of ground-hornbills are well known, yet the contents of one stomach I examined were remarkable: a piece of the hoof of a small antelope, many small feathers, a lizard (*Mabuya perrotetii*), a frog, many dung-beetles, a large water-bug, a caterpillar, many insect eggs, a millipede, and two small bean-pods. Three other stomachs held insect-remains, including beetles and large ants, two small cucumber-like fruits, seeds, and other vegetable material. These birds kill snakes, birds, and doubtless small mammals as well.

¹ See especially Alexander, 1907, 'From the Niger to the Nile,' I, p. 36.

² Heuglin, 1871, 'Orn. Nordost-Afr.,' I, p. 734.

³ 1905, *Ibis*, p. 353.

⁴ 1925, *Ibis*, p. 382.

⁵ Schubotz, 1921, 'Tageb. Emin Pascha,' VI, pt. 2, p. 105.

⁶ Lipscomb, 1938, *Ibis*, p. 153; Shuel, 1938, *Ibis*, p. 471.

ORDER STRIGIFORMES

FAMILY **Strigidæ.** SCOPS OWLS, HORNED OWLS, WOOD OWLS,
FISHING OWLS

KEY TO THE GENERA OF STRIGIDÆ AS REPRESENTED IN THE CONGO

- 1.—Feathering only on the upper end of front of metatarsus, which is otherwise bare and scaly, like the toes; under side of toes with sharp spiculate scales; no ear-tufts.....SCOTOPELIA, p. 388.
Metatarsus wholly feathered, toes either feathered or bare.....2.
- 2.—Ear-tufts always present, though sometimes not conspicuous (e.g., *Asio capensis*).....3.
Ear-tufts totally wanting.....6.
- 3.—Wing-length less than 210 mm.....OTUS, p. 371.
Wing-length exceeding 240 mm.....4.
- 4.—Toes entirely bare to base, without even small bristly feathers; general coloration rufous.....LOPHOSTRIX, p. 379.
Toes feathered above, at least some small or bristly feathers on upper surface near base.....5.
- 5.—Ear-opening scarcely wider than cornea or exposed part of eye, and the skin encircling it completely feathered; wing-tip somewhat rounded, the next-to-outermost primary never quite equal to the longest of the primaries.....BUBO, p. 380.
A large patch of naked skin extending above and below the ear-opening, just back of the flap of skin forming the edge of the facial disc; wing-tip more pointed, the next-to-outermost primary always the longest or one of the longest primaries.....ASIO, p. 401.
- 6.—Wing more than 230 mm. long.....STRIX, p. 397.
Wing shorter than 180 mm.....GLAUCIDIUM, p. 391.

KEY TO THE CONGO SPECIES OF OTUS

- 1.—Wing more than 170 mm. long; general color gray with blackish vermiculation or fine barring, and blackish shaft-streaks on back and breast; facial discs whitish with distinct black lateral borders.....*O. leucotis*.
Wing less than 170 mm. long.....2.
- 2.—6th and 7th primaries (= 4th and 5th from outside) longest; whole plumage rufous or cinnamon-brown, with dark brown vermiculation on back, and whitish spots or shaft-streaks above and below; primaries rufous barred with dusky, and with light spots on outer webs; wing 130–140 mm.....*O. icterorhynchus*.
8th primary (= 3rd from outside) longest, though sometimes equalled by 7th or 9th; general color of plumage grayish, but sometimes washed with tawny or rufous on primaries.....3.
- 3.—Wing longer: 144–164 mm.; 10th (outermost) primary always longer than the 5th (= 6th from outside).....*O. scops*.
Wing shorter: 122–143 mm.; 10th (outermost) primary never longer than the 4th (= 7th from outside).....*O. senegalensis*.

Otus icterorhynchus holerythrus (Sharpe)

Scops holerythra SHARPE, 1901, B. B. O. C., XII, p. 3 (type locality: Efulen, Cameroon). DUBOIS, 1905, Ann. Mus. Congo, Zool., I, f. 1, p. 26 (Banalia).—*Otus holerythrus* CHAPIN, 1921, A. M. Nov., No. 17, p. 15 (Medje). W. L. SCLATER, 1924, 'Syst. Av. Æth.', pt. 1, p. 242. SCHOUTEDEN, 1936, Ann. Mus. Congo, Zool., I, f. 2, p. 92.

SPECIMEN.—Medje, ♀ juv., May 5.

NESTLING.—Iris light yellow; cere pale yellowish, bill very light horn-gray, tip darker; feet pale yellowish pink.

DISTRIBUTION OF THE SPECIES.—Forests of the Gold Coast, to which *O. i. icterorhynchus* is restricted, and those of Lower Guinea from the Cameroon coast east to the Ituri district. *O. i. holerythrus* of the Cameroon and Congo differs from the typical race in being much more rufous, with shaft-streaks on breast less well developed. It is also somewhat larger, having wings 140–144 mm., tail 67–78.

Nahan's specimen from Banalia is preserved in the Congo Museum, and no other adult seems ever to have been taken within our territory. The cinnamon scops owl is undoubtedly a forest-dweller, and either rare or exceptionally difficult to find. We never saw an adult, and our young bird had been captured by natives.

This nestling is in the soft "mesoptyle" plumage so characteristic of young owls, and the wings and tail are not full grown, measuring 104 mm. and 46 mm., respectively. The bare toes, small bill, and small ear-opening clearly fix its proper genus, and the cinnamon-rufous remiges and rectrices, barred with blackish and with whitish spots on the outer webs of the distal primaries identify it plainly. The soft plumage beneath is nearly uniform cinnamon, that of crown and back somewhat ruddier, and more distinctly, though finely, barred with dusky.

Otus senegalensis ugandæ (Neumann)

Pisorhina ugandæ NEUMANN, 1899, J. f. O., p. 56 (type locality: Kwa Mtessa, Uganda).—*Scops capensis* SALVADORI, 1903, Mem. Acad. Sci. Torino, (2) LIII, p. 95 (Niam-Niam). ? DUBOIS, 1905, Ann. Mus. Congo, Zool., I, f. 1, p. 26 (in part. "Banalia").—*Otus senegalensis ugandæ* CHAPIN, 1930, A. M. Nov., No. 412, pp. 2, 4, 9 (Faradje). FRIEDMANN, 1930, Bull. 153, U. S. Nat. Mus., p. 297.—*Otus leucotis ugandæ* SCHOUTEDEN, 1936, Ann. Mus. Congo, Zool., I, f. 2, p. 93.

SPECIMENS.—Faradje, 7 ♂, Feb. 21, Sept. 5, 6, 19, Dec. 25, 29, 30; ♀, Jan. 3.

ADULTS.—Iris yellow; bill dusky, but greenish beneath mandible, cere usually dusky greenish; toes brownish or dull brownish green, claws blackish.

DISTRIBUTION OF THE SPECIES.—Cape Province north to Senegal,

Northern Nigeria, Darfur, Eritrea, the island of Socotra, and Arabia, but not in the heavy lowland forest of West Africa and the Congo, nor in the mountain forests of tropical Africa. It is my belief that eleven or twelve races will eventually be distinguished, and that three, or possibly four, of them occur in Congo territory.

O. s. senegalensis (Swainson) extends from Senegal across the Sudan, *O. s. pygmeus* (C. L. Brehm) of the eastern Sudan being doubtfully separable from it. *O. s. cæcus* Friedmann of Abyssinia and northern Kenya Colony is a very dark form, and a few examples of a new race have been collected in the Amiri district, at Najran, and at Dailami in Arabia.¹ *O. s. socotranus* (O.-Grant and Forbes) lives on Socotra Island. *O. s. ugandæ* is best known from Uganda and the Uelle district, but is believed to inhabit the eastern Congo savannas, north of the Kivu Volcanoes. *O. s. graueri* extends perhaps from the Ruzizi Valley and the western shore of Lake Tanganyika over the greater part of East Africa north of the Rovuma River. *O. s. hendersonii* seems to range from Angola to Landana and the southwestern Congo. *O. s. feæ* (Salvadori) is confined to the island of Annobon. *O. s. pusillus* (Gunning and Roberts) occupies the region of the lower Zambesi, and *O. s. intermedius* (Gunning and Roberts) that of the Transvaal and Limpopo River. In the dry central and western sections of South Africa lives *O. s. griseus* (Gunning and Roberts), while the Cape Province is the home of *O. s. latipennis* Kaup. The characters which seem to differentiate these races will be found in my paper of 1930.

O. s. ugandæ is a well-established race, moderately dark grayish, with blackish markings pronounced, a tawny wash on the upper back, and feathers of breast with a rusty cross-bar or median patch. The wing measures 131-143 mm. One of my males from Faradje has been compared with Neumann's types, and the series of eight from the Uelle shows remarkable uniformity of coloration. In Brussels and Tervueren I have been unable to find any specimen from Banalia, and feel sure that the species does not occur there. I now think that the "Ruzizi-Kivu" specimen in the Congo Museum is *graueri*; but it seems very likely that *ugandæ* extends to the Rutshuru Valley, where the voice of the species is to be heard frequently.

O. s. senegalensis is usually somewhat grayer above than *ugandæ*, with markings on breast less contrasted; but some examples are rather rufous. Possibly that race will be found to reach the savannas near

¹ Bates, 1936, B. B. O. C., LVII, p. 19; *O. s. pamelæ* Bates, 1937, B. B. O. C., LVII, p. 150.

the great bend of the Ubangi River; but thus far no scops owl has been obtained within that part of the Belgian Congo.¹

In suitable districts of the northeastern Congo the Uganda scops owl is not at all rare. Its presence cannot be overlooked at the season when the birds are calling. During two successive years at Faradje we found that it was in August or the first days of September that they began giving at dusk or by night a single short call-note, repeated at frequent intervals. The sound is slightly metallic rather than musical, and resembles "k'hong" or "k'hawng." Often a second bird answers in a much weaker voice, so I suspect that the female calls too. They continued to advertise their presence until the end of February. In the upper Semliki Valley I heard exactly similar notes of this owl in January, and Colonel Hackars has recently secured a specimen of *ugandæ* there. I listened to them also in the Rutshuru Valley in early May.

The calling is often so continuous throughout the night that one wonders when the birds eat. When approached in the dark they are not at all timid, but they can scarcely be seen amid the foliage. A close range one may sometimes hear a fainter, shriller cry, or other low weak notes. On rare occasions a bird will call in the middle of the day.

Near the post of Faradje they favored a thick patch of low wood around a spring, but they also haunted trees along the river bank, and others off amid the high grass. When their calling began the birds were in non-breeding condition, and enlargement of the sexual glands took place near Faradje only in late December. Eggs may be laid there in January or February, but we could find no nest.

In Northern Nigeria and Darfur scops owls of the race *senegalensis* nest in April and May, in holes in limbs of large trees. Two to four white eggs are laid, measuring 31–32.5 mm. \times 25.5–26.2.

Otus senegalensis must be almost entirely insectivorous. From the four stomachs that contained food we took pieces of a mantis, a cricket, two green orthoptera, and bits of other insects, as well as a single feather probably from the owl itself.

Otus senegalensis graueri Chapin

Otus senegalensis graueri CHAPIN, 1930, A. M. Nov., No. 412, p. 4 (type locality, Lueba, on N. W. shore L. Tanganyika).—*Scops capensis* DUBOIS, 1886, Bull. M. Roy. Nat. Hist. Belg., IV, p. 149 (L. Tanganyika); 1905, Ann. Mus. Congo, Z

¹ One collected on the upper Kemo River by Dybowski, and noted by Oustalet, 1893, Nat. Hist. Congo, (2) VII, p. 60, as *Scops giu*, is still preserved in the Paris Museum. Mr. Berlioz tells me that it is really *Otus senegalensis*.

I, f. 1, p. 26 (in part. L. Tanganyika, Ruzizi-Kivu). RODHAIN, ET AL., 1913, 'Rapp. Miss. Sci. Katanga,' pp. 142, 151, 156, 162 (Sankisia).—*Pisorhina capensis* NEAVE, 1910, Ibis, p. 106 (Dikulwe R.; Bunkeya R.). SASSI, 1912, Ann. Naturh. Hofmus. Wien, XXVI, p. 361 (Baraka).—*Pisorhina capensis pusilla* SCHOUTEDEN, 1918, Rev. Z. A., V, p. 235 (Baraka).—*Pisorhina capensis ugandæ* SCHOUTEDEN, 1918, idem, V, p. 235 (Mawagongo).—*Otus senegalensis ugandæ* CHAPIN, 1930, A. M. Nov., No. 412, p. 4 (in part. Ruzizi-Kivu).—*Otus senegalensis hendersoni* CHAPIN, 1930, A. M. Nov., No. 412, pp. 6-9 (in part. Katanga). FRIEDMANN, 1930, Bull. 153, U. S. Nat. Mus., p. 298 (in part).—*Otus senegalensis senegalensis* BANNERMAN, 1933, 'Birds Trop. W. Afr.,' III, p. 19 ("Congo" = Katanga).

DISTRIBUTION.—Western side of Lake Tanganyika and doubtless the Ruzizi Valley, extending to the Upper Katanga and probably into western Tanganyika Territory. Whether the birds of the coastal region of East Africa belong to this form is not at all sure.

O. s. graueri differs from *ugandæ* in having the crown, back, rump, and lesser wing-coverts more heavily washed with rufous, while the rufous markings on the basal half of breast-feathers are paler and less extensive. Wing averaging shorter, 126-136 mm.

In the Congo Museum there are now nine skins of *graueri*, from "Ruzizi-Kivu," Baraka, Mawagongo, Tembwe, and Kiambi. They are all surprisingly similar in general coloration. At Baraka Grauer collected two examples, which I have examined. Looking again at Neave's two specimens from the Upper Katanga, I find that they are not *hendersonii*, but agree better with the series of *graueri* in Tervueren.

Grauer's scops owl is found in savannas with a plentiful supply of rather small trees, and resembles *ugandæ* in its way of life. Its call, however, is distinctly hoarser, and in this it agrees with the scops owls living east of Lake Victoria—to whatever race they may belong. When I visited East Africa in 1926 I was already familiar with the voice of *ugandæ*, which has a slight metallic resonance, and only a faint "stutter" at the start. To my surprise, the birds heard near Ikoma and the Grumeti River in northern Tanganyika Territory called more hoarsely, or as it sounded to me, "k-k-kaw." On reaching Uganda I had my impression verified as I listened again to *ugandæ*, and this resonant type of note was heard in a few places along the eastern Congo border south to the Rutshuru Plain.

Again the difference was noticed when at two places in the lower Ruzizi Valley I listened to hoarser calls from the scops owls. Finally at Lueba I succeeded in shooting a male that had this same less resonant voice. It was sitting at dusk in a thickly foliated tree not far

from the lake shore, and two others with similar voices were heard the same evening. Unfortunately, the focusing flashlight is of little use in locating these scops owls, for I have never been able to see any glow from their eyes.

In the Katanga, Neave wrote, this scops owl seemed to be not uncommon, but was easily overlooked. It appeared to have a preference for thinly wooded hillsides. I have heard one calling in the evening from a tree in the center of Elisabethville. This was on August 17. The day before, in the middle of the afternoon, one was heard in the savanna woods a few miles to the eastward. In neither case could I see the bird, and the voice was not so clear and resonant as in the Uelle district.

Dr. Bequaert tells me that the specimen he and Dr. Rodhain obtained at Sankisia on September 30, 1911, had the ovary enlarged though breeding. The gonads of my male from Lueba on July 25 were somewhat enlarged, indicating that breeding would soon take place probably in the latter half of the dry season. The stomach contained only pieces of insects.

Otus senegalensis hendersonii (Cassin)

Ephialtes hendersonii CASSIN, 1853, Proc. Acad. Nat. Sci. Phila., VI, p. 186 (type locality: at sea off Novo Redondo, Angola).—*Scops hendersonii* HARTLAUB, 1857, 'Syst. Orn. Westafr.,' opp. p. lix ("Congo" [= Angola]).—*Scops capensis* DUBOIS, 1905, Ann. Mus. Congo, Zool., I, f. 1, p. 26 (in part. Kisantu).—*Pisorhina capensis* REICHENOW, 1901, 'Vög. Afr.,' I, p. 666 (in part. Loango).

DISTRIBUTION.—Angola from the Benguella Plateau to Ndala Tando, to the vicinity of Landana, and the savannas of the southwestern Congo. This is a very grayish race as compared with *graueri* or *ugandæ*, finely vermiculated throughout, and with narrower blackish markings on the upperparts, and only pale cinnamon-buff on the basal part of breast feathers. The dark streaks on the breast are fairly broad. Wings about 128–136 mm. I have examined six specimens including the type, and all were colored as described above.

The specimen from Kisantu cannot be found in the Congo Museum, but it seems very probable that this race occurs in the Kwango district and the Lower Congo.

Otus scops scops (Linnæus)

Strix scops LINNÆUS, 1758, 'Syst. Nat.,' 10th Ed., p. 92 (Europe; restricted type locality: Italy).—*Otus scops scops* HARTERT, 1913, 'Vög. pal. Fauna,' II, p. 978 (Uganda).

SPECIMEN.—Faradje, ♂, Dec. 31.

ADULT MALE.—Iris yellow, rim of eyelids greenish brown; bill dark green with blackish tip; toes light greenish gray with dusky greenish claws.

DISTRIBUTION OF THE SPECIES.—Breeds from the Canary Islands, southern Europe, and North Africa eastward to Persia, southern Russia, and central Siberia. It has been divided in three subspecies, but *pulchellus* and *sibiricus* are only doubtfully valid. The typical form of the Mediterranean region migrates southward to Timbaktu, the northern edge of the Congo, Uganda, and Nairobi in Kenya Colony.

Hartert gave the wing-length of *Otus s. scops* as: males, 144–160 mm.; females, 148–162. *O. s. pulchellus*, males, 151–164; females, 156–163. The present specimen has wings 157 mm. long, but Dr. Hartert himself identified it for me as typical *scops*. It shows considerable tawny wash on chest, wing-coverts, and back.

Our example was shot in an open grove of trees at the station of Faradje, where just the evening before we had taken an *Otus senegalensis*. It did not give its usual metallic note, possibly it never does in the winter quarters, but uttered only a hoarse “haaa—haaaa. . .” The stomach contained remains of an insect and a spider.

[*Otus scops pulchellus* (Pallas)]

Stryx pulchella PALLAS, 1771, ‘Reise versch. Prov. Russ. Reichs,’ I, p. 456 (type locality: Volga R., S. Russia).—*Otus scops pulchellus* HARTERT, 1913, ‘Vög. pal. Fauna,’ II, p. 980 (Unyoro). VAN SOMEREN, 1932, Nov. Zool., XXXVII, p. 273 (Uganda).

The validity of this eastern race of scops owl is denied by Meinertzhagen,¹ who ascribes its supposedly grayer coloration to individual variation, and finds the difference in size so slight as to be almost negligible. Specimens collected in Sennar, southern Abyssinia, and Unyoro have been referred to *pulchellus*; so such birds may occur in the northeast corner of the Congo.

Otus leucotis leucotis (Temminck)

Strix leucotis TEMMINCK, 1820, ‘Planches Coloriées,’ livr. 3, Pl. xvi (type locality: Senegal).

SPECIMEN.—Faradje, ♀ im., Feb. 18.

IMMATURE.—Iris orange; bill light grayish blue, cere dusky; toes bluish gray above, pale yellowish below, claws dusky brown.

DISTRIBUTION OF THE SPECIES.—Senegal to Khartoum, Abyssinia,

¹ 1922, Ibis, p. 55.

and Somaliland; south through eastern Africa to Natal and the Orange River; also to Angola and the savannas of the southern Congo. Never found in the equatorial forest, and not known from the Kivu district. This species has nothing to do with *Asio*, as examination of the ear-region proves, but some authors prefer to place it in a separate genus, *Ptilopsis* Kaup.

O. l. leucotis extends across the whole Sudan and to northern Kenya Colony, occurring also in the northern savannas of the Congo. It has the center of the crown blacker (in adults) and the remiges and rectrices always more finely barred than *O. l. granti* of the regions south of the equator. *O. l. margarethæ* Jordans and Neubaur¹ is said to be a pale desert form from the region of the White Nile.

In the savannas of the northern Uelle I believe that *Otus l. leucotis* is not rare. At Garamba and to the east of Faradje I heard several times a rather high-pitched "cu-hoo" or "cu-coo" which I attributed to this owl, and my identification has been confirmed by Admiral Lynes.²

On December 18, 1912, I was shown a stick-nest 14 feet up in a small tree, on which sat an incubating bird. By ill fortune I failed to kill it outright, and it never came back. The two white eggs remained unbroken for two weeks. In other regions of Africa the white-faced scops owl has been found breeding in holes in trees as well as in old nests of *Bubalornis albirostris*.

Our only specimen from the Uelle was reared in captivity. On January 17, 1913, a native brought us two young from an old nest of dry twigs, built no doubt by a hawk or plantain-eater in a small savanna tree. One young bird was replaced in the nest, but it disappeared the following night, and the parents were never seen. The other was kept for a month till it reached adult size. Sometimes it uttered a low hoarse note, and when demanding food it repeated a more impatient call.

Eggs of this typical race from Nigeria, where it breeds in February and March, measure 36.6-37.3 mm. \times 30.3-31.3.³

Otus leucotis granti (Kollibay)

Pisorhina leucotis granti KOLLIBAY, 1910, O. Mb., p. 148 (type locality: Southwest Africa).—*Scops leucotis* SHARPE AND BOUVIER, 1877, Bull. Soc. Zool. France, II, p. 473 (Boma). DUBOIS, 1905, Ann. Mus. Congo, Zool., I, f. 1, p. 26 (Katanga; Kisantu).—*Asio leucotis* REICHENOW, 1901, 'Vög. Afr.,' I, p. 661 (Boma). DE RIEMAECKER, 1927, Rev. Z. A., XIV, p. 262 (Elisabethville).—*Otus leucotis granti*

¹ 1932, *Falco*, XXVIII, p. 9 (Zankab, Bahr-el-Abiad).

² 1925, *Ibis*, p. 390.

³ Bannerman, 1933, 'Birds Trop. W. Afr.,' III, p. 26.

SCHOUTEDEN, 1923, Rev. Z. A., XI, p. 326 (Macaco; Kabambaie). BANGS AND LOVERIDGE, 1933, Bull. Mus. Comp. Zool., LXXV, p. 177 (Ujiji, L. Tanganyika).—? *Scops capensis* PETIT, 1926, 'Dix Années de Chasses,' p. 119 (near Boma).

DISTRIBUTION.—From the Orange River and Natal north to the Portuguese Congo and savannas of the Gaboon, Kasai district, Kattanga, northern Tanganyika Territory, and the Loita district of Kenya Colony. I have collected a female near Ikoma, east of Lake Victoria, sitting on an open stick-nest with two eggs, on April 17. The Berlin Museum has a skin from Donje Erok, west of Kilimanjaro.

Within the Congo it comes north only to the southern edge of the equatorial forest, but is rather common in the Kasai district. Father Callewaert has sent us several young, just out of the nest, which were collected in June, July, and August, so it is a dry-season breeder like the northern race in the Uelle. The Congo Museum has a well-grown nestling from Leopoldville in August. In South Africa the white eggs are said to be laid in sets of two, and to measure 39.4–40.6 mm. \times 33–34.

Lophostrix lettii (Büttikofer)

Bubo lettii BÜTTIKOFER, 1889, Notes Leyden Mus., XI, pp. 34, 115, 129 (type locality: Pessy distr., Liberia).—*Lophostrix lettii* SCHOUTEDEN, 1923, Rev. Z. A., XI, p. 326. DE SCHAEK, 1927, Bull. Soc. Zool. Genève, III, f. 6, p. 79 (Luluabourg).—*Otus lettii* W. L. SCLATER, 1924, 'Syst. Av. Æth.,' pt. 1, p. 243 (upper Uelle).—*Jubula lettii* BANNERMAN, 1933, 'Birds Trop. W. Afr.,' III, p. 26, Fig. 10 (Tungeddi, on Uelle R. between Angu and Bambili).

DISTRIBUTION.—Liberia, Gold Coast, forested southern Cameroon, the Upper Congo forest eastward to the Uelle and Ituri districts, and south in the gallery forests of the Kasai to Luluabourg. This is a forest-dwelling owl, apparently wholly insectivorous.

Although Lang and I did not secure a specimen, we took from a native hat at Avakubi two feathers since identified as a primary and a rectrix of this rare owl. In addition to two adults taken by Dr. Schouteden at Luebo the Congo Museum now has half-grown nestlings from Lukolela (March 25), Elisabetha, and Poko (May 21).

Such young birds can readily be identified by the pattern of their remiges, though these are somewhat more rufous distally than those of adults. The soft feathers of back and scapulars are cinnamon-rufous, with whitish tips and faint subterminal brownish bars. The head is somewhat paler, and the underparts paler and less distinctly marked.

Adults are rather variable in color, but always rufous. Some have chestnut shaft-streaks on lower underparts, others have them black. Wings, 235–280 mm. Mr. Bates¹ has proposed a new genus, *Jubula*,

¹ 1929, B. B. O. C., XLIX, p. 90.

with *lettii* as its type; but a comparison with *Lophotrix cristata* of tropical America does not convince me of the need of separation, despite the differences in color-pattern.

KEY TO THE CONGO SPECIES OF *BUBO*

- 1.—Wing-length exceeding 400 mm.....2.
 Wing-length less than 375 mm.....3.
- 2.—Breast and flanks with regular, clear-cut, heavy barring of blackish; facial discs with only a narrow blackish margin.....*B. shelleyi*.
 Breast and flanks only narrowly and irregularly barred—or vermiculated—with dusky gray or brown; facial discs margined laterally by a broad black band.....*B. lacteus*.
- 3.—Back, scapulars, and many wing-coverts with clear-cut bars of blackish on a tawny or rufous-buff ground; breast also regularly barred with blackish and more or less buff in ground-color; tail seldom more than 170 mm. long.....*B. poensis*.
 Upperparts not regularly barred with blackish on a tawny or rufous-buff ground, but more mottled, or else blackish brown with some fine buffy barring; tail usually exceeding 170 mm. in length.....4.
- 4.—Distal portion of bill light green or yellowish; breast heavily spotted with brown or blackish, but only imperfectly barred; blackish barring on tibiae and metatarsi wider than intervening pale bars; no whitish spots on outer wing-coverts.....*B. leucostictus*.
 Distal portion of bill black; breast rather narrowly barred with black, brown, or dusky gray, and dark spots on breast rather diffuse; dusky barring on legs very narrow, sometimes wanting; some large whitish spots on outer wing-coverts.....5.
- 5.—Wing-length generally 325–353 mm.; hind-neck with conspicuous rounded white spots or buffy streaks; iris yellow to orange.....*B. a. africanus*.
 Wing-length 295–328 mm., scarcely any light spots on hind-neck, back more vermiculated with gray; iris dark brown.....*B. a. cinerascens*.

Bubo leucostictus Hartlaub

Bubo leucostictus HARTLAUB, 1855, J. f. O., pp. 354, 360 (type locality: Dabocrom, Gold Coast). CHAPIN, 1921, A. M. Nov., No. 17, p. 15 (Batama; Medje). W. L. SCLATER, 1924, 'Syst. Av. Æth.', pt. 1, p. 246. BANNERMAN, 1933, 'Birds Trop. W. Afr.', III, p. 43, Fig. 17 (Landana). SCHOUTEDEN, 1936, Ann. Mus. Congo, Zool., I, f. 2, p. 93 (Kotili; Buta).—*Huhua leucosticta* DUBOIS, 1905, Ann. Mus. Congo, Zool., I, f. 1, pp. 19, 26, Pl. XI (Popoie; Lower Congo).—*Bubo poensis* SCHOUTEDEN, 1936, Ann. Mus. Congo, Zool., I, f. 2, p. 93 (in part. Buta).

SPECIMENS.—Lukolela, ♂, Dec. 17. Batama, ♂, Sept. 17. Medje, ♀, Sept. 12; ♀ juv., Sept. 15.

ADULTS.—Iris chrome-yellow to nearly cadmium (♂), bill light grayish green, approaching yellow distally, cere greenish buff; toes yellowish, claws black with gray bases.

DISTRIBUTION.—West coast of Africa from Sierra Leone to the

Gaboon and Lower Congo, and inland as far as the Ituri Forest, indicating that it inhabits the whole of the solid lowland forest in the Congo.

Apparently nowhere numerous, it is still known from only about eight localities in the Belgian Congo. One was shot by Lang in a tree in the forest near Batama, by day. At Medje on September 12 a female was trapped by the natives, and on dissection was seen to have laid recently. Three days later they brought us a young nestling, plainly of this same species, said to have been found on the ground near the spot where the old bird had been caught. The latter's breast is somewhat stained from the red soil, as though possibly her nest really was on the ground.

The natal down is white; the first plumage (mesoptyles) white with a wash of pale cinnamon on the upperparts, and barred with blackish brown above and below, save for the facial disc, abdomen, and legs. Our specimen is so young that its tail does not yet show, still the irides were already yellow, the bill greenish, toes yellow, and claws black.

A half-grown nestling in the Congo Museum was secured at Buta in April, another with slightly longer wings on May 7, and a third with wings three-fourths grown at the same locality in October. From the vicinity of Lisala there is also a fledgling taken in May. So breeding is not restricted to the dry period and may perhaps take place throughout the year.

The light barring and mottling of the upperparts are more extensive in our adult female of *B. leucostictus* than in either male, but there is no great sexual difference in size. Bannerman (1933) gave the wing-length of this owl as 305–330 mm., tail 178–205. Nine skins from the northeastern Congo forest have wings 290–310 mm., tails 188–204. A mounted specimen supposedly from the Lower Congo has wing 346 mm., tail 228, and is darker in color than any of the others. *B. leucostictus* is strikingly weak-footed; and it certainly cannot be referred to *Huhua*, the type of which is *H. nipalensis* Hodgson, an extremely powerful bird.

No owl-note was ever heard which might have come from the present species; and even the specimen I shot at Lukolela, sitting in a tall tree on the edge of the forest, late in the dusk, was perfectly silent.

As compared with the bolder, stronger species of *Bubo* this weak-footed owl seems to occupy a place comparable to that of *Ariceda* among the hawks, being perhaps exclusively insectivorous. In three stomachs we found only insects, especially beetles. Bates likewise

reported¹ that of five specimens he examined all had eaten insects—chiefly Orthoptera—and that he watched one at dusk catching cockroaches in the air.

***Bubo africanus africanus* (Temminck)**

Strix africana TEMMINCK, 1821, 'Planches Coloriées,' livr. 9, Pl. L (type locality: Cape of Good Hope).—*Bubo maculosus* SHARPE AND BOUVIER, 1877, Bull. Soc. Zool. France, II, p. 473 (Boma). DUBOIS, 1905, Ann. Mus. Congo, Zool., I, f. 1, p. 26 (Mayombe). NEAVE, 1910, Ibis, p. 106 (Katanga). REICHENOW, 1911, 'Wiss. Ergeb. D. Z.-Afr. Exp.,' III, p. 265 (Kisenyi; Usumbura). MOURITZ, 1914, Ibis, p. 38 (Kalonga and Tshinshenda in Katanga). SALVADORI, 1914, Ann. Mus. Zool. Napoli, IV, No. 10, p. 14 (L. Bangweolo). LÖNNBERG, 1917, Arkiv f. Zool., X, No. 24, p. 15 (eastern Congo border). SCHOUTEDEN, 1918, Rev. Z. A., V, p. 235 (in part. Uvira; Sibatwa forest; Kalembelembe; Goma). DE RIEMAECKER, 1927, Rev. Z. A., XIV, p. 262 (Elisabethville; Lubumbashi R.; Kaponda Road).—? *Bubo* sp. SCHALOW, 1887, J. f. O., p. 231 (Mpala).—*Bubo cinerascens* DUBOIS, 1905, Ann. Mus. Congo, Zool., I, f. 1, p. 26 (Ruzizi-Kivu; Mayombe; Lower Congo).—*Bubo maculosus cinerascens* LÖNNBERG, 1907, Arkiv f. Zool., III, No. 21, p. 5 (Mukimbungu).—*Bubo africanus africanus* NEUMANN, 1914, J. f. O., LX, p. 38. HARTERT, 1921, Nov. Zool., XXVIII, p. 98 (L. Kivu; W. of L. Tanganyika). FRIEDMANN, 1930, Bull. 153, U. S. Nat. Mus., p. 303.—*Bubo africanus cinerascens* MENEGAUX, 1918, Rev. Fr. O., V, p. 258 (Lower Congo). SCHOUTEDEN, 1932, Rev. Z. A., XXII, p. 125 (Ngoma).—*Bubo africanus trothæ* SCHOUTEDEN, 1923, Rev. Z. A., XI, p. 326 (Macaco).—*Bubo africanus* SCHOUTEDEN, 1930, Rev. Z. A., XVIII, p. 283 (Kafubu R.).

DISTRIBUTION OF THE SPECIES.—Cape Province to southern Arabia, Eritrea, the Sudan, and French Guinea, but never in heavy equatorial forest or in dense mountain forests. *B. a. africanus* occupies the southern half of Africa, north to the Loango Coast, the southern borders of the Congo forest, Lake Edward, and central Kenya Colony. Its wings measure about 310–360 mm. and its iris is deep yellow. *B. a. cinerascens* is smaller, wings about 295–328 mm., and has the iris dark brown. The barring of its underparts is generally finer, upperparts more vermiculated and grayer, white spotting of hind-neck and dusky patches on breast-feathers much less pronounced. This is the Sudanese race, extending south to the northern edge of the equatorial forest, to the southern shores of Lake Albert, and northern Kenya Colony. *B. a. milesi* Sharpe is a rather tawny race, restricted to southern Arabia. According to Bates its iris is yellow.

Unusually brownish examples of *africanus* are not rare, and the type of *Bubo ascalaphus trothæ* Reichenow² was an aberrant individual tinged to an unusual degree with cinnamon. The majority are grayish.

¹ 1904, Ibis, p. 603.

² 1906, O. Mb., p. 10 (Keetmanshoop, S. W. Africa).

The wings of nineteen skins of *africanus* from the southern and eastern Congo measure 310–349 mm. A specimen from Zambi on the Lower Congo has the wing only 320 mm., but its color pattern is that of *africanus*.

The spotted horned owl appears to be rather common in the Kasai, and Neave mentioned it as by no means uncommon in the well wooded districts of the Katanga. In the Lower Congo I saw it on several occasions, as it flew from the rocks of a steep hill near Matadi, or perched in the palms of the grasslands near Boma. At dusk I have also watched it sitting high on the boughs of a baobab within the town of Boma. Its call is a low double hoot, sometimes prolonged to four syllables.

In the eastern Congo this southern form extends northward through the grasslands around Lake Kivu to the upper Semliki Valley. Near the new post of Beni I shot a female with deep yellow irides and wing 345 mm. long.

In southern Africa this owl lays its two eggs—or occasionally three—on the ground in a slight depression, in a hollow of the earth along a river bank, amid the rocks on a steep hillside, or even on top of a nest of *Scopus*. The eggs are rounded, pure white, and measure 48.5–53 mm. by 41.7–42.5. Breeding should begin in the Katanga toward July, for a half-grown nestling was obtained by de Witte at Kanzenze in mid-August.

***Bubo africanus cinerascens* Guérin**

Bubo cinerascens GUÉRIN, 1843, Rev. Zool., Paris, p. 321 (type locality: Abyssinia). SHARPE, 1884, Journ. Linn. Soc. Lond., Zool., XVII, p. 438 (Ndoruma).—*Bubo capensis* SCHWEINFURTH AND RATZEL, 1888, 'Emin Pascha,' German Ed., p. 365 (Djanda, western Lado Enclave).—*Bubo maculosus cinerascens* REICHENOW, 1901, 'Vög. Afr.,' I, p. 656.—*Bubo africanus cinerascens* NEUMANN, 1914, J. f. O., p. 38. SCHOUTEDEN, 1936, Ann. Mus. Congo, Zool., I, f. 2, p. 93 (Buta; Dramba; Niarrembe).—*Bubo maculosus* SCHOUTEDEN, 1918, Rev. Z. A., V, p. 235 (in part. Boga).

SPECIMENS.—Niagara, ♂, May 22; ♀, Mar. 9. Faradje, 6 ♂, Feb. 18, 23, Mar. 3, 16, Aug. 21, Sept. 30; 8 ♀, Jan. 9, Feb. 18, 24, 25, Mar. 3, 13, Aug. 19, Nov. 9; 4 ♂ juv., Feb. 18, 24, 25; ♀ juv., Apr. 22.

ADULTS.—Iris dark brown, rim of eyelids blackish red; bill black, cere dusky; skin of toes rather dark gray, claws black.

NESTLING.—Iris very dark brown; bill gray, tip of lower mandible whitish; toes light bluish gray, claws dusky.

DISTRIBUTION.—Northeastern Africa from Eritrea to northern Kenya Colony, and westward through the grasslands north of the equatorial forest to Asben and French Guinea, possibly to the Gambia. In the northeastern Congo it inhabits the savannas of the Uelle and

the west shore of Lake Albert. I have secured a male with dark brown eyes at Kasenyi, and a female with eyes of the same color at Kichwamba in Toro. A specimen taken by Pilette at Boga near the lower Semliki is likewise of this race.

The commonest owl in the Uelle savannas is *B. a. cinerascens*, which spends the day singly or in pairs, hidden among the patches of trees that grow in swampy spots. It hunts by night far and wide, often approaching villages, and advertising its presence by a short, low hoot, which may be doubled, and which sounds as though its author were much farther off than in reality. Another bird in the distance will often answer it; and they are not hard to see by moonlight, perching on the larger trees overlooking the bush. All the specimens I have seen from the Uelle are grayish, but more rufescent examples from Asben and Abyssinia have been reported by Hartert.¹

Their breeding season is very well defined: near Faradje the majority seem to lay about January 1-10, two or three being the usual brood. During February, March, and April the natives would bring us young birds, so that we were able to observe this seasonal regularity in three successive years. Holes in trees are usually chosen as nests, generally at a little elevation above the ground, in the larger trees of the savanna growth; but in one case (January 9, 1913) three rounded, white eggs of this horned owl had been laid on the bare earth inside the base of a hollow tree, on a level with the ground. Through this dry part of the bush a fire had already passed, and the whole interior of the tree had rotted or been burned out, leaving several openings close to the ground. Young birds when taken from the nest raise their wings, claw, and snap their beaks. Dimensions of eggs, 48.4-51.5 mm. \times 40.0-41.4.

Of nine stomachs investigated five contained insects, and six the hair or bones of rats. The rats numbered seven, the only other vertebrate found was a blind-snake (*Typhlops* sp.). About a dozen beetles had been eaten, many of goodly size, one a large horned dung-beetle. We noted also many roaches, nine crickets, a grasshopper, a large moth, and one spider.

Bubo poensis Fraser

Bubo poensis FRASER, 1853, P. Z. S. Lond., p. 13 (type locality: Fernando Po). OUSTALET, 1893, Naturaliste, VII, p. 60 (Ubangi). REICHENOW, 1901, 'Vög. Afr.,' I, p. 657. SASSI, 1912, Ann. Naturh. Hofmus. Wien, XXVI, p. 361 (Moera; Beni). CHAPIN, 1921, A. M. Nov., No. 17, p. 15 (Avakubi; Medje).—*Bubo poensis poensis* W. L. SCLATER, 1924, 'Syst. Av. Æth.,' pt. 1, p. 246 (lower Congo R.). BANNER-

¹ 1924, Nov. Zool., XXXI, p. 16.

MAN, 1933, 'Birds Trop. W. Afr.', III, p. 45, Fig. 18. SCHOUTEDEN, 1936, Ann. Mus. Congo, Zool., I, f. 2, p. 93 (in part. Panga).—*Bubo ? poensis* SCHOUTEDEN, 1926, Rev. Z. A., XIII, p. 193 (Temvo).

SPECIMENS.—Avakubi, 2 ♂, Mar. 10, 19; ♀, Aug. 12. Medje, ♂, June 22.

ADULTS.—Iris deep brown (with slightly reddish tinge, at least in ♂), eyelids bluish gray, tinged with pink above (by blood) and blackish at rim; bill pale bluish gray; toes pale flesh-color, claws light bluish gray, shading to black at tip.

DISTRIBUTION.—From the Gold Coast eastward through the Cameroons, as well as on the island of Fernando Po, to the Mayombe, the Ubangi River, and the Ituri district, where Grauer has collected it at Beni, on the eastern edge of the forest. The Congo Museum has an adult from Lusambo. The wings of seven specimens from the Congo measure 280–316 mm.¹

About Avakubi *Bubo poensis* is a forest-haunting owl, not frequently seen, and I have never even heard a note that I could attribute to it. I shot one at dusk from a tree near a small forest-village, where we also heard the loud call of *Strix woodfordii nuchalis*. Another was found in the forest during the day through its being scolded by a band of small birds. The female killed on August 12 showed a slight enlargement of the ovary; the males, in March and June, were clearly non-breeding.

In juvenal (mesoptyle) plumage the young of *poensis* is much more buffy than that of *leucostictus*, and more abundantly barred with blackish. The facial disc is conspicuously outlined with black, and the remiges and rectrices are barred very much as in the adult.

Only two stomachs had food in them; one the remains of insects, largely Orthoptera; the other, bones of a small bird and of a frog, also pieces of a large round millipede. Bates reported a small lemur (*Galago*), a mouse, a squirrel, and a fruit-bat from stomachs of this owl.

It might be said that natives of this region consider owls to be birds of ill omen; yet they never worry much about them, and will wear their feathers on hats quite as readily as those of hawks, hornbills, and other birds.

On the other hand, in the country around Niangara, where the feathers of a *Scotopelia peli* are precious as adornments, the low gruff hooting of *Bubo lacteus*, said Nekuma, foretells a coming death in the village; and a similar superstition is connected with the same bird by the Bakusu, who likewise fear the weird call of *Clamator cafer*, when occasionally it is heard at night.

¹ *Bubo vosseleri* Reichenow of Usambara, though regarded by Sclater as a race of *B. poensis*, is a distinct species, I am told by Professor Stresemann.

Bubo shelleyi (Sharpe and Ussher)

Huhua shelleyi SHARPE AND USSHER, 1872, Ibis, p. 182 (type locality: Fantee, Gold Coast).

DISTRIBUTION.—Forests of Liberia, Gold Coast, southern Cameroon, and Ituri district. Long known from only two examples collected in Fanti, it was rediscovered in 1921 by Bates at the River Ja, Cameroon.¹ In 1926, Dr. Bouet² obtained a fourth specimen near Monrovia, Liberia.

Shelley's eagle-owl certainly occurs in the Ituri as well. Among some perplexing feathers which I took from native hats at Avakubi in 1913 there is a secondary of a large owl, easily recognized by the "moth-wing" texture of its upper surface. Inclusive of quill this feather measures 306 mm., and is slightly larger than secondaries of *Bubo lacteus*. From corresponding feathers of *lacteus* it differs in its more regular and more numerous dark bars, which extend completely across the inner web. There can be no doubt that it is a secondary of *Bubo shelleyi*. Another black-barred feather secured at the same time may be a primary from the same bird, but its basal portion is lacking.

Feathers worn on native hats usually come from no great distance, and I feel certain that *Bubo shelleyi* will eventually be found in scattered localities in the Upper Congo forest.

Bubo lacteus (Temminck)

Strix lactea TEMMINCK, 1820, 'Planches Coloriées,' livr. 1, Pl. iv (type locality: Senegal).—*Bubo lacteus* DUBOIS, 1886, Bull. Mus. Roy. Hist. Nat. Belg., IV, p. 149 (L. Tanganyika); 1905, Ann. Mus. Congo, Zool., I, f. 1, p. 26 (Lower Congo). HARTLAUB, 1887, Zool. Jahrb., II, p. 306 (L. Albert). SHELLEY, 1901, Ibis, p. 167 (Karungwesi R.). REICHENOW, 1901, 'Vög. Afr.,' I, p. 650 (Kudurma); 1911, 'Wiss. Ergeb. D. Z.-Afr. Exp.,' III, p. 265 (Semliki R. near Beni). RODHAIN ET AL., 1913, 'Rapp. Miss. Sci. Katanga,' pp. 151, 152 (Bukama). SCHOUTEDEN, 1918, Rev. Z. A., V, p. 235 (N. of Kivu; Baraka; Beni; Luvungi; Baudouinville; Molekera); 1932, idem, XXII, p. 126; 1936, Ann. Mus. Congo, Zool., I, f. 2, p. 93 (Bwale in Upper Uelle; Mauda). SCLATER AND M.-PRAED, 1919, Ibis, p. 679 (Yambio). SCHUBOTZ, 1921, 'Tageb. Emin Pascha,' VI, p. 269 (Mangbetu country). DE RIEMAECKER, 1927, Rev. Z. A., XIV, p. 262 (Kafubu R.). ? *Bubo lacteus* SCHOUTEDEN, 1923, Rev. Z. A., XI, p. 326 (Basongo).

SPECIMENS.—Niagara, ♂, Nov. 22; ♀, Nov. 25; ♂ juv., Nov. 21. Faradje ♂, Oct. 5. Garamba, ♂ im., May 29.

ADULTS.—Iris dark brown, skin of the upper eyelids with a rosy blush; bill light grayish blue, palest at the tip of the maxilla; skin of toes blue-gray, claws black with gray bases.

¹ Bannerman, 1923, B. B. O. C., XLIII, p. 144.

² 1931, Ois. R. F. O., (N. S.) I, p. 435.

NESTLING.—Iris blackish, bill light blue-gray, toes light bluish gray.

DISTRIBUTION.—From Senegal, the northern territories of the Gold Coast, Darfur, and northern Abyssinia to Cape Province, but never in the heavy lowland forest of western and central Africa. It is found in the northern, eastern, and southern savannas of the Congo, often rather close to the forest border.

From the Lower Congo there was no record except that of Dubois (1905); but Paul Janssens tells me he shot one at Sumba in Angola, just south of the lower Congo River. Dr. Schouteden believed he saw this owl at Basongo, in the northern Kasai, but did not collect it there. Father Callewaert has obtained several specimens at Luluabourg. In the Kivu district it ascends to the highlands, for I have collected one in rather open woodland at 6700 feet, four miles north of Kibati. Yet it is not found in the denser mountain forests. In addition to the localities mentioned above, the following are represented by specimens in the Congo Museum: Tembwe on Lake Tanganyika, Kiambi on Luvua River, Inkongo on Sankuru River, and Mokabe-Kasari and the Kapiri Plateau in the Katanga.

In the regions where it is found I have heard two kinds of notes that I credit to it. One is a series of low, gruff, hooting sounds, with considerable carrying power, repeated at intervals; the other a weaker whistling sound, also given again and again, likewise at night. I made sure about the second note by sending after it a keen native hunter, who soon brought back one of these owls, a specimen not quite mature; and I find both notes described from South Africa by Major Stevenson-Hamilton.¹

In October, 1911, I came upon a pair roosting by day in a forest patch between Faradje and Aba. They were not very shy, but the trees were so very high as to keep them almost out of danger from my shot-gun.

South of Niangara, in November, the people of Okondo brought us a young gray eagle-owl they had taken from a nest. We later secured both parents, and found they had been rearing their single offspring on a structure of sticks that must have been set up by some other bird. It was in the fork of a rather small tree standing in the savanna, near the edge of some woods, and only 30 feet from the ground. In other parts of Africa these large eagle-owls have usually been found utilizing nests of sticks, but I doubt if they construct them. Occasionally they occupy a hollow tree. In Southern Rhodesia nestlings have been

¹ 1917, 'Animal Life in Africa,' III, p. 42.

taken in April, and in Angola in July. The eggs are plain white, somewhat rounded, measuring 54–64.2 mm. \times 44–50. Sets of two are the rule, but there may sometimes be three, or only one.

Small mammals up to the size of hares, and birds as large as guinea-fowl are said to be preyed upon; but much smaller creatures are likewise taken. In the three stomachs we examined there were several beetles, a cricket, and bones of a frog (or toad), as well as of a fruit-bat. Heuglin also mentioned fruit-bats in this connection.

KEY TO THE CONGO SPECIES OF *SCOTOPELIA*

- Wing more than 390 mm. long, upperparts mainly light rufous boldly barred with blackish.....*S. peli*.
 Wing less than 340 mm. long, upperparts buff or pale rufous mottled with dusky brown and obscurely streaked with blackish.....*S. bouvieri*.

Scotopelia bouvieri Sharpe

Scotopelia bouvieri SHARPE, 1875, Ibis, p. 260 (type locality: Lopé, Ogowé R., Gaboon). CHAPIN, 1921, A. M. Nov., No. 17, p. 15 (Niapu; Niangara); 1935, Bull. C. Z. C., XII, p. 71. W. L. SCLATER, 1924, 'Syst. Av. Æth.', pt. 1, p. 247. BAN-
 NERMAN, 1933, 'Birds Trop. W. Afr.', III, p. 50 (Landana). SCHOUTEDEN, 1935, Bull. C. Z. C., XII, p. 43 (Buta; Dika in Uelle); 1936, Ann. Mus. Congo, Zool., I, f. 2, p. 93.—*Scotopelia* CHAPIN, 1915, A. M. Journ., p. 284 (Congo).

SPECIMENS.—Niapu, 2 ♂, Dec. 8, 12; ♀, Dec. 6; ♀ juv., Dec. 2. Niangara, 2 ♀, Apr. 26, Dec. 6.

ADULT FEMALE.—Iris dark brown, rim of eyelids dirty yellowish; cere and both mandibles dull light yellowish green, dusky along cutting edges; feet brownish yellow, claws light gray, shading to blackish at tips.

DISTRIBUTION.—Obtained once in Liberia, but occurring mainly from southern Cameroon east to the Upper Uelle district, and also on the southern side of the equatorial forest from the Gaboon, Landana, and perhaps northern Angola east to the Kasai district and possibly the Manyema. In the Congo it has never been found in the unbroken area of lowland forest, but only along its edges, or in gallery forests. Father Callewaert sent two specimens to the American Museum from the vicinity of Luluabourg, and there is one adult in the Congo Museum from Kunungu near Bolobo. The species may be expected in the Mayombe.

One of our examples from Niangara was shot during the afternoon in some woods bordering a stream. The others, including the nestling bird, were secured through native hunters. One which we kept alive called several times at night, giving either a half-dozen short "hu's" in rapid succession, or a protracted quavering hoot.

In this small series from the Uelle the males are distinctly more rufous above than females, especially on sides of neck, and more tinged with rusty on lower breast and flanks.¹ There is no important difference in size between the sexes: wing, ♂, 302, 303, ♀, 303, 316; tail, ♂, 180, 185, ♀, 178, 182; culmen from cere, ♂, 20.3, 23, ♀, 23.3, 24; metatarsus, ♂, 61, 62, ♀, 60, 62. The skins from Luluabourg, not sexed, have wings 300 and 320 mm.; others in the Congo Museum from Kunungu 281, Buta 280, and Dika 298 mm.

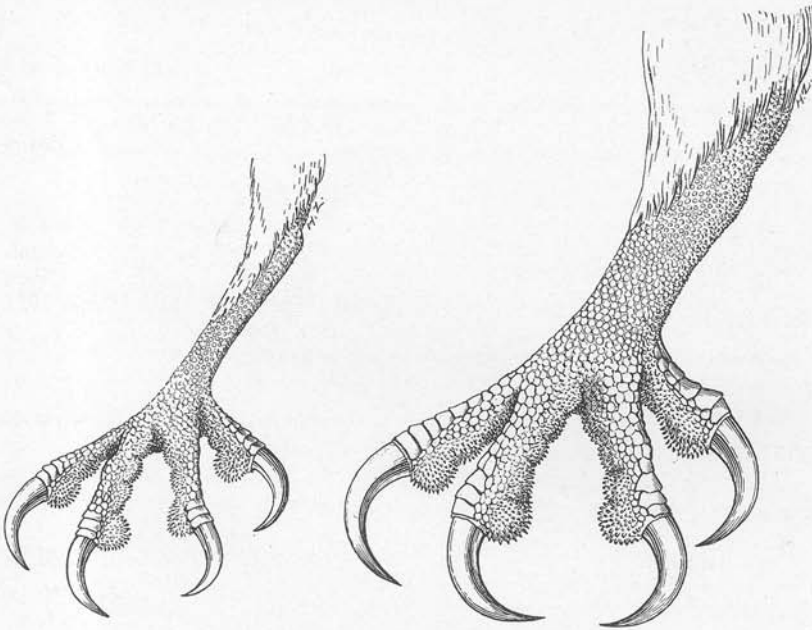


Fig. 26. Left feet of *Scotopelia bowieri* and *S. peli* (at right). $\times 1/2$.

The natal down of *Scotopelia bowieri* is white. It can still be seen adhering to the tips of the feathers in our nestling bird, which has the tail half-grown and is clothed in the loose "mesoptyle" plumage. The rectrices, remiges, and alula-quills are more cinnamon than in the adult; the underparts white with very fine, fuscous shaft-streaks. The upperparts from crown backward have a pale cinnamon wash, heavier shaft-streaks, and on the wing-coverts mottling or broken barring of fuscous. Facial discs nearly pure white. The Congo Museum has two young from Buta in this same plumage. One of them is much more cinnamon-rufous

¹ The illustration in 'Cat. Birds Brit. Mus.,' II, 1875, Pl. 1, better represents the adult male.

on back, breast, and wing-coverts. This example has wings and tail full-grown, and was obtained on February 11. So eggs would seem to be laid in the Uelle toward November and December. The nest is unknown.

No food was found in the stomachs we examined, but Bates has recorded that birds from the Cameroon had eaten small fishes, prawns, and a small bird.

Scotopelia peli peli Bonaparte

Scotopelia peli BONAPARTE, 1850, 'Consp. Gen. Av.,' I, p. 44 (type locality: Rio Boutry, W. Africa). JOHNSTON, 1884, 'River Congo,' p. 366 (Congo R.). DUBOIS, 1905, Ann. Mus. Congo, Zool., I, f. 1, p. 26 (L. Leopold II; Lower Congo). RODHAIN ET AL., 1913, 'Rapp. Miss. Sci. Katanga,' pp. 151, 156, 162 (Bukama). MOV-
RITZ, 1914, Ibis, p. 32 (Luapula R.). CHAPIN, 1925, Nat. Hist., p. 462 (Mangbetu country). BANNERMAN, 1933, 'Birds Trop. W. Afr.,' III, p. 46, Fig. 19 (Landana).—*Scotopelia peli peli* SCHOUTEDEN, 1936, Ann. Mus. Congo, Zool., I, f. 2, p. 93.

SPECIMENS.—Avakubi, ♀, Aug. 21. Faradje, ♀ (?), Apr. 2.

ADULT FEMALE.—Iris very dark brown, rim of eyelids gray; bill black with mandible light gray beneath, cere light gray, slightly bluish; feet pinkish white with a faint tinge of yellow, claws light gray.

DISTRIBUTION OF THE SPECIES.—Senegal, the Shari River district, and Eritrea, south to eastern Cape Province. While found along large rivers in the Congo forest, it seems to be more common in savanna countries where the streams are fringed with trees.

Although Zedlitz¹ proposed to divide this species in three races, it is very doubtful if his East African race, *fischeri*, can be upheld. His dark-colored form, *S. p. salvago-raggii* from the Tacazzé River in Eritrea, is said to be represented only by the type.²

Although so seldom collected, Pel's Fishing-Owl probably occurs throughout the lowlands of the Belgian Congo. On my way up the Congo River, near Ukaturaka Island, I saw a large owl by moonlight which was almost certainly of this species. Next we heard of it among the Mangbetu just south of Niangara. They considered this "Né-bi" so noble a bird that none save the chiefs and their immediate relatives were allowed to wear its plumage. It was said to be found mainly along the Bomokandi River.

Our specimen from Faradje was secured by native boatmen as it flew from tree to tree along a tributary to the Dungu River. Somehow they caught it alive, and plucked out all its larger quills, so I preserved it as a skeleton.

¹ 1908, O. Mb., p. 172.

² Grant and M.-Praed, 1937, B. B. O. C., LVII, pp. 158, 159, deny the validity of any races.

In January, 1914, I found a few molted feathers of *S. peli* lying on the shore of a small wooded island in the Ituri River above Avakubi. Several evenings were spent watching for it there, but in vain. Not far away, in May of the same year, Nekuma saw one of these fine birds, but it was only in August that he was able to shoot our second specimen. Its stomach contained the bones and head of a catfish, *Synodontis*. The wing of this female measured 404 mm., tail 220, culmen from cere 38, metatarsus 70.

The powerful feet of this fishing-owl remind one of an osprey's, the more so because the lower surface of all the toes is covered with small spiny scales. *S. bouvieri* has much smaller feet, likewise spiculate beneath.

Although I traveled several hundred miles by canoe on rivers in the northeastern Congo, never did I see *Scotopelia peli* along their banks by day. The only note I could attribute to it was a single deep and resonant "Hmmm," which I heard repeated several times one night along the Ituri River in October. But a young bird in captivity in the Staten Island Zoölogical Park during 1936 gave hoots that were not unlike those of many other owls.

This young bird was brought from South Africa while still in juvenal ("mesoptyle") plumage. Dubois's specimen from the "Lower Congo" is in that same plumage, with remiges and rectrices not yet fully grown. It is entered in the register of the Congo Museum without any note as to its origin, but it may have been collected by Cabra in the Lower Congo.

In its "mesoptyle" plumage the young *Scotopelia peli* is mainly pale cinnamon, with some blackish bristly feathers on loreal region; scapulars and greater wing-coverts with dusky barring, and wing and tail-quills very like those of adults.

In Southern Rhodesia Carlisle is said to have found a set of four white eggs during September in a large stick-nest, like an eagle's, in a high tree along a river bank. The eggs measured 54×44 mm.¹

KEY TO THE SPECIES OF *GLAUCIDIUM* EXPECTED IN THE CONGO

- 1.—Crown brown or blackish with numerous bars or V-shaped markings of white, wing-length 130 mm. or longer.....2.
- Crown rufous, brown, or dark slate, either uniform or with rounded spots or streaks of white (the hind-neck may have broken bars or mottling of white); wing-length less than 125 mm.....3.
- 2.—Wing-length exceeding 150 mm.; back uniform chestnut or deep rufous-brown; tail barred with white.....*G. sjöstedti*.

¹ Priest, 1934, 'Birds S. Rhodesia,' II, p. 434.

- Wing shorter than 149 mm.; back dusky brown to rufous-brown, faintly barred at least with buff or light rufous; tail barred with buff or pale rufous. *G. capense*.
- 3.—Crown and back rufous or brown, often with round white spots or fine white streaks; rectrices with spots or bars of white on both inner and outer webs *G. perlatum*.
- Crown and back slate-gray or very dark slaty brown without white markings (there may be some on hind-neck); rectrices with white spots on inner webs only. *G. tephronotum*.

Glaucidium perlatum (Vieillot)

Strix perlata VIEILLOT, 1817, 'Nouv. Dict. Hist. Nat.,' VII, p. 26 (type locality: Senegal).—*Noctua perlata* HARTLAUB, 1881, Abhandl. Naturwiss. Verein Bremen, VII, p. 85 (Magungo).—*Glaucidium perlatum* SHARPE, 1884, Journ. Linn. Soc. Lond., Zoöl., XVII, p. 439 (Semio). MATSCHIE, 1887, J. f. O., p. 148 (Mpala). REICHENOW, 1901, 'Vög. Afr.,' I, p. 674 (Sassa); 1911, 'Wiss. Ergeb. D. Z.-Afr. Exp.,' III, p. 266. O.-GRANT, 1908, Ibis, p. 315 (N. W. of L. Tanganyika); 1910, Tr. Z. S. Lond., XIX, p. 440 (Mokia). SASSI, 1912, Ann. Naturh. Hofmus. Wien, XXVI, p. 362 (Urundi; Uvira; Baraka). MOURITZ, 1914, Ibis, p. 38 (Tshinshenda). SCHOUTEDEN, 1918, Rev. Z. A., V, p. 236 (Molekera; Mutum-Peke); 1936, Ann. Mus. Congo, Zool., I, f. 2, p. 93. SCHUBOTZ, 1921, 'Tageb. Emin Pascha,' VI, p. 82 (Tunguru).

SPECIMEN.—Dungu, ♂, June 6.

ADULT MALE.—Iris yellow, rim of eyelids dark greenish; bill light green; skin of toes yellow, claws dusky.

DISTRIBUTION.—From Senegal to Abyssinia, through the open countries north of the forest belt; then through eastern Africa and the lowland savannas of the eastern Congo to the Orange River; westward also to Angola. Not known from the Lower Congo, the Kasai district, or the highlands of the Kivu; but the Congo Museum has specimens from Kabalo on the Lualaba River, Funda Biabo, Kinda, and Lake Musolo in the eastern Lulua district, Kilwa on Lake Moero, and Tembwe on Lake Tanganyika, in addition to other localities cited above. At Baraka the pearl-spotted owlet must be common. From the region about Lake Edward I have seen only Pilette's specimen from Molekera.

In the Uelle district during two and a half years I saw but a single example, sitting on a small leafless tree in the full glare of the sun at 10 A.M. We never heard its notes, which have been described as consisting of "an ascent of the octave in clear distinct notes, and then a slurred descent in one prolonged note."¹

Although there is much variation in color, some specimens being grayish brown above, others more rufous, two distinct color-phases

¹ E. C. Chubb, 1909, Ibis, p. 149.

cannot be distinguished. The crown-spots widen occasionally almost to bars. Specimens with finely streaked or unspotted crown appear to be young.

The breeding season in the Uelle is likely to be about April, as it is in Northern Nigeria and the Gambia.¹ In the southeastern Congo eggs are probably laid toward September. Nests are in holes in trees which have usually been excavated by barbets or woodpeckers; and sets are of two to four white eggs, measuring 30–32 mm. \times 24–26.5.²

***Glaucidium capense ngamiense* (Roberts)**

Smithiglaux capensis ngamiensis ROBERTS, 1932, Ann. Transvaal Mus., XV, p. 26 (Maun, Ngamiland).—*Glaucidium capense* SCHOUTEDEN, 1932, Bull. C. Z. C., IX, p. 9 (Dilolo).—? *Smithiglaux capensis castaneum* PAGET-WILKES, 1926, S. Afr. Journ. Nat. Hist., VI, p. 67 (upper Kafue R. near Ndola).

DISTRIBUTION OF THE SPECIES.—Eastern Cape Province north to Kenya Colony, the upper Semliki Valley, southeastern Congo, and Angola. Not known from the Kasai district or northwestern Angola.

G. c. capense is usually regarded as ranging from South Africa to Angola, Katanga, Marungu, and Unyamwezi, but Austin Roberts recognizes two other races, *ngamiense* and *rufum*³ within that area, restricting *capense* to Eastern Cape Province, Natal, and Zululand. *G. c. ngamiense* is said to differ from *capense* in having dark brown bars on the head, instead of red-chestnut-brown. It seems to range from Ngamiland north to the southern Lulua district. *G. c. rufum* is somewhat lighter and perhaps a little more ruddy above than *ngamiense*, extending apparently from the lower Zambesi to the region of Lake Tanganyika. *G. c. scheffleri* Neumann, of East Africa from Kilosa and Bagamoyo north to Gilgil and Sokoke in Kenya Colony, has the back of a still warmer brown, with light barring weakly developed. *G. c. castaneum* has the back even more reddish brown, only faintly barred with light rufous, and lesser wing-coverts uniform deep reddish brown.

At Dilolo in early September G. F. de Witte collected a series of twelve specimens which I here refer to *ngamiense*. They are very uniform in coloration, with backs dark brown rather boldly barred with buff, and crowns dark grayish brown barred with white. From birds taken near Lake Tanganyika they differ in their darker, more contrasted coloration.

The barred owlet is an inhabitant of savannas, where it spends the

¹ Bannerman, 1933, 'Birds Trop. W. Afr.', III, p. 31.

² Roberts, 1913, Journ. S. Afr. Orn. Union, IX, p. 19; Paget-Wilkes and Sladen, 1930, Ibis, p. 451; Benson, 1937, Ibis, p. 558.

³ Gunning and Roberts, 1911, Ann. Transvaal Mus., III, p. 111 (Boror, Port E. Afr.).

day in scattered trees, sometimes sitting in plain view, sometimes hiding in the densest foliage. Austin Roberts says it utters a croaking or rattling noise when alarmed during daylight. Its food is known to include caterpillars, grasshoppers, and mice.

***Glaucidium capense rufum* Gunning and Roberts**

Glaucidium capense rufum GUNNING AND ROBERTS, 1911, Ann. Transvaal Mus., III, p. 111 (type locality: Boror, Portuguese E. Afr.).—*Athene capensis* SCHALOW, 1886, J. f. O., pp. 411, 414, 421, 426, 432 (Kapampa in Marungu; Luvua R.; Lugoma R.; Likulwe R.; Lufira R.); 1887, idem, p. 230.—*Glaucidium capense* DUBOIS, 1886, Bull. Mus. Roy. Hist. Nat. Belg., IV, p. 149 (L. Tanganyika). MATSCHIE, 1887, J. f. O., p. 148 (Mpala). SHELLEY, 1901, Ibis, p. 167 (E. shore of L. Moero). REICHENOW, 1901, 'Vög. Afr.,' I, p. 672 (Luapula); 1911, 'Wiss. Ergeb. D. Z.-Afr. Exp.,' III, p. 266.—*Tænioglaux capensis* DUBOIS, 1905, Ann. Mus. Congo, Zool., I, f. 1, p. 26.—*Glaucidium capense capense* PITMAN, 1934, 'Rep. Faunal Survey N. Rhodesia,' p. 225 (L. Moero).

DISTRIBUTION.—If this race is valid, it extends from the lower Zambesi Valley to the interior of Tanganyika Territory, the Marungu district of the Belgian Congo, and Lake Moero. I have been unable to secure any specimen for comparison from the area to which Austin Roberts restricts *G. c. capense*, and must assume that he is justified in separating *rufum*. But I have compared specimens from Mpala, Kakoma, and Unyamwezi with two from Beira and Mozambique Province and found no difference. Two skins from Lukonzolwa on Lake Moero and Fort Jameson in Northern Rhodesia seem also to agree. When he described *scheffleri*, Professor Neumann took such birds to represent *G. c. capense*.

In the mountains of Marungu Böhm found this owlet very common, and believed it to be breeding in the first half of August. He described the birds as calling to their mates in broad daylight with buzzing and chirping sounds which grew louder and more rapid. In February, G. F. de Witte collected a molting individual at Lukonzolwa.

A nest of the barred owlet discovered by Austin Roberts¹ in Portuguese East Africa on September 12 was in a hollow of a broken tree-trunk. The three white eggs, of rounded form, measured 32–34 mm. × 27.3–27.5.

***Glaucidium capense castaneum* Reichenow**

Glaucidium castaneum REICHENOW, 1893, O. Mb., p. 62 (type locality: Andundi in Semliki Valley, E. Congo); 1901, 'Vög. Afr.,' I, p. 673; 1904, idem, Atlas, Pl. III, fig. 1; 1911, 'Wiss. Ergeb. D. Z.-Afr. Exp.,' III, p. 266.

¹ 1911, Journ. S. Afr. Orn. Union, VII, p. 71.

DISTRIBUTION.—Known only from the type specimen, which was collected by Stuhlmann at Andundi on the west side of the Semliki River. Sclater¹ stated that this locality was probably near Bukoba, but this is erroneous. The position of the village, called in full Andundi-wa-Kinabo, will be found explained in Stuhlmann, 1894, 'Mit Emin Pascha ins Herz von Afrika,' II, p. 629; and on page 633 of the same book there is mentioned "a small owl of the genus *Atheana*." Andundi was said to be in a forest clearing, and it does seem extraordinary that this species should be found in the forest of the Semliki Valley. The savanna nearer Lake Edward, on the other hand, would be quite suitable for it.

***Glaucidium tephronotum medje* Chapin**

Glaucidium tephronotum medje CHAPIN, 1932, A. M. Nov., No. 570, p. 3 (type locality: Medje, Ituri distr.; also from Nala).—*Glaucidium tephronotum* CHAPIN, 1921, Auk, p. 457; 1921, A. M. Nov., No. 17, p. 15; 1935, Bull. C. Z. C., XII, p. 71.—*Glaucidium pycrafti* W. L. SCLATER, 1924, 'Syst. Av. Æth.,' pt. 1, p. 244. SCHOUTEDEN, 1932, Bull. C. Z. C., VIII, p. 54 (Buta).—*Glaucidium tephronotum pycrafti* SCHOUTEDEN, 1936, Ann. Mus. Congo, Zool., I, f. 2, p. 93.

SPECIMENS.—Medje, ♂, May 7; ♂ ?, June; ♀, July 7. Nala, ♀, July 14.

ADULTS.—Iris and eyelids yellow; bill and cere light green; toes yellow, claws grayish.

DISTRIBUTION OF THE SPECIES.—Forests of the Gold Coast, and possibly those of Liberia, eastward to the Ituri forest and that on Mt. Elgon; southward at least to Lukolela on the middle Congo River. The type of *G. tephronotum* Sharpe² was erroneously believed to come from South America, and only recently has the typical race been re-discovered in the Gold Coast Colony by Willoughby P. Lowe.³ *G. t. pycrafti* Bates, of forested southern Cameroon, is darker, much less gray on crown and back than *tephronotum*, and has less rufous on flanks and sides of chest. In *tephronotum* the spots on the middle of the underparts are rufous shaded with dusky, in *pycrafti* they are blackish. *G. t. medje* of the northeastern Congo forest is slightly larger than *pycrafti*, less brownish on crown and back, black spots on underside narrower and longer. The wings of five adults of *medje* measure 116–121 mm., tails 82–87. Wings of two males of *pycrafti* 103, 109, tails 67, 68. *G. t. lukolelæ*, known only from the type, is still larger than *medje*, lighter and more grayish above, with spotting of underparts blackish. Wing

¹ 1924, 'Syst. Av. Æth.,' pt. 1, p. 244.

² 1875, Ibis, p. 260; 1875, 'Cat. Birds Brit. Mus.,' II, p. 211, Pl. XIII, fig. 2.

³ Bannerman, 1934, B. B. O. C., LIV, pp. 122, 123.

127 mm., tail 95. *G. t. elgonense* Granvik¹ of Mt. Elgon, likewise known from a single specimen, is another large race, but darker brown above than *pycrafti*. Wing 127 mm., tail 92.

Glaucidium t. medje is known from only three localities in the north-eastern Congo, but it must occur throughout that section of the lowland forest. The only example that I shot myself was seen near Medje at 3 o'clock in the afternoon of a rainy day, while the sky was very much overcast. It flew across a forest path in front of me, and luckily alighted on a horizontal liana not too far away. Until I picked it up I thought I had seen a small *Accipiter*.

Two of the specimens secured by Lang through natives were said to have been caught in holes of trees, and one was certainly taken alive. The birds taken on May 7 and July 7 were noted as not in breeding condition, the other two were probably not. From Buta the Congo Museum has an adult male and a young bird with rectrices not fully grown. The date of the latter was not recorded.

In two stomachs examined there were a rat, a hemipter, and a mantis.

***Glaucidium tephronotum lukolelæ* Chapin**

Glaucidium tephronotum lukolelæ CHAPIN, 1932, A. M. Nov., No. 570, p. 4 (type locality: Lukolela, middle Congo R.).

DISTRIBUTION.—Though known only from Lukolela, this race may extend eastward in the southern part of the Upper Congo forest. The type was secured in exactly the same way as that of *medje*. In the middle of the day it flew across a forest road and was shot after alighting on a horizontal limb.

[*Glaucidium tephronotum pycrafti* Bates]

Glaucidium pycrafti BATES, 1911, B. B. O. C., XXVII, p. 85 (type locality: Bitye, southern Cameroon).

The three specimens thus far collected all came from the type locality, but possibly this subspecies ranges as far as the middle Ubangi River.

[*Glaucidium sjöstedti* Reichenow]

Glaucidium sjöstedti REICHENOW, 1893, O. Mb., p. 65 (type locality: Cameroon Mountain).

Sjöstedt's owlet is known to inhabit the Lower Guinea forest, from the base of Mt. Cameroon at least to the River Ja and the French Congo.

¹ 1934, Rev. Z. A., XXV, p. 41.

We received a young specimen from Mr. A. Baudon, taken at Suanké in the Karagua district of the French Congo; and it seems likely that the species may range eastward to the lower Ubangi River.

***Strix woodfordii woodfordii* (Smith)¹**

Noctua woodfordii A. SMITH, 1834, S. Afr. Quart. Journ., (2), p. 312 (type locality: South Africa).—*Syrnium woodfordi* NEAVE, 1910, Ibis, p. 106 (E. of L. Bangweolo; Upper Katanga, probably). DE RIEMAECKER, 1927, Rev. Z. A., XIV, p. 263 (Tshinsangwe, between Elisabethville and Kasenga).—*Strix woodfordii woodfordii* W. L. SCLATER, 1924, 'Syst. Av. Æth.,' pt. 1, p. 240 (L. Bangweolo).

DISTRIBUTION OF THE SPECIES.—From eastern Cape Province north to Abyssinia, the Azande country of the southern Sudan, Mt. Cameroon, Southern Nigeria, hinterland of the Ivory Coast, and Sierra Leone. It is wanting in the drier parts of Southwest Africa, but extends through the equatorial forests.

S. w. woodfordii of South Africa extends northward to Nyasaland, Northeast Rhodesia, and the Upper Katanga. Eastern Africa has two races, which can be separated only provisionally, for they may represent individual rather than geographic differences. Sclater restricts *S. w. nigricantior* (Sharpe) to the coastal region, and *S. w. suahelica* to the interior of Tanganyika Territory and Kenya Colony, and Ruwenzori. It may occur also in the highlands of the Kivu. *S. w. umbrina* (Heuglin) is the Abyssinian form, while the remainder of the range in central and western Africa is occupied by *S. w. nuchalis*. Sharpe's *bohndorffi* seems synonymous with *nuchalis*.

The typical race is relatively dull brown, usually with considerable fine barring or vermiculation of buff on the upperparts, in addition to more or less white spotting. The light bars on the tail are broad and conspicuous, but the brown barring of the underparts not very heavy.

In the general region of the Katanga Neave noted that *woodfordii* was not uncommon, but difficult to obtain. It frequents patches of dense forest, usually on the banks of streams. At Lukonzolwa de Witte obtained one specimen for the Congo Museum, at Kasenga four, and at Kansenia two. One of the Kansenia skins is unusually rufous, the other dark brown. A rufous example, plainly of this race, was collected at Elisabethville by Dr. Richard.

In Natal A. D. Miller twice found these wood-owls nesting in a hollow at the top of a dead tree-stub, on September 24 and October 21. Each time there was a single white egg. They measured 44.4×35.5 mm. and 46.5×38.1 mm.

¹ After careful study of the car-region, J. L. Peters (1938, Auk, pp. 179-186) has decided that this species really belongs to the genus *Ciccaba* Wagler.

***Strix woodfordii suahelica* (Reichenow)**

Syrnium woodfordi var. *suahelicum* REICHENOW, 1898, in Werther, 'Mitt. Hochl. Deutsch-Ost-Afr.,' p. 272 (type locality: Tununguo, Morogoro distr., Tanganyika Terr.). *Syrnium suahelicum* O.-GRANT, 1910, Tr. Z. S. Lond., XIX, p. 440 (Mubuku Valley, 6000-7000 ft.).—*Syrnium woodfordi* SASSI, 1912, Ann. Naturh. Hofmus. Wien, XXVI, p. 362 (N. W. of L. Tanganyika). SCHOUTEDEN, 1918, Rev. Z. A., V, p. 235 (Kivu); 1934, idem, XXII, p. 126.—*Syrnium nuchale* SCHOUTEDEN, 1918, Rev. Z. A., V, p. 236 (in part. Biogo).—*Strix woodfordii suahelica* W. L. SCLATER, 1924, 'Syst. Av. Æth.,' pt. 1, p. 240 (W. to Ruwenzori). GRANVIK, 1934, Rev. Z. A., XXV, p. 40.

DISTRIBUTION.—Presumably from Tanganyika Territory and the interior of Kenya Colony westward to Uganda, the slopes of Ruwenzori, the Kivu district, and the highlands northwest of Baraka. *S. w. suahelica* is often rather similar in color-pattern to the typical race, but seems more variable. Some examples are not unlike *nuchalis*. Its status in the Congo is doubtful, for there are scarcely any specimens from the eastern highlands.

In the Congo Museum I found only two skins, from "Kivu" (Pauwels) and Biogo (Bonnievie), which are perhaps *suahelica*. The British Museum expedition obtained an example above 6000 feet on east Ruwenzori. On the western side of Ruwenzori I did not hear this owl; but in a native hut at Kalongi, 7000 feet, we found a dried head of the species impaled on a stick. At Lukumi camp on Mt. Karisimbi, 12,000 feet, one called repeatedly during a moonlit night, and was finally seen in a heath tree with the aid of an electric flashlight. Unfortunately it escaped. Near Behungi, at 8500 feet in the Kigezi district, I followed its call without success.

***Strix woodfordii nuchalis* (Sharpe)**

Syrnium nuchale SHARPE, 1870, Ibis, p. 487 (type locality: Fantee, W. Africa). HARTLAUB, 1887, Zool. Jahrb., II, p. 307 (Tomaya). OUSTALET, 1893, Naturaliste, (2) VII, p. 60 (Ubangi region). EMIN, 1894, J. f. O., p. 166 (old Irumu). FLOWER, 1894, P. Z. S. Lond., p. 600 (Ipoto). REICHENOW, 1901, 'Vög. Afr.,' I, p. 670 (Lendu; Scongá); 1911, 'Wiss. Ergeb. D. Z.-Afr. Exp.,' III, p. 266. DUBOIS, 1905, Ann. Mus. Congo, Zool., I, f. 1, p. 26 (Upper Congo; Banalia; Niam-Niam; Lower Congo). LÖNNBERG, 1907, Arkiv f. Zool., III, No. 21, p. 5; 1917, idem, X, No. 24, p. 15 (Beni). SASSI, 1912, Ann. Naturh. Hofmus. Wien, XXVI, p. 362 (Ukaika). SCHOUTEDEN, 1918, Rev. Z. A., V, p. 236 (in part. Beni).—*Syrnium bohndorffi* SHARPE, 1884, Journ. Linn. Soc. Lond., Zool., XVII, p. 439 (type locality: Semio; also from Ndoruma). DE SOUSA, 1887, Journ. Sci. Lisboa, XII, p. 84 (Mwata-Yamvo; Kwango R.).—*Syrnium woodfordii* SCHUBOTZ, 1921, 'Tageb. Emin Pascha,' VI, p. 269 (Mangbetu country).—*Strix woodfordi bohndorffi* BANNERMAN, 1922, Rev. Z. A., X, p. 164.—*Strix woodfordi nuchalis* SCHOUTEDEN, 1923, Rev. Z. A., XI, p. 326 (Basongo; Luebo; Kabambaie; Ngombe in Kasai); 1926, idem, XIII, p. 193

(Tshela; Kisala; ? Kai Bumba); 1936, Ann. Mus. Congo, Zool., I, f. 2, p. 92 (Kotili; Buta; Panga; Poko; Nava R.; Medje; Rungu; Djalasinda).—*Strix woodfordi nuchale* BANNERMAN, 1923, Ibis, p. 739 (Congo mouth).—*Strix woodfordii nuchalis* W. L. SCLATER, 1924, 'Syst. Av. Æth.,' pt. 1, p. 240. BANNERMAN, 1933, 'Birds Trop. W. Afr.,' III, p. 16, Fig. 5.—*Strix woodfordii bohndorffi* W. L. SCLATER, 1924, 'Syst. Av. Æth.,' pt. 1, p. 240 (Uelle distr.; Mangbetu country). GRANVIK, 1934, Rev. Z. A., XXV, p. 41.

SPECIMENS.—Avakubi, ♀, Jan. 9; ♂ juv., Nov. 30. Medje, ♂, Aug. 7; ♀, Aug. 11; ♂ juv., Jan. 11. Niangara, ♂, Dec. 6; 3 ♀, Nov. 24, Dec. 6, 7; ♂ juv., Nov. 28. Nzoro, ♂, Apr. 7; ♀, Apr. 8; ♀ im., Apr. 21. Between Faradje and Aba, ♀, Nov. 30.

ADULTS.—Iris very dark brown, rim of eyelids light brown; bill yellow; toes yellow, claws black.

DISTRIBUTION.—From Sierra Leone, and possibly the Casamance River, eastward to the Azande country, the plateau west of L. Albert, and probably the lowland forests of Uganda.¹ It occupies the whole forest of Lower Guinea, and ranges southward to Mombolo in the Benguela province of Angola, the southern Kasai, and probably the vicinity of Lake Kisale on the Lualaba.

This subspecies is usually much more rufous than the others, although there is some variation in this respect, and the light vermiculation of the upperparts is all but suppressed. Very dark brown examples are not common. I can see no real difference between specimens from the Uelle and those of the forested Upper and Lower Congo, and do not recognize *bohndorffi*.²

The variation in color is not dependent upon sex. The lightest and the darkest examples in my series are both females, but the first has still a few feathers of the juvenal plumage, and it seems not impossible that the darker birds may be older, especially as the loose mesoptyle plumage is so much paler than the next succeeding.

This is the common wood-owl of the greater part of the Congo, with the exception of the Upper Katanga and the highlands of the eastern border. It loves the shade of the forest, and in the more open parts of the country to the north and south it is restricted to the denser patches of woodland. But since it is a noisy bird its presence is easily ascertained.

Two very different notes it gives, one a single, loud, and rather high-pitched hoot, the other a lower "hu-hu, t'hu-u t'hu." They are repeated at varying intervals; and not infrequently both are heard, coming from slightly different directions, so native saying in the Uelle has it

¹ See van Someren, 1922, Nov. Zool., XXIX, p. 45.

² See however M.-Praed and Grant, 1938, Ibis, pp. 333-335.

that the first mentioned is the male's, the second the reproachful tones of his mate. I once kept a live female in a basket overnight, and heard from it notes like the lower reiterated hoots, yet it seems more likely that they are generally produced by the male.

One evening near Niangara a pair of these owls came and occupied the trees over our tent, giving both kinds of calls. They sat a little apart, one invariably giving the single higher hoot, but the other varied its lower syllables with a single low hoot. At first we could only see the birds as they flew back and forth against open patches of sky, but they were devoid of fear. We had a palm-oil light burning, and finally the low-voiced individual perched within range of its illumination. It was secured and proved to be a male. The other bird returned again later in the night, but gave only the single, higher hoot. This would make it very probable that the difference in voice is sexual.

In the Ituri Forest, where *nuchalis* is common, it is only occasionally seen by day, in twos, or sometimes even in threes; but they seem to have no definite roosting trees. Conditions are always like the summer of temperate regions, the foliage is dense, and the birds can wander. Hence accumulations of owl-pellets under a single tree are never to be seen.

In the Upper Uelle favorable situations are more restricted in size; and where they haunt a narrow strip of forest in the gorge of some small stream they are much easier to find, for they will not leave the shelter of the high trees. I have also seen them being mobbed by drongos and bulbuls.¹

The female taken at Niangara, December 6, was captured on her nest in the top of a large stub, some 20 feet high, standing in cleared land. She had but a single white egg, and her ovary gave no promise of any more. An egg collected by Bates in the Cameroon measured 45 × 39.5 mm. The fact that young birds were invariably brought singly by natives makes it likely that one egg is the rule.

In the Uelle the breeding season lasts from November to April. Females with very large ovaries were taken on November 7 and December 7, a young bird ready to leave the nest was noted at Faradje on February 14, and the Congo Museum has a well-grown nestling from Buta on April 11.

In the forest belt, from Avakubi northward, the season is much the same. Young birds were brought to us in November, January, and April, so laying must begin there in October. From Lukolela, in the southern

¹ *Dicrurus adsmilis divaricatus* and *Prosoprocichla scandens orientalis*.

part of the forest belt, I have seen nestlings taken on July 4, November 16, and December 17. At Kai Bumba in the Mayombe Dr. Schouteden collected a newly hatched bird, in pure white natal down, on October 11.

South of the forest, at Luluabourg, Father Callewaert has obtained nestlings on June 11, July 2, August 1, and September 10. At Kabambaie Dr. Schouteden preserved a young bird with remiges three-fourths grown on October 11. These dates are about the reverse of those in the Uelle, so the young are reared mainly during the dry season.

There is considerable variation in the first fluffy plumage of the young, but it is usually rather rufous, the feathers of upperparts conspicuously tipped with white, while those beneath are more apt to be barred with brown and white. Remiges and rectrices are rather like those of the adult.

Twelve stomachs of *Strix w. nuchalis* were examined, 10 containing insects. There were vertebrates in only four, consisting of 2 mice, a small bird, and a frog (bones). Among the insects noted were: numbers of beetles (in 5 stomachs), several grasshoppers, 1 cricket, 2 mantises, 1 large roach, 3 cicadas, and 12 small green caterpillars (these last from a single owl). Insects far outweighed the other food.

KEY TO THE CONGO SPECIES OF *ASIO*

- With rather short, inconspicuous ear-tufts, of which the longest feathers do not exceed 30 mm. from base; central portion of facial disc, just around eye, blackish; dark barring and vermiculation of lower surface very faintly indicated; wing seldom longer than 300 mm. *A. capensis*.
 With long ear-tufts, of which some feathers attain a length of 50 mm.; whole facial disc yellowish buff; barring and streaking of lower surface very distinct, often forming heavy cruciform markings; wing more than 300 mm. long. *A. abyssinicus*.

Asio capensis capensis (Smith)

Otus capensis A. SMITH, 1834, S. Afr. Quart. Journ., (2) No. 4, pt. 1, p. 316 (type locality: S. Africa).—?*Asio capensis* DUBOIS, 1886, Bull. Mus. Roy. Hist. Nat. Belg., IV, p. 149 (L. Tanganyika).—*Asio capensis* DUBOIS, 1905, Ann. Mus. Congo, Zool., I, f. 1, p. 26 (Kisantu). SALVADORI, 1914, Ann. Mus. Zool. Napoli, IV, No. 10, p. 14 (Lobo on Luapula R.).—*Asio nisuelia* REICHENOW, 1911, 'Wiss. Ergeb. D. Z.-Afr. Exp.,' III, p. 265 (W. of Kagera R.).—*Asio helvola helvola* W. L. SCLATER, 1924, 'Syst. Av. Æth.,' pt. 1, p. 239.

DISTRIBUTION OF THE SPECIES.—From Cape Province north to Angola and the lower Congo River, the Manyema district, Ruanda, East Africa, and Abyssinia. Thence westward again across the Sudan to Lake Chad, and in Algeria, Morocco, and southern Spain. *A. c. capensis* extends from South Africa to the southern Congo and Abyssinia, and

possibly to the Bahr-el-Ghazal, though the Sudanese specimens may bear a closer resemblance to the more reddish *A. c. tingitanus* (Loche) of North Africa and southern Spain.¹ *A. c. hova* Stresemann is a large dark-colored form found on Madagascar.

A. c. capensis is widely distributed in the southern Congo, though not yet known from the Kasai district. In addition to the specimen from Kisantu the Congo Museum now has one from Mutombo Mukulu in the Lomami district, and one from Kalembelembe near the northwest side of Lake Tanganyika. Conover and Zimmer collected two for the Field Museum at Katobwe, 30 miles north of Bukama. The marsh-owl seems not to inhabit the highlands of the Kivu or the lowland savannas of the Uelle.

In the region of Lake Bangweolo and the Upper Katanga, according to Neave, this owl is not uncommon about large swamps and other suitable localities. It appears to be partially diurnal in habits. According to South African observers, it often goes in small parties of five or six, and seeks concealment during the day amid rushes and long grass. Their prey includes frogs, lizards, mice, and aquatic insects. The cry is not a hoot, but a harsh screech.

The nest is a depression hidden by a clump of reeds or grass, and lined with a few dry rushes. Two to four white eggs are laid, which measure 40-43.5 mm. \times 32-35.

***Asio abyssinicus graueri* Sassi**

Asio abyssinicus graueri SASSI, 1912, Anz. Akad. Wiss. Wien, p. 122 (type locality: forest country N. W. of Tanganyika, at 2000 m.); 1912, Ann. Naturh. Hofmus. Wien, XXVI, p. 360.—*Asio abyssinicus graueri* W. L. SCLATER, 1924, 'Syst. Av. Æth.', pt. 1, p. 239.

DISTRIBUTION OF THE SPECIES.—Highlands of Abyssinia, the home of *A. a. abyssinicus* (Guérin); Ruwenzori, and the mountains northwest of Baraka on Lake Tanganyika, whence came the only known specimen of *A. b. graueri*. The latter bird is described as smaller than the typical form, having wing but 309 mm. long, darker and more uniformly blackish brown on upperparts, and the cross-barring of the underparts beginning only below the breast.

Dr. Hartert² regarded *abyssinicus* as only subspecifically distinct from the European long-eared owl, though differing markedly in the heavy cross-barring of its underparts, darker coloration, and larger measurements.

¹ See Sclater and M.-Praed, 1919, *Ibis*, p. 677.

² 1913, 'Vög. pal. Fauna,' II, p. 987.

The validity of *graueri* still awaits confirmation, but it is safe to say that the species occurs on Ruwenzori. In a native hut at Kalongi, near 7000 feet on the west side of the range, we discovered a dried head of a long-eared owl, showing the ear-tufts and other distinctive characters, though badly soiled by soot. It was pierced by a thin stick and stuck among the rafters. So this long-eared owl may well be expected on the other high mountains of the eastern Congo border.

FAMILY Tytonidæ. BARN-OWLS

KEY TO THE CONGO SPECIES OF TYTO

Back with grayish vermiculation, each feather with an irregular white spot near its middle; a dark reddish-brown spot in front of eye. *T. alba*.
 Back not vermiculated, but dark brown with white spots; a black spot in front of eye *T. capensis*.

Tyto alba affinis (Blyth)

Strix affinis BLYTH, 1862, Ibis, p. 388 (type locality: Cape of Good Hope).—*Strix flammea* SHARPE, 1884, Journ. Linn. Soc. Lond., Zool., XVII, p. 440 (Semio). SCHALOW, 1886, J. f. O., p. 421 ("Lualaba" = Luvua R.). MATSCHIE, 1887, J. f. O., p. 149. SHELLEY, 1888, P. Z. S. Lond., p. 47 (Tingasi).—*Strix flammea maculata* REICHENOW, 1901, 'Vög. Afr.', I, p. 676 (Mombuttu; Kwango R.). MENEGAUX, 1918, Rev. Fr. O., V, p. 258 (Lower Congo).—*Tyto alba affinis* BANNERMAN, 1923, Ibis, p. 740. HARTERT, 1929, Nov. Zool., XXXV, p. 97. SCHOUTEDEN, 1936, Ann. Mus. Congo, Zool., I, f. 2, p. 92.—*Stryx* SCHOUTEDEN, 1930, Bull. C. Z. C., VII, p. 82 (Katanga); 1932, idem, VIII, p. 80 (Sandoa); 1932, idem, IX, p. 14.—*Tyto alba* SCHOUTEDEN, 1933, Bull. C. Z. C., X, p. 32 (Kanzenze).

SPECIMENS.—Niagara, ♂, June 8; ♀, Apr. 20; 2 ♀ im., Mar. 8, 9. Faradje 2 ♂, July 25, Oct. 22; ♀, Nov. 9; 3 ♀ im., May 1.

ADULTS.—Iris dark brown, rim of eyelids dark brown or dusky reddish; beak pale pinkish gray, claws and scales on feet dusky brownish, skin between scales whitish.

DISTRIBUTION OF THE SPECIES.—Almost cosmopolitan, except in the colder regions and some of the equatorial forests. Divisible—according to Hartert¹—into at least twenty-six subspecies, some of which inhabit oceanic islands such as Samoa and the Galápagos.

The African race of the common barn-owl, *T. a. affinis*, though ranging from the Senegal and southern Nubia all the way to the Cape,² is unknown within the limits of the Congo and Cameroon forests, except in the immediate vicinity of Mt. Cameroon. Two specimens from Fernando Po in the American Museum show more contrast in the

¹ 1913, 'Vög. pal. Fauna,' II, pp. 1029-1040; 1929, Nov. Zool., XXXV, pp. 93-102.

² The form inhabiting Madagascar has slightly longer wings and has been named *T. a. hypermetra* Grote.

vermiculation of crown, back, and wing-coverts than those of the mainland; and I think that *T. a. poënsis* (Fraser)¹ may be a valid race. São Tomé is inhabited by a dark-colored form, *T. a. thomensis* (Hartlaub); and Arabia has *T. a. erlangeri* Sclater.

Of our ten specimens of *affinis*, all with numerous spots on the underparts, four have the ground-color, from throat to legs, nearly pure white; and these I noted from dissection as certainly adult birds. Five others are conspicuously washed with buff, especially on the chest and legs. Two of them still showed traces of natal down, and all were taken under such circumstances as to indicate that they were just out of the nest, this being confirmed by the condition of the internal organs.

Only one example (Niagara, June 8) is of intermediate tint, and while not plainly a juvenile bird, it was noted as non-breeding. The evidence seems sufficient to show that the whiteness of the breast is not simply a matter of variation, but primarily a mark of the adult.

In the Congo the barn-owl has never been found on high mountains, nor is it known from the grasslands near Lake Albert and Lake Edward. It seems to be wanting on the Kivu plateau, although in Abyssinia it nests at Addis Ababa, and in Kenya Colony is found to at least 5000 feet.

North and south of the Congo forest, and in the Katanga, barn-owls are fairly common. In addition to published localities, there are specimens in the Congo Museum from Zambi, Leopoldville, Dilolo, Mukula Gombe, Lake Musolo, Kansenia, Kiambi, and the vicinity of Kasongo.

In the northern savanna we found them not at all rare near the Uelle and Dungu rivers, spending the day in the densest foliage they could find, often well away from water. One was seen to fly from a crevice in a rocky cliff near Aba. At the post of Faradje there were signs of the nocturnal visits of one or more of these owls to the verandah of a house, where they perched on some projecting beams beneath the rafters, but a careful search failed to show that they were entering any of the buildings. A neighboring rubber tree with stout horizontal boughs was frequently visited, and pellets of fur and bones dropped beneath it. Here we heard the voice, a hoarse "sh-sh-sh-sh-sh.—," and finally brought down a bird by moonlight.

Occasionally attention is called to them in the daytime by mobbing of small birds, and at 9 A.M. one day in October a barn-owl flew from a tree along the bank of the river Dungu, bearing in its claws the headless body of an adult female weaver bird (*Textor cucullatus femininus*), from

¹ 1843, P. Z. S. Lond., pt. 10 (1842), p. 189 (Fernando Po).

which it had pulled all the flight-feathers. A colony of these weavers was established there, and the owl was later found to have eaten two adult birds, being still busy with one of its captures by daylight.

In this latitude the eggs are laid and young reared between November and May, largely during the dry season, as by so many predatory birds. This was indicated by the dissection of adults, also by two broods of young, the first of which had just left the nest on May 1, and comprised at least three birds, while the other, in March, consisted of two still sitting in the tree where they had been reared. Its trunk and a main limb were hollow, with several openings, and inside lay a great number of pellets, as well as a piece of egg-shell. In neither case could we find the parents.

Another well-known nesting site of the African barn-owl is in nests of *Scopus umbretta*.¹ Sets of eggs vary from three to six, their color being white. At Mohoro, eastern Tanganyika Territory, Schuster² found barn-owls nesting in a house. Eggs were first laid at the end of May, but young were still being reared in early September. He gave the dimensions of four eggs as 35.3–39.5 mm. \times 29.4–31.75. In the southern Congo breeding may be expected between June and October, during the dry months.

Only four of the stomachs we examined contained food, this consisting of remains of three passerine birds, fur and bones of a mouse, and grasshoppers (in one adult's stomach).

***Tyto capensis capensis* (Smith)**

Strix capensis A. SMITH, 1834, S. Afr. Quart. Journ., (2), p. 317 (type locality: S. Africa). REICHENOW, 1898, in Werther, 'Mitt. Hochl. Deutsch Ost-Afr.,' p. 278 (Urundi); 1901, 'Vög. Afr.,' I, p. 678. DE RIEMAECKER, 1927, Rev. Zool. Afr., XIV, p. 262 (Elisabethville).—*Strix cabræ* DUBOIS, 1902, 'Synopsis Av.,' II, p. 900, foot-note (type locality: S. of Cataracts of Congo R.); 1905, Ann. Mus. Congo, Zool., I, f. 1, pp. 20, 26, Pl. XII (Cataract distr.).—*Tyto cabræ* W. L. SCLATER, 1924, 'Syst. Av. Æth.,' pt. 1, p. 238.—*Tyto capensis* BANNERMAN, 1933, 'Birds Trop. W. Afr.,' III, p. 11, Fig. 2 (valley of Lupe R., near Cataracts).

DISTRIBUTION OF THE SPECIES.³—Cape Province north to the middle Congo River, the Katanga, Kivu district, and Kenya Colony. Three races have been recognized. *T. c. capensis* certainly ranges north to the Congo River and Rutshuru; *T. c. damarensis* Roberts is a doubtful race from Damaraland, supposedly smaller and paler; and *T. c.*

¹ See Paget-Wilkes and Sladen, 1930, Ibis, p. 450; Geyr v. Schweppenburg, 1932, O. Mb., p. 48; Cheesman, 1935, Ibis, p. 320.

² 1926, J. f. O., p. 528.

³ The specific name should be *T. punctata* (Lichtenstein), says Austin Roberts, 1936, Ann. Transvaal Mus., XVIII, p. 268, because *Strix capensis* A. Smith is antedated by *Strix capensis* Daudin, 1800.

librata Peters and Loveridge,¹ of Kenya Colony, is unspotted on the upperparts.

In addition to the type of *cabrax*, which Bannerman has compared with the type of *capensis*, the Congo Museum has four adults from Kunungu near Bolobo, two nestlings from Luluabourg in the Kasai, one immature specimen from Ibanda on the west side of Lake Kivu, and a sub-adult from Rutshuru. The wings of the five adults from the Congo measure 310–320 mm., their tails 108–116 mm. Their underparts vary from nearly pure white, always spotted, to light buff; but neither this color nor the size of white spots on the back seems indicative of sex.

The nestlings from Luluabourg, with wings 205 and 242 mm., were taken in the latter part of July. Their facial discs are rather rufous, underparts deep buff with blackish spots, and remiges very much darker than those of adults. The natal down still adhering to their plumage is grayish cinnamon.

Nothing has been recorded of the habits of the grass-owl in the Congo. In South Africa it is most often flushed from the ground amid grass or reeds, sometimes about marshes, though it has also been met with in the "bush" as well. A nest was found in a swamp in Cape Province by Atmore in May, and others by Millar in South Africa from April to August. The eggs of the species are described as white, with granular surface, measuring 37.3–43.18 mm. \times 30.5–35.5.

ORDER CAPRIMULGIFORMES

FAMILY Caprimulgidæ. NIGHTJARS

KEY TO THE AFRICAN GENERA OF CAPRIMULGIDÆ

- 1.—Second primary (ninth, counting from the outer side) strikingly elongated. 2.
 Second primary not noticeably prolonged. 3.
- 2.—Only one modified primary in each wing, its shaft for the most part nearly bare, its tip with broad racquet-like web. MACRODIPTERYX, ♂, p. 433.
 Second primary very long, pennant-like. Third primary also prolonged, though not equalling second, and all the remaining primaries somewhat lengthened. COSMETORNIS, ♂, p. 436.
- 3.—Tail pointed or graduated, median pair of rectrices at least 28, but usually more than 50 mm. longer than the outermost. SCOTORNIS,² p. 429.
 Tail rounded, square, or slightly forked. 4.
- 4.—Tail square or slightly forked; outer primaries barred or spotted with buff throughout their length. 5.

¹ 1935, Proc. Biol. Soc. Wash., XLVIII, p. 77 (Kaimosi). See also van Someren, 1922, Nov. Zool., XXIX, p. 46.

² *Caprimulgus fossii apatelius* of N. E. Africa is said to have median rectrices sometimes as much as 50 mm. longer than the outer ones.

- Tail more or less rounded, or double-rounded.....6.
- 5.—Tail square, or sometimes very slightly forked; wing not exceeding 180 mm.....
.....MACRODIPTERYX, ♀, ♂ im., p. 433.
- Tail usually with slight fork; wing more than 185 mm. long.....
.....COSMETORNIS, ♀, ♂ im., p. 436.
- 6.—Tail double-rounded, rectrices of third pair longest, the whole tail vaulted;
primaries unusually strong and curved, with no light markings on inner
webs; rictal bristles very small and weak.....VELES, p. 432.
- Tail usually rounded, and of normal flattened form; rictal bristles conspicu-
ous.....CAPRIMULGUS, p. 407.

KEY TO THE SPECIES OF *CAPRIMULGUS* IN THE CONGO

- 1.—Tips or larger areas of outer rectrices white.....2.
Outer tail-feathers without white, though they may have buffy or grayish areas
at tips.....12.
- 2.—Outermost tail-feather with white at tip on inner web and whole outer web
white; white patches on five outer primaries.....*C. fossii*, ♂.
Both webs of outermost tail-feather dark-colored basally, or else the greater
part of both webs white.....3.
- 3.—Only three outermost primaries with whitespots, wing usually exceeding 174 mm.
.....*C. europæus*, ♂.
Four outer primaries with white or pale buff areas, except when there is no
light spot on the outermost.....4.
- 4.—White on outermost tail-feather extending more than 32 mm. from the tip.....5.
White on outmost tail-feather does not reach 32 mm. from tip.....9.
- 5.—No white on outer web of any primary; wing at least 169 mm. long; general
coloration dark grayish, no very distinct pattern above....*C. tristigma*.
With white on outer webs of a few of primaries; wing often less than 169 mm.
long.....6.
- 6.—Pattern of upperparts unusually plain, crown with only very small spots or
very fine streaks of black; no pure white patch on throat....*C. inornatus*.
Middle of crown with broad markings of black; a white area on throat.....7.
- 7.—A bright rufous collar around hind-neck, region about eye rufous, often finely
barred with black.....*C. pectoralis*, ♂.
Collar more buffy and less conspicuous, region about eye not rufous.....8.
- 8.—Tail usually less than 105 mm. long; general tone of plumage brownish spotted
with black; abdomen and under tail-coverts light buff without barring....
.....*C. natalensis*, ♂.
Tail exceeding 105 mm.; general tone of plumage darker and grayer; abdomen
and under tail-coverts barred with blackish.....*C. poliocephalus*, ♂.
- 9.—Wing exceeding 175 mm.; coloration mostly very dark brown, often washed
with rufous.....*C. batesi*, ♂.
Wing less than 175 mm. long.....10.
- 10.—Narrowing of outer webs of outer primaries takes place distally to their white
areas.....*C. rufigena*, ♂.
Narrowing of outer webs of outer primaries begins within their white areas..11.
- 11.—Feathers of chest with large buff spots near their tips, lower breast coarsely

- barred with blackish; region about eye not particularly rufous.....
 *C. poliocephalus*, ♀.
 Feathers of chest without buff spots, or at most with a narrow buffy bar near tips; lower breast narrowly barred with blackish; region about eye distinctly rufous.....*C. pectoralis*, ♀.
 12.—Outermost rectrices brownish black, with faint traces of buffy barring toward bases but not at tips; wing always exceeding 175 mm.....*C. batesi*, ♀.
 Outermost rectrices never plain blackish toward tips.....13.
 13.—Outermost rectrices gray, with flecking or faint barring of grayish buff, but no distinct light tips; wing at least 169 mm. long.....*C. tristigma*, ♀.
 Outermost rectrices with distinct paler areas at tips.....14.
 14.—Wing usually more than 174 mm. long; inner webs of outer primaries with many buffy bars or similar markings, which do not quite reach shaft.....
*C. europæus*, ♀.
 Wing less than 174 mm. long.....15.
 15.—Crown only finely spotted or very narrowly streaked with black; pattern of back unusually plain, no pure white on throat; outer primaries with several spots or imperfect bars of buff on inner webs...*C. inornatus*, ♀.
 Crown rather heavily streaked with black; scarcely more than one light area on outer primaries.....16.
 16.—Tail usually less than 105 mm. long; scapulars with broad black centers, but lateral buffy stripes inconspicuous.....*C. natalensis*, ♀.
 Tail usually more than 105 mm. long; lateral buffy stripes on scapulars more conspicuous.....17.
 17.—Light color of tip of outermost tail-feather extending up whole of outer web.....
*C. fossii*, ♀.
 Light area at tip of outermost tail-feather not extending up outer web.....
*C. rufigena*, ♀.

Caprimulgus tristigma tristigma Rüppell

Caprimulgus tristigma RÜPPEL, 1840, 'Neue. Wirbelth. Fauna Abyss.,' p. 105 (type locality: Gondar, Abyssinia).—*Caprimulgus claudi* ALEXANDER, 1907, 'From the Niger to the Nile,' II, p. 308 (Kodja hill near Mt. Gaima).—*Caprimulgus trimaculatus goslingi* W. L. SCLATER, 1924, 'Syst. Av. Æth.,' pt. 1. p. 251 (in part. Uelle). SCHOUTEDEN, 1936, Ann. Mus. Congo, Zool., I, f. 2, p. 94.—*Caprimulgus trimaculatus tristigma* SCHOUTEDEN, 1929, Bull. C. Z. C., V. p. 79 (Abimva; Dramba).—*Caprimulgus tristigma tristigma* BANNERMAN, 1933, 'Birds Trop. W. Afr.,' III, p. 156, foot-note.

SPECIMENS.—Nzoro, ♂, Apr. 11; 2 ♀, Apr. 13, 19. Aba, 3 ♂, July 14, 18, Dec. 16. Garamba, ♂ juv., May 5.

ADULTS.—Iris dark brown, rim of eyelids buff; bill brown with blackish tip; feet dark brownish.

DISTRIBUTION OF THE SPECIES.—Senegal east to Abyssinia and central Kenya Colony, south through the eastern Congo and East Africa, and then to the Katanga, Lulua district, Mashonaland, Transvaal, Great Namaqualand, and the Benguela province of Angola. It

frequents rocky hills in savannas, is not found much above 6000 feet in the Congo, and has been taken just once in the Lower Guinea forest, on a great bare rock at Ebolowa, Cameroon.¹

Swainson's description of *C. trimaculatus* is indeterminable, so the species must be called *tristigma*. *C. t. tristigma* ranges from Abyssinia and the Anglo-Egyptian Sudan to the Uelle district, the vicinity of Lake Edward, Uganda, and Nairobi in Kenya Colony. Its wing measures 170–181 mm. *C. t. lentiginosus* of southern Africa, north to Tanganyika Territory, the southeastern Congo, and central Angola, is not very different in color, but has the wing usually 183–195 mm. long. *C. t. sharpei*, which ranges from the region of the Ubangi west to French Guinea and supposedly Senegal, is a smaller, darker race, with wing 164–176 mm.

The typical race of the rock goatsucker is found only locally in the northeastern Congo, wherever there are hills with considerable expanses of bare rock. We observed or secured specimens in the Upper Uelle near Garamba, Aba, Mt. Gaima, and northwest of Nzoro. Elsewhere we did not even hear its voice. Relatively low hills with naked rocks are likely to be inhabited, while much larger ones overgrown with grass and trees may not be. If it is present it will make the fact known soon after dusk by a weird "whow-whow!" repeated again and again. Occasionally there are three syllables, rarely four, in quick succession. Calling begins again before dawn. In the Uelle we heard it in April, July, and December.

During my visit to the eastern Congo I saw *tristigma* on Mt. Avu, north of Nioka, and heard it call near the new post of Beni and at the new station of Kasindi. A specimen was collected near Fort Portal. It does not ascend the forested slopes of the higher mountains.

By day the rock goatsuckers rest in sheltered positions on the rocks, where their resemblance in color to the dark weathered granite is extraordinarily deceptive.

In the Uelle eggs were laid in the early part of the rainy season, directly upon the bare rock or in a spot where some pebbles and earth had accumulated in a slight depression, and not far from a loose block of stone. We found two sets, on April 13 and 19, near Gangura's village, northwest of Nzoro. The females were incubating, they sat very close, and then played the usual game of hide-and-seek.

While caprimulgine eggs are often as protectively colored as the birds that lay them, these on the contrary became very conspicuous

¹ Bates, 1907, *Ibis*, p. 423; 1909, *idem*, p. 26.

when abandoned. They were whitish, spotted irregularly with dull brown, many of the markings clouded by a thin layer of chalk. One set measured 29.1×21.6 and 30.4×21.7 .

At Garamba Lang found two young with tails still very short on May 5. In general coloration their plumage was like that of adults, only more spotted with buff above. So their juvenal plumage was more like the adult than in species of *Caprimulgus* with a more complex color-pattern. It may well be that *C. tristigma* lays its eggs during the early rains because of the great heat on open rocks during the dry season. But the one specimen whose stomach-contents I noted was an incubating female. She had eaten many winged termites, and the abundance of such food during the breeding season may also have some importance.

[*Caprimulgus tristigma sharpei* Alexander]

Caprimulgus sharpei ALEXANDER, 1901, B. B. O. C., XII, p. 29 (type locality: Gambaga, Gold Coast hinterland).—*Caprimulgus goslingi* ALEXANDER, 1907, B. B. O. C., XIX, p. 47 (type locality: Mt. Kaga Dzirri, Kemo R., Fr. Eq. Afr.).—*Caprimulgus trimaculatus goslingi* W. L. SCLATER, 1924, 'Syst. Av. Æth.', pt. 1, p. 251 (in part. Ubangi).—*Caprimulgus tristigma sharpei* BANNERMAN, 1933, 'Birds Trop. W. Afr.', III, p. 156, Fig. 46.

This race of rock goatsucker seems to reach its eastern limit in the neighborhood of the Ubangi. While not yet recorded from Belgian territory, it is likely to occur within our limits if there are suitable hills in that region.

Caprimulgus tristigma lentiginosus Smith

Caprimulgus lentiginosus A. SMITH, 1845, 'Ill. Zool. S. Afr.', p. 101 (type locality: Great Namaqualand).—*Caprimulgus trimaculatus* MOURITZ, 1914, Ibis, p. 31 (Inkosakapenda).

DISTRIBUTION.—Namaqualand and Transvaal north to the vicinity of Songea and Njombe in Tanganyika Territory, the Upper Katanga, southern Lulua district, and Mombolo on the Benguella plateau. Sir Harry Johnston was certainly mistaken in reporting *lentiginosus* from the Lower Congo, he probably saw *C. fossii*. It is not impossible, however, that the species may occur almost anywhere in the southern Congo on suitable hills, and I should expect it in the country between Albertville and Kabalo.

There can be little doubt that Mouritz identified correctly the nightjar which he "found on a stony rise close to Inkosakapenda's" in the southeastern corner of the Katanga. Neave did not collect the rock goatsucker, but we may be sure that specimens will be forthcoming from the Katanga.

On the granite hills near Sandoa Lynes obtained a pair with a chick and an addled egg on September 8. Near Njombe in Tanganyika Territory he found a set of two eggs in November. These he described as like the eggs of *C. europæus*, and measuring 30.0×20.2 and 31.5×22.5 mm.¹

Caprimulgus inornatus inornatus Heuglin

Caprimulgus inornatus HEUGLIN, 1869, 'Orn. Nordost. Afr.,' I, p. 129 (type locality: Bogosland). REICHENOW, 1902, 'Vög. Afr.,' II, p. 360 ('Upper Congo'). SCLATER AND M.-PRAED, 1919, Ibis, p. 655 (Meridi; Mt. Baginzi). BANNERMAN, 1921, Ibis, pp. 99, 100 (Angu); 1922, Rev. Z. A., X, p. 135. W. L. SCLATER, 1924, 'Syst. Av. Æth.,' pt. 1, p. 252 (Uelle). SCHOUTEDEN, 1936, Ann. Mus. Congo, Zool., I, f. 2, p. 94 (Mahagi Port).—*Caprimulgus inornatus inornatus* BANNERMAN, 1933, 'Birds Trop. W. Afr.,' III, p. 158, Fig. 47.

SPECIMENS.—Niangara, 3 ♂, Dec. 3, 4; 4 ♀, Dec. 1, 3, 6, 19. Nzoro, 2 ♂, Apr. 5, 10; ♀, Apr. 22. Faradje, 3 ♀, Nov. 24, Dec. 4, 22.

ADULTS.—Iris very dark brown, rim of eyelids light brown; bill brown with black tip; feet brown, claws black.

DISTRIBUTION OF THE SPECIES.—From Eritrea, southwestern Arabia, and Somaliland westward across the Sudan to Asben, the Gold Coast Colony, and the French Sudan. The greater part of the range is occupied by *C. i. inornatus*, which breeds in the north and migrates afterward to East Africa, where it reaches Usambara, Usaramo, and Iranga, to Uganda, and to the savannas just north of the equatorial forest belt, from the Uelle west to the Gold Coast. *C. i. vinacea-brunneus* Bannerman,² of a distinctive vinaceous brown color, is known only from the French Niger Territory, where it appears to breed. This race also may be expected to migrate southward.

C. i. inornatus shows great variation in color. One of our males from the Uelle is a bright rufous bird, as is also one of the females. The remaining specimens exhibit complete gradation in both sexes between the rufous and gray phases. The darkest of the females is a brownish-gray bird, of a deeper shade than any of the males. This diversity of coloration seems to have nothing to do with age. The ruddiest male is a fully adult bird; the reddest of the females, on the other hand, is not quite adult, and another female of the same age is one of those in the gray phase.

The plain nightjar certainly does not nest in Congo territory, nor even in adjacent regions of Uganda or the Sudan. All our specimens

¹ Lynes, 1934, J. f. O., Sonderheft, p. 62.

² 1932, B. B. O. C., LII, p. 147 (Tawa, French Sudan).

were taken in the months from November to April. Boyd Alexander secured three specimens on the right bank of the Ubangi near Luma Island in November, and another near Angu on the Uelle in early February. None has yet been found within the forest belt of the Congo, but in the Cameroon forest Bates collected two at Bitye in December and February.

The nest of *C. inornatus* has not yet been discovered, but there can be no doubt that it breeds toward June along the southern edge of the Sahara¹ and near the Red Sea. Dr. van Someren² has reported specimens from Koroli and Marsabit, northern Kenya Colony, in July. All the other East African specimens I have seen were taken between December and March.

Near Niangara in the Uelle district this seemed to be the commonest nightjar in December. It was fond of sitting on dry, dusty paths, and appeared there just before darkness fell. Short sallies would be made into the air after passing insects, and by nightfall their stomachs were usually well filled. On the ground they uttered only a low "chuck," and they seemed to have no other call.

During the day *Caprimulgus inornatus* would be found on the ground in the woods, but when flushed sometimes alighted on the branches of trees. Near Gangura's village, northwest of Nzoro, it took refuge in the wooded swamps; and along the Dungu River I found it on a steep, wooded bank, as well as on a small island below Faradje. Only once or twice I saw it at night on the open ground in the post of Faradje.

The stomachs of eight individuals yielded a variety of insects, representing six different orders. Seven of them had eaten beetles, including dung-beetles and an elater; 5 had eaten small numbers of hemiptera; 4 had swallowed moths; 4, large winged ants; 2 had disposed of 6 mantises; 2 more, of 3 grasshoppers; 1, a large leaf-hopper, and another a cricket.

***Caprimulgus poliocephalus ruwenzorii* O.-Grant**

Caprimulgus ruwenzorii O.-Grant, 1909, B. B. O. C., XXIII, p. 94 (type locality: Mubuku Valley, E. Ruwenzori, 8000-9000 ft.); 1910, Tr. Z. S. Lond., XIX, p. 429. REICHENOW, 1911, 'Wiss. Ergeb. D. Z.-Afr. Exp.,' III, p. 294 (Mt. Sabinyo). C. GRANT, 1915, Ibis, p. 305. GYLDENSTOLPE, 1924, K. Svenska Vet. Akad. Handl., (3) I, No. 3, p. 265 (Mt. Sabinyo, 2600 m.). SCHOUTEDEN, 1929, Bull. C. Z. C., V, p. 79 (Mts. Mikeno and Karisimbi). NEUMANN, 1931, J. f. O., p. 550 (W. of Baraka).—*Caprimulgus poliocephalus ruwenzorii* W. L. SCLATER, 1924, 'Syst. Av. Æth.,' pt. 1, p. 253. CHAPIN, 1927, Ibis, p. 359 (W. slope of Ruwenzori). SCHOUTEDEN, 1932, Rev. Z. A., XXI, p. 125 (Burunga; Nya-Muzinga).

¹ See Lynes, 1925, Ibis, p. 369.

² 1930, Journ. E. Afr. Ug. N. H. Soc., No. 35, p. 45.

DISTRIBUTION OF THE SPECIES.—Abyssinia, south in the highlands of East Africa to Kilimanjaro, Usambara, and West Nyasa, also the higher mountains of the eastern Congo border, and probably the Benguella plateau. *C. p. poliocephalus* Rüppell of Abyssinia and East Africa has the outer tail-feathers in males white practically to the base, although there may be some blackish brown on the outer web, distally. In the female the inner web is white over the distal half or more. Wing (both sexes) 147–156 mm.

C. p. ruwenzorii is often darker in general color, and males have well-marked blackish bases on outer tail-feathers, so that the white distal area is only 50–61 mm. long. Females have white tips only 23–31 mm. in length. Wing in males 150–162 mm., in females 154–161 mm. This race is now known from Ruwenzori, the Kivu Volcanoes, the mountains west of Lake Edward, and those northwest of Lake Tanganyika. It seems likely that *C. koesteri* Neumann¹ of the Angolan highland and still more certain that *C. "pectoralis" guttifer* Grote² of Usambara, southwest Tanganyika Territory, and the Vipya plateau will prove to be races of this same species.

The Ruwenzori nightjar is a mountain-dweller, living above 6000 feet, and especially about the borders of mountain-forests in areas cleared by natives, or on bracken-covered ridges. It has not been found above 9000 feet. The voice of the male is of two syllables, high-pitched whistles with a buzzing quality, or finely trilled, which we recalled by the words "p i f i r, f i f i r." It is repeated at short intervals, especially if there be a bright moon.

In Kenya Colony *C. p. poliocephalus* gives very similar notes, but usually from a perch in a tree, whereas *ruwenzorii* seemed invariably to call from the ground. We collected specimens on the western slope of Ruwenzori near 7000 feet, and at Matembe in the mountains west of Lake Edward, 7500 feet. The species was also heard calling near Burunga, at the base of Mt. Mikenno, 6500 feet; and in August, 1937, I saw several on the automobile road through the mountain forest north of Kibati.

Our specimens from Ruwenzori in November and December were all in breeding condition, as was also a male at Matembe in March. Dr. Schouteden's specimen from Burunga, December 13, is a young male still wholly clad in juvenal plumage, with white tail-patches well developed. His other young male from Nya-Muzinga, December 30, is in post-juvenal molt on crown, back, and breast.

¹ 1931, J. f. O., p. 550 (Chipepe, Bailundu).

² 1921, J. f. O., p. 125 (Mlalo, near Wilhelmstal).

In Abyssinia *C. p. poliocephalus* lays two eggs on the ground, pink with spots and blotches of terra-cotta.¹ Those of *ruwenzorii* are still unknown.

***Caprimulgus natalensis fulviventr*s Hartlaub**

*Caprimulgus fulviventr*s HARTLAUB, 1861, J. f. O., p. 102 (type locality: Bembe, Angola). HARTERT, 1892, 'Cat. Birds Brit. Mus.,' XVI, p. 564.—*Caprimulgus natalensis natalensis* LYNES, 1938, Rev. Z. A., XXXI, p. 111 (Sandoa; L. Mukamba).

DISTRIBUTION OF THE SPECIES.—Natal and Zululand, Angola, Gaboon coast, savannas of southern and eastern Congo, Uganda, southern Anglo-Egyptian Sudan, and Uelle district; then westward north of the forest belt to Liberia.

C. n. natalensis Smith is known with certainty only from South Africa, and has wings 149–163 mm. *C. n. fulviventr*s is supposed to differ by its more fulvous coloration and less barred underparts. If valid it may extend from northern Angola eastward to the southern Congo and the Ruzizi Valley. *C. n. gabonensis* of the Gaboon and Lower and Middle Congo is distinguished by its small size, wings usually 138–147 mm. *C. n. chadensis*, of the northeastern Congo, Uganda, and the southern Sudan west to Lake Chad, is rather like *natalensis* in color, but with slightly shorter wings, 147–159 mm. in adults. *C. n. accræ* Shelley, ranging from the vicinity of Mt. Cameroon west to Liberia, is much darker and grayer than any of the other races, and has wings 146–154 mm.

The type of *fulviventr*s, in the British Museum, is in adult male plumage, with wing 154 mm. It is rather fulvous or tawny in general coloration, apparently with little dark barring on the underparts, though this may be due in part to the way the skin was made up. A male from Atene, Kwango district, in the Congo Museum, with wing 151 mm. is not less barred on the underparts than *chadensis*, nor is it more fulvous above. At Nyanza on the northeast shore of Lake Tanganyika Raven collected an immature male, with wing 147 mm., which is more fulvous or sandy than any of our skins of *chadensis* save one from the Rutshuru Plain. In the Congo Museum there is an adult male from the Ruzizi Valley, wing 152 mm., which may perhaps be referable to *fulviventr*s. On the other hand, Admiral Lynes collected specimens at Sandoa and Lake Mukamba which he regarded as typical *natalensis*.

The species seems to be scarce in the southeastern Congo, and I did not hear it call along the Lualaba River in 1927. Neither did Gaston de Witte collect it in the Katanga.

¹ Cheesman, 1935, Ibis, p. 322.

Two eggs from Sandoa, September 9, were described by Lynes as white distinctly tinged with buff and faintly marbled with buffy brown and secondary gray. Dimensions, 27.6×20.1 and 28.5×20.6 mm.

***Caprimulgus natalensis chadensis* Alexander**

Caprimulgus chadensis ALEXANDER, 1908, B. B. O. C., XXI, p. 90 (L. Chad).—*Caprimulgus natalensis* O.-GRANT, 1910, Tr. Z. S. Lond., XIX, p. 430 (Mokia).—*Caprimulgus natalensis chadensis* C. GRANT, 1915, Ibis, p. 303 (Uelle R.). W. L. SCLATER, 1924, 'Syst. Av. Æth.,' pt. 1, p. 252. BANNERMAN, 1933, 'Birds Trop. W. Afr.,' III, p. 160.—*Caprimulgus fossei* SCHOUTEDEN, 1918, Rev. Z. A., V. p. 253 (in part. Kayera; Lisasa; old Mission St. Gustave-Semliki; Katwe).

SPECIMENS.—Niangara, ♂ im., Apr. 6. Faradje, 11 ♂, Feb. 28, Aug. 30, 31, Sept. 26, 28, 29, Oct. 10, 20; 3 ♀, Aug. 31, Oct. 10; 2 ♂ im., Sept. 27, 29; ♂ juv., May 18. Garamba, ♂, July 14; ♂ juv., May 6.

ADULTS.—Iris rather dark brown, rim of eyelids light brown; bill brown with blackish tip; feet buff.

DISTRIBUTION.—From the Rutshuru Plain, Uganda, Kakamega in Kenya Colony, and the Baro River westward across the southern Sudan and the Uelle to Lake Chad. It may prove inseparable from *fulviventris*.

Though never entering the heavy forest, and not reported from the Kivu plateau, *C. n. chadensis* is common in the Rutshuru Plain, and at the new post of Beni and about Irumu it is the commonest member of the family. We noted it at Kasenyi on the shore of Lake Albert, and it is common in the Upper Uelle savannas. One was flushed from an open bog near Pawa in the northern Ituri.

In the vicinity of Faradje it is non-migratory, and often seen at dusk flying low about termite hills where the winged brood is escaping, or about cow-sheds and pastures. When resting on the ground it sometimes utters a low "kik." The most characteristic call, probably given only by males, is a prolonged "chop-chop-chop-chop—," not so rapid as the gurgling of *C. fossii*, or the clicking of *Scotornis*. It continues for indefinite periods, while the maker is usually hidden in high grass, but occasionally sitting on a termite hill or low bush. In the eastern Congo its voice is heard through most of the year. Still another note is a tremulous "wha-hu-hu-hu" emitted during flight.

During the day they retire to open grassy meadows, often marshy during the rains, where they squat on some small open place, or a flat stone, amid the grass. It is in these spots that they lay their eggs, toward the month of April in the Uelle district.

Near Niangara, April 20, I found a set of two eggs on a small patch of

bare earth completely enclosed and shaded by grass about knee-high, near the edge of a grassy marsh. Their color is white, with many faint spots of brownish, so clouded over that the whole egg, at first glance, looks simply dirty white. Dimensions: 26.4×21.4 mm. and 27.2×21.3 . The female was incubating, and flew up silently only when almost stepped on. Two eggs were found in a similar situation near Faradje in April by Judge Smets; the one which he brought me being dull white, practically unspotted, 28.5 mm. \times 21.5 . The young birds retain an immature plumage for many months, but the season of reproduction is short, and probably over by July, as shown by dissection of our adult specimens. Near Beni a nest with two downy young was located on March 2, and in the lower Rutshuru Valley another with one egg on May 7.

Of 16 stomachs examined, 14 contained remains of beetles, sometimes recognized as dung-beetles, 8 had winged termites, or were largely filled with them, while hemiptera were taken only twice, and a green leaf-hopper once.

***Caprimulgus natalensis gabonensis* Alexander**

Caprimulgus gabonensis BOYD ALEXANDER, 1908, B. B. O. C., XXI, p. 90 (type locality: Gaboon).—*Caprimulgus natalensis gabonensis* BANNERMAN, 1933, 'Birds Trop. W. Afr.,' III, p. 162 (Boma; Ngombe on middle Congo R.).

SPECIMEN.—Leopoldville, ♂ im., Dec. 21.

DISTRIBUTION.—Savannas of the Gaboon to the Lower Congo, Leopoldville, and the Lake Leopold district. Of this race I have examined Alexander's types in the British Museum and ten other specimens from Leopoldville, Kunungu near Bolobo, Lukolela, and Ngombe. Wings of six males measure 139–147 mm., of six females 138–152 mm. Immature examples of *chadensis* from the Uelle sometimes have wings only 143–147 mm. long. At Boma I heard the calls of this species, and assume that the race there is *gabonensis*. But intergradation with *fulviventris* must take place not far to the south of Boma.

In habits and voice this subspecies is exactly like *chadensis*. It is not at all rare in grassy situations along the middle Congo, but never enters the forest. At Leopoldville I shot the above-mentioned specimen by day in a pasture. At Kunungu Dr. Schouteden's collector Gwé obtained two males and a female. The female has exceptionally long wings, 152 mm. At Lukolela I heard one calling very frequently between February 28 and April 4, 1931. Two examples were collected there after my departure. During the evening of March 6, 1931, at

Ngombe, I saw about eight examples near the government station, and by approaching them very cautiously with a focusing flashlight I was able to capture three in my hand. A negro obtained a fourth by hitting it with a stick. The two adult males taken that evening showed fair enlargement of the gonads, and the adult female had just laid one egg. So they were breeding at a rather rainy time of year.

Near the aviation field at Boma I heard two birds calling from high grass in a low marshy spot during the evening of April 23, but could not obtain a specimen.

***Caprimulgus pectoralis fervidus* Sharpe**

Caprimulgus fervidus SHARPE, 1875, in Layard, 'Birds S. Afr.,' p. 86 (type locality: Damaraland). NEAVE, 1910, Ibis, p. 114 (Bunkeya R.). SCHOUTEDEN, 1929, Bull. C. Z. C., V, p. 79 (Elisabethville); 1930, Rev. Z. A., XVIII, p. 283.

DISTRIBUTION OF THE SPECIES.—From Cape Province to the Lower Congo, the vicinity of Lusambo, the eastern Congo, and the interior of Tanganyika Territory to Uganda; then westward in savannas just north of the forest belt to Nigeria and Portuguese Guinea.

C. p. pectoralis Cuvier, of Cape Province, Natal, and Zululand, is dark in color, with a collar of large buffy spots around the hind-neck, and wings 155–170 mm. *C. p. fervidus* is lighter, less boldly barred on lower breast and flanks, markedly rufous from lores to ear-coverts, and with a conspicuous rufous collar; wing-length 150–171 mm. It intergrades with *pectoralis* in the lowlands of southeastern Africa¹ and ranges from there to Nyasaland, Tanganyika Territory, Marungu, the country just south of Lusambo, northern Angola, and Ovampoland. *C. p. nigriscapularis* extends from the northern end of Lake Tanganyika to Uganda, and westward again to Portuguese Guinea; also in Lower Congo. It is darker than *fervidus*, but with warmer tones than *pectoralis*, the collar rather rufous, and feathering of face finely barred with rufous. Wings shorter, 148–165 mm.²

All three races of *pectoralis* differ from *C. rufigena* in the position of the white areas with reference to the emargination of the outer webs of the primaries. In *C. pectoralis* the sudden narrowing of the outer web takes place within the white area, in *C. rufigena* it is distal to the white area. *C. p. fervidus* is more variable in general coloration than the two other races. Females of all three races of *pectoralis* have white spots on the tail, but smaller than in males.

The Congo Museum has skins of *fervidus* from Kiambi on the Luvua

¹ Roberts, 1935, Ann. Transvaal Mus., XVI, p. 106.

² *C. guttifer* Grote is not a race of *pectoralis*.

River, Elisabethville, and Lake Musolo in the eastern Lulua district. Rockefeller and Murphy secured seven males at Kasoko, Kampia, and Lake Suse in southern Marungu, at altitudes between 3800 and 4500 feet. The Museum of Comparative Zoölogy has a female collected by Pierrepont 20 miles south of Pania Mutombo, and *fervidus* may also be expected in the southern Kwango district.

Notes are lacking in the habits of this nightjar in the Congo, but in Gazaland Swynnerton¹ found it frequenting the outskirts of forests and forest-remnants consisting of a few trees on grassy slopes. They frequently sat lengthwise on the larger branches of trees with reddish bark. The voice of *fervidus* appears to be similar to that of *nigriscapularis*, for Belcher² has written it "Chaw-wi-u, chiu-iu-u-u," and R. M. de Schauensee "whi-whi-whiuuuuu." The last part is a trill. In Nyasaland it is heard from February to October. The breeding season in Southern Rhodesia is October and November, possibly January as well. At Mt. Sunzu, Northeast Rhodesia, in October, Lynes³ found a nest with two eggs. These he described as pinkish white, lightly sprinkled with faint pinkish-brown clouds, spots, and more distinct dots. In size they averaged 27.2×19.4 mm. Priest⁴ gave measurements of 24.5×20 and 26×20.5 mm.

Caprimulgus pectoralis nigriscapularis Reichenow

Caprimulgus nigriscapularis REICHENOW, 1893, O. Mb., p. 31 (type locality: Seonga, or Songa, in the Lendu region, W. of L. Albert); 1902, 'Vög. Afr.,' II, p. 364 (Nyangabo); 1911, 'Wiss. Ergeb. D. Z.-Afr. Exp.,' III, p. 294 (Ndussuma). SCHOUTEDEN, 1918, Rev. Z. A., V. p. 253 (Baraka); 1936, Ann. Mus. Congo, Zool., I, f. 2, p. 94 (Uelle). W. L. SCLATER, 1924, 'Syst. Av. Æth.,' pt. 1, p. 250 ("Ituri R."; Uelle R.). BOWEN, 1932, Ibis, p. 600 (Rangu in S. Bahr-el-Ghazal). BANNERMAN, 1933, 'Birds Trop. W. Afr.,' III, p. 155, Fig. 45 (Ubangi-Shari; Matadi).—*Caprimulgus claudi* ALEXANDER, 1907, B. B. O. C., XIX, p. 47 (type locality: Ubangi R.).—*Caprimulgus goslingi* ALEXANDER, 1907, 'From the Niger to the Nile,' II, p. 229 (Ubangi R., 35 miles above mouth of Kwango R.).

SPECIMENS.—Nzoro, ♂, Aug. 1. Matadi, ♀, ♀ juv., Dec. 26.

ADULTS.—Iris dark brown, rim of eyelids light brown; bill brown, shading to black at tip; feet dark brown.

DISTRIBUTION.—From Baraka on Lake Tanganyika north to Uganda⁵ and the eastern edge of the Congo, then westward through the northern Congo and the southern Bahr-el-Ghazal to French Equatorial

¹ 1908, Ibis, p. 393.

² 1930, 'Birds of Nyasaland,' p. 147. See also Vincent, 1934, Ibis, p. 792.

³ 1934, Ibis, p. 38.

⁴ 1934, 'Birds S. Rhodesia,' II, p. 444.

⁵ van Someren, 1922, Nov. Zool., XXIX, p. 84, reported one example from Nairobi in Kenya Colony.

Africa, Nigeria, Sierra Leone, and Portuguese Guinea. Also occurs in the Lower Congo, and perhaps up the Congo River to the vicinity of Kunzulu. While found up to 4500 feet, it does not ascend the slopes of the higher mountains.

The female example obtained at Baraka by Pauwels shows no approach in color to *fervidus*, though its wing is rather long, 165 mm. The wing of my female from Matadi measures only 148 mm. Seven males of *nigriscapularis* from Uganda and the northeastern Congo have wings 150–158 mm.

Reichenow's type of *nigriscapularis*, though labeled as a female, is undoubtedly a male. It has the white patch on outermost rectrix a little larger than in our male from Nzoro, where it is 41 mm. long. The white spots on outermost tail-feathers of females are only 20–27 mm. long.

The rather peculiar distribution of this race is readily explained by its preference for the borderland of the lowland forest. It is not often collected because it seeks thick cover during the daytime, and only its sweet voice is apt to betray its presence. Its occurrence in Sierra Leone has recently been announced by Bannerman,¹ and Rudyerd Boulton has shown me a specimen he collected in the Benin Province of Nigeria.

From the gallery forests of the Uelle, at dusk or during the night, one hears a quavering "t-wîp, tûrr-r-r-r-r," often repeated, which is clearly the note of a nightjar. We noticed it especially in the district just south of Niangara, in December, at Madrapili's between Faradje and Aba, in December, at Nzoro in August, and even at Ibambi in the northern Ituri in July. By elimination I decided that it must be the call of *nigriscapularis*, of which I obtained only a single individual near Nzoro. This bird was flushed from the ground in woods fringing the Kibali River, and alighted on a low branch.

Near Matadi I found a female on the slope of a stony hill during the afternoon. She flew a little way, alighted on a rock, and then began to flutter about as though wounded. At the spot she had left there crouched a single chick in natal down, pale grayish buff, varied with dusky on the lores, a post-ocular line, and on wings and back. Four other nightjars observed on Loadi hill, south of Matadi, may also have been *nigriscapularis*.

In August, 1926, at Bogoro on the escarpment west of Lake Albert, I finally proved the authorship of the tremulous calls with the aid of an electric flashlight, by collecting a male *nigriscapularis*. Others were heard at Bambu near Kilo, Beni, Nganzi's village at the west base of

¹ 1936, B. B. O. C., LVI, p. 62.

Ruwenzori, Mai-na-Ivi in the Rutshuru Plain, and Lueba on the north-west shore of Lake Tanganyika. In July, 1930, at Mambutu, a wood post on the middle Congo River below Kunzulu, I again heard a goat-sucker calling in very similar tones, which I believe to have been of this race.

The sweet, if melancholy, "twíp, túrr-r-r-r-r" is repeated as its maker perches on a low branch or leaning stalk of elephant grass. The birds begin to call at dusk and continue, if there is bright moonlight, well into the night. Just before daybreak it is taken up again. In the Semliki Valley *C. p. nigriscapularis* was in condition to breed at the end of January, and besides the call described above it occasionally repeated a monotonous "what-what-what—" or "kwa-kwa-kwa—" without pause as many as twenty or thirty times. This sound is audible only for a short distance. The call-note is of two or three husky "chucks" in rapid succession.

In the Uelle district nesting may be expected to begin toward April or May, in the Lower Congo toward November. The eggs are still unknown.

Caprimulgus batesi Sharpe

Caprimulgus batesi SHARPE, 1906, B. B. O. C., IX, p. 18 (type locality: River Ja, Cameroon). BANNERMAN, 1919, B. B. O. C., XXXIX, p. 96 (Poko); 1933, 'Birds Trop. W. Afr.,' III, p. 164. CHAPIN, 1921, A. M. Nov., No. 17, p. 15 (Medje; Avakubi); 1931, Nat. Hist., p. 611 (Lukolela). W. L. SCLATER, 1924, 'Syst. Av. Æth.,' pt. 1, p. 254. SCHOUTEDEN, 1925, Rev. Z. A., XIII, p. 11 (Kunungu); 1936, Ann. Mus. Congo, Zool., I. f. 2, p. 94 (Kotili).

SPECIMENS.—Avakubi, ♀, Nov. 9. Medje, ♂, Sept. 15; ♀, Mar. 8; ♂ juv., Apr. 2; 2 ♀ juv., Sept. 22, Oct. 6.

ADULTS.—Iris very dark brown, rim of eyelids grayish brown; bill black at tip, brown at base; scales of feet grayish brown, but softer skin whitish, soles yellowish.

DISTRIBUTION.—Rain forest of Lower Guinea, from Bitye in southern Cameroon south to the middle Congo River, east to the southern Uelle district, the Semliki Valley, and probably the Manyema forest.

This is the largest nightjar of the Congo, save *Cosmetornis vexillarius*. Five adult males from the Congo have wings 185–199 mm., tails 142–157. Six Congo females: wings 183–191 mm., tails 139–150. The white patches on outer tail-feathers of males measure 21–27 mm. in length. Females have not even a light patch to correspond.

Veles binotatus and *Caprimulgus batesi* are the only nightjars truly at home in the West African forests. *Caprimulgus europæus*, *inornatus*,

rufigena, and *fossii*, as well as *Scotornis climacurus* and *Cosmetornis vexillarius*, all invade the forest belt occasionally, but then are restricted to the most open clearings they can find. Bates's nightjar, on the contrary, is a bird which I never met save in the forest itself. The first individual seen flew up from a game-trail in an unfrequented part of the forest and perched on a low bough. Another was said to have taken wing at my shot, and disappeared in the undergrowth. Relatively few of them are seen, and they usually behave in the same way, alighting sometimes on the ground, but often perching, and always showing an unexpected shyness, so that the majority make off successfully into the forest.

On two occasions, along the forested bank of the Ituri, in April and July, 1914, I heard notes which I was inclined to credit to *Caprimulgus batesi*. They might be written "whow-whow-whow—," the same syllable being repeated from two to twelve times. As good reasons for assigning them to the nightjar, I may explain that they were heard at night from places I knew the bird to live, that they recalled strongly the voice of another member of the genus (*C. tristigma*) in the Uelle, and finally that no other nightjar is known to inhabit these places.

Nearly thirteen years passed before I was able to verify this assumption. On February 9, 1927, I arrived at a rest-house called Masimango's in the Semliki forest about 10 miles west of the base of Ruwenzori. As night fell, three or four birds were heard in different directions from the forest, repeating the same "whow-whow-whow—" that I had heard near Avakubi. It would be given more rapidly than the call of *tristigma* and was not so loud. Moreover, it continued for ten to a dozen times in one spell.

So a search was started with the flashlight, and finally one yellow eye showed forth in the forest undergrowth at a spot whence the noise had come. After my shot, silence; and the bird could not be found until the following morning. It was an adult male of *C. batesi*, and seemed to have been sitting on a branch 8 or 10 feet from the ground. The next evening another was heard calling at the village of Mutshunga Mabese, but far off in the woods. This was the first time the species had been taken in the Semliki Valley, and it is scarcely to be expected farther east. However, it might find a suitable environment in some of the larger forests of Uganda.

At Lukolela in 1930, a native hunter secured a male and a female for me. The latter, on October 6, had laid a single egg right in a footpath through the forest.

Bates¹ has found that this nightjar often sits on its egg—for it lays but one—at the edge of a garden or plantation. Eggs taken at Bitye measured 31.5–34.5 mm. \times 24–25 and were of oval form, somewhat glossy. The ground-color is white, with blotches of brown and pale lavender-gray often distributed over the entire shell.

In the Ituri, too, but a single young nightjar is reared at a time, for at Medje the natives found them for us on April 2, September 22, and October 6. The natal down is yellowish buff, with no dark markings whatever; and the juvenal plumage (in specimens with tails 36 and 42 mm.) is similar to that of adults of corresponding sex, but distinctly paler, both above and below. The white tail-spots of the male make their appearance in this first plumage.

According to Bates² the goatsuckers of the Cameroon forest breed at all seasons except during the greater rains (August to October), and it is probable that in the Ituri the breeding season of *C. batesi* extends practically throughout the year. Our four adults were all noted as having the gonads slightly enlarged, and the dates of the young birds offer similar evidence. In the Congo Museum there is a half-grown nestling from Barumbu in July.

In the stomach of each of four adults, beetles were found, the other insects eaten consisting of moths (once), 3 mantises, a cricket, 2 grasshoppers, and a large ant.

Caprimulgus rufigena rufigena Smith

Caprimulgus rufigena A. SMITH, 1845, 'Ill. Zool. S. Afr.,' Pl. c (type locality: Eastern distrs. of Cape Colony). HARTLAUB, 1857, 'Syst. Orn. Westafr.,' opp. p. lix ("Congo").—*Caprimulgus fraenatus* NEAVE, 1907, Mem. Proc. Manchester Lit. Phil. Soc., LI, No. 10, p. 40 (near Chiwali's, Alala Plateau).

DISTRIBUTION OF THE SPECIES.—Cape Province north to Angola, the Katanga, Kenya Colony, and Eritrea. *C. r. rufigena* breeds in a large part of South Africa, north at least to the Angolan highland and Northern Rhodesia, during the southern summer, and is found there from early September to early April.³ Then it disappears, and it certainly migrates northward, for in Darfur Lynes⁴ took three molting individuals between mid-June and mid-July. Bates⁵ also obtained a specimen in molt north of Yola in eastern Nigeria in July, and a badly worn bird at Bitye, Cameroon, in May. In the Carnegie Museum there is a male from

¹ 1909, Ibis, p. 25.

² 1908, Ibis, p. 564.

³ Roberts, 1935, Ann. Transvaal Mus., XVI, pp. 105, 106.

⁴ 1925, Ibis, p. 369.

⁵ 1927, Ibis, p. 19. The supposed occurrence of *rufigena* in Ashanti (Ibis, 1937, p. 647) was based on a wrong identification.

Donenkeng, Bafia, Cameroon, taken on May 4 by J. A. Reis, Jr., and the Congo Museum has a male without date from Kunungu near the middle Congo River, where this nightjar surely does not breed.

The Congo Museum has also a male from Kanzenze in the western Katanga, September 20, where the birds may possibly nest, as Bowen says they surely do in the highlands of Angola.

C. r. frænatus Salvadori of northeastern Africa, from Eritrea and British Somaliland to Mt. Elgon, Kenya Colony, and Kilimanjaro, is not known to be migratory, and it is so different from *rufigena* as almost to be considered a distinct species. Its upperparts have much broader dark markings than do those of the South African form, and the white markings on the outer rectrices of males are much more extensive, 39–50 mm. long. *C. r. rufigena* is only streaked with black on crown, middle of back, and rump, the white tips on tail-feathers scarcely 30 mm. long. Its wing measures 154–170 mm., tail 104–126.¹

The supposed records of *rufigena* from the Congo mouth and Landana were erroneous, and specimens once reported from Beni were *C. fossii*. In southern Africa *C. r. rufigena* lives in "brushwood" districts, but during its migration it must drop into clearings of the equatorial forest. It seems surprisingly rare in the Congo, but will probably prove not uncommon in the Upper Katanga. If it nests there, breeding should begin about October.

A nest found in Southern Rhodesia by Captain Priest² in November was on bare ground shaded by a small sapling, surrounded by rock. The two eggs were pale pink, clouded and smeared with pale purplish, grays, and browns, 25.5 × 19 mm. In Southwest Africa Hoesch³ found that a single egg was the rule, and that it was very apt to be laid on reddish sand. His measurements of three eggs were 25–27 mm. × 18.5–20.

Caprimulgus europæus europæus Linnæus

Caprimulgus europæus LINNÆUS, 1758, 'Syst. Nat.,' 10th Ed., p. 193 (Europe and America; restricted type locality: Sweden). EMIN, 1892, Zool. Jahrb., VI, p. 146 (W. shore L. Albert).—?*Caprimulgus europeus europeus* GROMIER, 1924, Rev. Fr. O., VIII, p. 461 (L. Edward).—*Caprimulgus europæus europæus* SCHOUTEDEN, 1936, Ann. Mus. Congo, Zool., I, f. 2, p. 94 (in part. "Uelle" = Ituri).

SPECIMEN.—Avakubi, ♀, Feb. 16.

DISTRIBUTION OF THE SPECIES.—Europe, Northwest Africa and tem-

¹ I cannot distinguish *C. r. quanzæ* Bowen from the typical race. *C. ugandæ* Madarász is a synonym of *C. natalensis chadensis*, and *C. keniensis* van Someren is doubtfully separable from *C. r. frænatus*.

² 1934, 'Birds S. Rhodesia,' II, p. 438.

³ 1934, J. f. O., pp. 333, 334.

perate Asia east to the Gobi Desert. Divisible into five subspecies, some of which migrate southward into Africa and India. According to Colonel Meinertzhagen¹ the typical race is best distinguished from *C. e. meridionalis* by its longer wing, 189–204 mm. in males, whereas males of *meridionalis* have wings 174–189 mm. *C. e. unwini* is paler in color than either of the foregoing, with wings of males 178–195 mm. Females are very like males in size.

C. e. europæus breeds in Europe, as far north as Archangel, and east to the Urals, migrating in autumn south to Africa, where it has been found in Sierra Leone, the Congo, and even Cape Town. *C. e. meridionalis* migrates from the Mediterranean countries of Europe and North-west Africa to the southwestern Congo and Natal. *C. e. unwini* comes from Persia and Turkestan to northeastern Africa, reaching the northeastern Congo and possibly even Natal.

My specimen from Avakubi is a perfectly typical female of *C. e. europæus*, with wing 199 mm. long. It was secured as it flew by at dusk, and had eaten beetles, a moth, and a small mantis. Another female of this race, with wing 203 mm., I shot in the same manner at the new post of Beni on February 21, 1927. At Tembwe on Lake Tanganyika, Dr. Schouteden collected a female with wing 200 mm., in February, 1926.

It seems certain that few if any migrants of this species remain in the Uelle district during the northern winter, and the majority of the typical race may pass through the eastern half of Africa. South African records of *C. e. europæus* between November and March are numerous, and it must be a regular migrant to the eastern and southeastern Congo.

Caprimulgus europæus meridionalis Hartert

Caprimulgus europæus meridionalis HARTERT, 1896, Ibis, p. 370 (type locality: Greece).—*Caprimulgus europæus europæus* SCHOUTEDEN, 1936, Ann. Mus. Congo, Zool., I, f. 2, p. 94 (in part. Kwango; Kisenyi).

DISTRIBUTION.—Southern Europe, Black Sea region, and Northwest Africa, migrating southward at least to southern Cameroon, the Kwango district, and Natal. In the Congo Museum there are two females, one from Baaba, Kwango, with wing 184, the other from Kisenyi on L. Kivu, January 30, with wing 186. This subspecies may be expected in all sections of the Congo.

Caprimulgus europæus unwini Hume

Caprimulgus unwini HUME, 1871, Ibis, p. 406 (type locality: W. of Kashmir).—*Caprimulgus europæus europæus* SCHOUTEDEN, 1936, Ann. Mus. Congo, Zool., I, f. 2, p. 94 (in part. Beni).

¹ 1922, Ibis, p. 43. See also Bannerman, 1933, 'Birds Trop. W. Afr.', III, pp. 149–152.

SPECIMEN.—Avakubi, ♀ im., January 12.

Iris dark brown; bill brown at base, black at tip; feet brown.

DISTRIBUTION.—Breeds from Persia and Baluchistan to Kashmir and Turkestan, migrates southward to India and also to the Anglo-Egyptian Sudan, eastern Africa, and as far as Natal. In the Congo it may occur only in the eastern regions.

Our single example from Avakubi was flying about at dusk near a house, alighting on the roof. It is referred to *unwini* because it is far grayer than the young of *C. e. europæus* and extremely small, wing 165 mm., tail 107. I have compared it with specimens of *unwini* in the British Museum from Khartoum and Beira. In the Congo Museum there is also a very pale female of *unwini* from Beni, February 5, with wing 188 mm., tail 123.

The bird from Avakubi fed on small beetles and hemiptera, three moths, two roaches, and one green grasshopper.

Caprimulgus fossii welwitschii Bocage

Caprimulgus welwitschii BOCAGE, 1867, Journ. Sci. Lisboa, I, No. 2, p. 133 (type locality: between Penedo and Cacao, Angola).—*Caprimulgus rufigenis* SHARPE, 1873, P. Z. S. Lond., p. 716 (Congo R.).—*Caprimulgus rufigena* SHARPE AND BOUVIER, 1876, Bull. Soc. Zool. France, I, p. 37 (Landana). REICHENOW, 1902, 'Vög. Afr.,' II, p. 356 (in part. "Congo"). SCHOUTEDEN, 1918, Rev. Z. A., V, p. 253 (Beni).—? *Caprimulgus lentiginosus* JOHNSTON, 1884, 'River Congo,' p. 366 (Lower Congo).—*Caprimulgus fossii* DUBOIS, 1886, Bull. Mus. Roy. Hist. Nat. Belg., IV, p. 148 (L. Tanganyika). MATSCHIE, 1887, J. f. O., p. 152 (Masembe; "Lualaba" [= Luvua R.]; L. Itambe). HARTERT, 1892, 'Cat. Birds Brit. Mus.,' XVI, p. 551 (Landana; Lower Congo). NEAVE, 1910, Ibis, p. 114 (Kambove; Bunkeya R.). MOURITZ, 1914, Ibis, p. 29 (Irupe Mts., S. E. Katanga). GYLDENSTOLPE, 1924, K. Svenska Vet. Akad. Handl., (3) I, No. 3, p. 265. CHAPIN, 1931, Nat. Hist., p. 611 (Lukolela). SCHOUTEDEN, 1935, Rev. Z. A., XXVII, p. 401 (Katana).—*Coprimgulmus fossii* OUSTALET, 1893, Naturaliste, (2) VII, p. 126 (no locality given; specimen from Brazzaville).—*Caprimulgus fossei* REICHENOW, 1902, 'Vög. Afr.,' II, p. 365 ("Ubangi R."; Ngombe; Kwango); 1911, 'Wiss. Ergeb. D. Z.-Afr. Exp.,' III, p. 294 (Kenshambi; Kisenyi; Wau Is. in L. Kivu). DUBOIS, 1905, Ann. Mus. Congo, Zool., I, f. l, p. 33 ("Uelle"; Stanley Pool; L. Leopold II; Mayombe). SALVADORI, 1907, Boll. Mus. Zool. Anat. Torino, XXII, No. 570, p. 3 (Lukonzolwa). LÖNNBERG, 1907, Arkiv f. Zool., III, No. 21, p. 10 (Mukimbungu); 1917, idem, X, No. 24, p. 22. SASSI, 1912, Ann. Naturh. Hofmus. Wien, XXVI, p. 373 (Uvira; Kasindi). SCHOUTEDEN, 1918, Rev. Z. A., V, p. 253 (in part. N.W. L. Tanganyika); 1924, idem, XII, p. 267 (Kisantu; Kidada); 1926, idem, XIII, p. 193 (Banana; Moanda). DE RIEMAECKER, 1927, Rev. Z. A., XIV, p. 275 (Lumbumbashi R.).—*Caprimulgus fossei fossei* SCHOUTEDEN, 1923, Rev. Z. A., XI, pp. 326, 394 (Basongo; Kwamouth); 1924, idem, XII, p. 415 (Eala); 1925, idem, XIII, p. 11 (Kunungu); 1932, idem, XXII, p. 125; 1933, idem, XXII, p. 378 (Kisenyi). FRIEDMANN, 1930, Bull. 153, U. S. Nat. Mus., p. 311.—*Caprimulgus fossii fossii* W. L. SCLATER, 1924, 'Syst. Av. Æth.,'

pt. 1, p. 253. BANNERMAN, 1933, 'Birds Trop. W. Afr.,' III, p. 162.—*Caprimulgus fossii clarus* BOWEN, 1931, Proc. Acad. Nat. Sci. Phila., LXXXIII, p. 41. PITMAN, 1934, 'Rep. Faunal Survey N. Rhodesia,' p. 226 (Luombo R. in S. E. Katanga).

SPECIMENS.—Boma, ♂, ♀, Jan. 8; ♀ im., Jan. 12. Matadi, ♀ im., Dec. 26. Stanleyville, 1 ad. in ♀ plumage.

ADULTS.—Iris dark brown, rim of eyelids lighter brown; bill brown with black tip; feet brown.

DISTRIBUTION OF THE SPECIES.—Zululand and Orange Free State north to the Danakil Coast, southern Abyssinia, Uganda, Semliki Valley, central Congo, and Gaboon Coast.

C. f. fossii Hartlaub was described from the Gaboon and for many years was supposed to range far into central and southern Africa. Finally W. W. Bowen¹ examined the series of nine specimens collected by Aschemeier for the U. S. National Museum in the Fernand Vaz district, and found that the typical race does not even reach the Congo. These Gaboon specimens average smaller, with wings 141–150.5 mm., tails 96–113, and they are dark in color, finely speckled above with whitish gray, in a way that is never quite matched by birds even from the Lower Congo. Specimens from the Congo almost always have a slight tawny wash over much of the upper surface, and especially the median rectrices.

Bowen called the Congo birds *clarus*, but this is certainly erroneous. A much older name is *welwitschii*, the type of which was said to have the wing 160 mm. long. This is a wide-ranging and variable race, examples of rather different coloration occurring in the same localities. Wings of adults vary from 144 to 167 mm., tails from 100 to 132 mm., the longest rectrices exceeding the outermost by 1 to 14 mm. The average length of wing and tail is only slightly greater in the eastern Congo than along the middle and lower Congo River. *C. f. welwitschii* extends from the Congo mouth and the southern edge of the Congo forest through Angola, the Katanga, and Rhodesia perhaps to the Orange Free State. It also occupies Uganda and the eastern savannas of the Congo north to the upper Semliki Valley.

C. f. mossambicus Peters is a rather doubtful race inhabiting the East African coastlands from Mozambique north at least to Mombasa. Many specimens are dark in color, and the median rectrices are not lengthened. Birds from the northern part of the range have usually short wings, 146–154 mm., but near the lower Zambesi they measure 145–158 mm.² A skin from the Luombwa River, southeast Katanga, is so exceptionally dark that it may represent this form.

¹ 1931, Proc. Acad. Nat. Sci. Phila., LXXXIII, pp. 40–43.

² Vincent, 1934, Ibis, p. 793.

A single specimen from North Nyasaland was separated by Austin Roberts¹ as a new race, *youngi*, because its tail measured 140 mm. The Congo Museum has a remarkable male example from Kiambi on the Luvua River, with wing 162 and tail 141 mm. A female from the same locality has wing 162, tail 124. The status of *youngi* is very doubtful, and other specimens from Kiambi, Moba on Lake Tanganyika, and the Upper Katanga show no special lengthening of the tail.

C. f. clarus Reichenow² is apparently a valid subspecies inhabiting the interior of Kenya Colony and Tanganyika Territory, usually below 5000 feet. It is usually of light brown-and-gray coloration, with median rectrices often slightly longer than the next pair, and 5-19 mm. longer than the outermost. Wing length 140-159 mm. So far there is no proof that *clarus* ever reaches the eastern Congo. A female from Gabiro, Ruanda, is probably *welwitschii*, and I have seen two specimens even from Bukoba which I would refer to that race. *C. f. clarus* may be a migrant during its off-season to the western shore of Lake Victoria.

C. f. apatelius Neumann³ of the Danakil Coast, southern Abyssinia, Jubaland, and northern Kenya Colony has the median rectrices noticeably lengthened, and wings measuring 147-162 mm. The white bar on the outer primaries is more extensive than in the other races, and some specimens have white spots on greater and middle wing-coverts. There are two males of this race in the Congo Museum labeled as collected in the Uelle by Dr. Polidori. I feel certain they did not come from Congo territory, but possibly from the Bahr-el-Jebel.

In various ways *apatelius* is intermediate between *Caprimulgus fossii clarus* and *Scotornis climacurus*. But in view of the fact that *Scotornis c. sclateri* and *Caprimulgus fossii welwitschii* live side by side along the middle Congo River, it does not seem possible to unite the two species. Grant and Mackworth-Praed⁴ regard *clarus* as a race of *Scotornis climacurus*, with *apatelius* a synonym of *clarus*.

In the Congo, therefore, we can be sure of the occurrence of only one race, *welwitschii*, which occupies all the savannas of the south and south-east, as well as the east, north to Beni. Specimens from Banana and Moanda are not *C. f. fossii*, as might have been expected. This goat-sucker has also been found here and there in clearings of the Congo forest. I have taken it at Ganda Sundi in the Mayombe; Whiteside has

¹ 1932, Ann. Transvaal Mus., XV, p. 26 (Livingstonia).

² 1892, J. f. O., pp. 29, 215 (Bukoba on L. Victoria).

³ 1904, O. Mb., p. 143 (L. Abaya, Abyssinia).

⁴ 1937, B. B. O. C., LVIII, pp. 18-20.

collected it at Ikau on the upper Lulonga River, $1^{\circ} 15' N.$ lat., in July; and a specimen from Stanleyville was given me by Dr. Grossule.

From Boma up to Kwamouth it is very common, specimens from the Kasai and Upper Katanga are not numerous, but about Kabalo and in the Ruzizi and Rutshuru Plains it is one of the commonest nightjars. While frequent around the shores of Lake Kivu, it does not ascend far above 5000 feet.

During the day these birds hide in the grass or among bushes, then toward dusk they come out on the roads, flying low and alighting like *Scotornis climacurus*. The voice is a prolonged gurgling or churring, given by the male as it squats on the ground. It recalls that of the goat-sucker in Europe, and has something frog-like or toad-like about it. But in the case of *C. fossii*, while it may continue for several minutes, one soon notices that it is divided into louder and weaker spells, which alternate. The louder periods may last about five seconds, then the tone is abruptly lowered or weakened for perhaps two and a half seconds, and again the volume increases for another five seconds. So it continues, and one almost wonders if there are not two birds calling, one of them intermittently.

There is also another short note, a low, hollow "chow" or "whiow," given by the bird in flight, and sometimes repeated at intervals. Thus *C. fossii* has two kinds of calls which parallel those of *Scotornis climacurus*.

In the Rutshuru Plain, I collected one male in breeding condition on May 13, in the Ruzizi Valley a breeding female on July 13, and at Kabalongwe near Bukama a breeding male on August 10. Other specimens taken at the same time were not ready for reproduction, so I believe these dates mark the beginning of the breeding season at each place. At Sandoa, Lynes found a chick on a granite hill on September 8. On the middle and lower Congo River it seems that the breeding season is from September to November.

No nest of *C. fossii* ever came to my notice, but the eggs of the species in southern Nyasaland are said to be laid in twos, especially amid grass near streams and pools. They are light pinkish buff, spotted with faint purple and red-brown, one set measuring 26.6×20.3 and 27.4×20.5 mm.¹

Of six examples of *welwitschii* collected at Boma in April, 1931, every one had its stomach filled with insects, mainly large winged termites. In most cases there were also a few small beetles, and in a few one or two hemiptera.

¹ Paget-Wilkes and Sladen, 1930, *Ibis*, p. 452.

Scotornis climacurus climacurus (Vieillot)

Caprimulgus climacurus VIEILLOT, 1834, 'Galerie des Oiseaux,' I, p. 195, II, Pl. CXXII (type locality: Senegal).

SPECIMENS.—Faradje, 2 ♀, Feb. 7, Nov. 24.

DISTRIBUTION OF THE SPECIES.—Senegal to the Blue Nile, south to the northern edge of the equatorial forest and to Uganda where specimens have been taken at Masindi, Entebbe, Kangao's, and Katwe. Occurring occasionally in the clearings of the Congo and Cameroon forests, it is also established in the grasslands of the middle Congo and northern Kasai.

As for the generic characters of *Scotornis*, I agree with Dr. van Someren¹ that they consist merely of a difference in the graduation of the tail-feathers. The gap is more or less bridged by *Caprimulgus fossii apatelius*, so that the genus *Scotornis* should really be retained only if *fossii* can be removed from *Caprimulgus* and included in *Scotornis*.

The color variation in *S. climacurus* is considerable, the more arid districts bordering the Sahara, as pointed out by Selater and Praed,² usually having the palest birds, whereas the darkest forms are found in Sierra Leone and about Lake No. *S. c. climacurus* is a pale brown race extending from Senegal and the Gambia east to Lake Chad and the region about Khartoum. *S. c. leoninus* Bannerman,³ with plumage very dark blackish brown, is known so far only from Sierra Leone. *S. c. nigricans* Salvadori⁴ is strikingly dark gray heavily vermiculated with black, and breeds near the Bahr-el-Ghazal and Sobat River. *S. c. sclateri* is of dark coloration, usually strongly tinged with rufous or chestnut, and only very finely vermiculated. It inhabits grasslands near the equatorial forest, on the northern side from Nigeria to the Lado Enclave, and on the south from the middle Congo River to the Kasai. The most rufous specimens I have seen came from the Nyong River in Cameroon, January 15, and Buta in the Lower Uelle, January 16. These may not be breeding birds of those places, but migrants from the north.

In any case it seems certain that *S. c. climacurus*, which is said to breed near the Niger, Lake Chad, and Kordofan toward June and July, migrates southward after its nesting is over. In the off-season it has been found at Freetown, Accra, Sakbayeme, and Bitye in southern Cameroon, and in the Upper Uelle.

Of our two females of *climacurus* from Faradje, the one taken on

¹ 1922, Nov. Zool., XXIX, p. 86.

² 1919, Ibis, pp. 657, 658.

³ 1932, B. B. O. C., LIII, p. 148 (Bo, Sierra Leone).

⁴ 1868, Atti. Soc. Ital. Milano, p. 449 (White Nile).

November 24 has an exceedingly long tail, 196 mm., and very pale underparts. The other has the tail only 132 mm. and is more heavily barred on the breast.

S. c. nigricans seems not to be migratory, and has never been taken in the northeastern Congo.

Scotornis climacurus sclateri Bates

Scotornis climacurus sclateri BATES, 1927, Ibis, p. 20 (type locality: Ngaundere, northern Cameroon. Also from Uelle R.; Ubangi R.; Ndoruma; Angu on Uelle R.). SCLATER, 1930, 'Syst. Av. Æth.,' App., p. 856. BANNERMAN, 1933, 'Birds Trop. W. Afr.,' III, p. 178 (Lukolela).—*Scotornis longicauda* SHARPE, 1884, Journ. Linn. Soc. Lond., Zoöl., XVII, p. 434 (Ndoruma). EMIN, 1922, in Stuhlman, 'Tageb. Emin Pascha,' III, p. 426 (Tunguru on L. Albert).—*Scotornis climacurus* HARTERT, 1892, 'Cat. Birds Brit. Mus.,' XVI, p. 596. OUSTALET, 1893, Naturaliste, VII, p. 126. REICHENOW, 1902, 'Vög. Afr.,' II, p. 368 ("Ubangi R."). SCLATER AND M.-PRAED, 1919, Ibis, p. 657 (Meridi; Upper Uelle). BANNERMAN, 1922, Rev. Z. A., X, p. 136. SCHOUTEDEN, 1923, Rev. Z. A. XI, pp. 327, 394 (Luebo; Kabambaie; Kwamouth); 1925, idem, XIII, p. 11 (Kunungu; Bolobo); 1935, Bull. C. Z. C., XII, p. 43 (Buta); 1936, Ann. Mus. Congo, Zool., I, f. 2, p. 95 (Niagara; Mauda; Dika; Dingila; Dungu; Faradje; Abimva). W. L. SCLATER, 1924, 'Syst. Av. Æth.,' pt. 1, p. 255. CHAPIN, 1928, A. M. Novit., No. 313, pp. 9, 10 (Kasai distr.).

SPECIMENS.—Yumbi on middle Congo R., ♂, July 16. Avakubi, ♀, Dec. 20. Niagara, 8 ♂, Nov. 28, Dec. 5, 7, 9, 13, 16. Dungu, ♀, June 2. Faradje, 6 ♂, Sept. 11, 23, 27, Oct. 11, Dec. 7; 5 ♀, Feb. 14, Mar. 12, 22, Apr. 23.

ADULTS.—Iris dark brown, rim of eyelids light brown, bill dusky brown or blackish at tip, brown at base; feet pinkish gray to brown.

DISTRIBUTION.—Savannas just north of the equatorial forest from the Lado district west to the lower Benue River, and perhaps to the Gold Coast Colony. It ventures into clearings of the forest belt, especially in its northern half, and has crossed the forest and established itself in savannas from the middle Congo River to the Kasai district.

Besides the localities mentioned in the synonymy, it has been collected at Mambutu, Langa-Langa, and Fumu Djale, villages on the "channel" between Maluku and Kwamouth, and at Luluabourg in the Kasai. On the middle Congo I have found *Scotornis climacurus* and *Caprimulgus fossii* together in the same field, and neither species seemed migratory. Specimens of *Scotornis* from south of the forest cannot be separated from those of the Uelle.

One exceptionally rufous male from Buta has already been mentioned. The variation in color among our males from the Uelle is not very great, less indeed than among the females. The latter average a little lighter than males, and one or two are decidedly washed with ru-

fous. The tails of fourteen adult males from the Upper Uelle measure 177–260 mm., median rectrices exceeding outermost by 88–157 mm. Five males from Kwamouth and Kunungu have tails 189–218 mm., with longest feathers exceeding outermost by 90–113. The average tail-length in the Uelle is 210.6 mm. on the middle Congo River 199.6.

Six females of *sclateri* from the Upper Uelle have tails 143–169 mm., with graduation of feathers 57–74 mm. Seven females from the middle Congo, tails 141–163, graduation 54–69 mm.

Whether the examples reported from Toro are *sclateri* or migrants from farther north I cannot say, but *Scotornis* seems to be wanting in the savannas just west and south of Lake Albert. Neither could I find *C. fossii* there, and *C. natalensis* is the common goatsucker.

Throughout the savannas of the Uelle *Scotornis* is the most abundant bird of the family, present all year round, though far more likely to be observed during the dry season. At that period it calls loudly after sunset, and indeed sometimes in the middle of a cloudy day. From the ground a loud, energetic, and protracted “clicking” noise is delivered, sounding like a rapid succession of electric sparks, a long “k-k-k-k-k-k-k-k—.” I have known one bird to continue this for five minutes without interruption. The toad-like voice of *Caprimulgus europæus* is only faintly reminiscent of the noisy *Scotornis*. It leaves the ground with an audible whirring of wings, and in flight *Scotornis* often gives a single short “chŭng.” Not only are these goatsuckers silent during the greater part of the rainy season, but they are seldom seen then alighting on paths at nightfall. Lest they be suspected of migrating northward, I must add that I have flushed them many times during the rains, and even as far south as Pawa, northern Ituri, in July.

At Faradje it is toward the end of September that their behavior begins to change, they come to the roads at dusk; and in 1912 I noted that the clicking note was heard again on the evening of October 3, for the first time since it stopped in late May. By December the birds’ reproductive organs have begun to develop, but we found no sign of eggs before February.

By day one flushes this nightjar from bare patches of earth or flat stones surrounded by grass, less often they sit in papyrus swamps; but their eggs are laid on high ground. At Faradje, March 22, we were shown a set of two eggs, on bare earth slightly shaded by a bush, in a field where manioc had recently been grown. Another similar set was found on April 23, in a field freshly cleaned for planting, where a few shoots of grass were the only vegetation. The incubating females are

readily snared. As late as June 2, near Dungu, we found a bird which had deposited her two eggs on the bare ground in an important road. It was on the side opposite the winding footpath the natives always followed; and thus it was that 40 porters had passed before us, and only the arrival of a man on a donkey frightened the nightjar from her eggs. The ground was covered with small limonite pebbles, but a space of $1\frac{1}{2}$ to 2 inches all about the eggs had been swept clear. Even though the eggs were much larger than the pebbles, they were practically invisible, being as usual of a brownish-white ground color, heavily spotted and blotched with brown. The female bird took refuge in a bush, sitting crosswise on a sloping branch. The dimensions of three sets of eggs are 23.5–25 mm. \times 17.6–19.4. The female we collected at Avakubi in December had only a very small ovary, and while several had been seen about the post, the clicking call was not heard. During the remainder of the year none was ever found there.

The breeding season south of the forest appears to begin toward August, and the male shot at Yumbi already had enlarged gonads. At Lukolela I first heard the clicking call of *Scotornis* on March 3.

Eleven out of fourteen stomachs contained beetle remains, including an elater and small dung-beetles, of which one bird had eaten 13. Four birds had eaten moths, totaling only 7 individuals; four had eaten hemiptera; three, small grasshoppers (5 in all); two had taken mantises (4); two some winged driver-ants; and finally one had its stomach crammed with winged termites.

[*Veles binotatus* (Bonaparte)]

Caprimulgus binotatus BONAPARTE, 1850, 'Conspectus Genera Av.,' I, p. 60 (type locality: Dabocrom, Gold Coast).—*Veles binotatus* BANGS, 1918, Proc. N. Eng. Zool. Cl., VI, p. 91.

This very dark-colored forest nightjar is known only from the western Gold Coast and the southern Cameroon, where Bates secured it at Efulen, Metet, and Bitye. There is only a very slight possibility that it may occur in the Upper Congo forest.

I agree with Bangs's separation of *Veles* from *Caprimulgus*, because of the "boat-shaped" or vaulted form of the tail, the curvature of the primaries, and the slight development of rictal bristles. In lacking white spots on the primaries it is like *Caprimulgus concretus* of Borneo, but in other details of form and color-pattern *C. concretus* recalls *C. natalensis*.

Macrodipteryx longipennis (Shaw)

Caprimulgus longipennis SHAW, 1796, 'Naturalists' Miscellany,' VIII, Pl. cclxv (type locality: Sierra Leone).—*Macrodypteryx longipennis* ANTINORI, 1868, Boll. Soc. Geogr. Ital., I, p. 116 (Niam-Niam land, near present Bafuka). PETERMANN, 1868, in Petermann's Mitteil., p. 416.—*Macrodipteryx longipennis* HARTLAUB, 1891, Abhandl. Naturwiss. Verein Bremen, XII, p. 32 (Buguera). JACKSON, 1906, Ibis, p. 519 (Kangao, Toro). SCLATER AND M.-PRAED, 1919, Ibis, p. 658 (Meridi). EMIN, 1921, in Schubotz, 'Tageb. Emin Pascha,' VI, p. 118 (in part. Wadelai; Mangbetu country; Tunguru). SCHOUTEDEN, 1929, Bull. C. Z. C., V, p. 79; 1936, Ann. Mus. Congo, Zool., I, f. 2, p. 94 (Mauda; Faradje). BANNERMAN, 1933, 'Birds Trop. W. Afr.,' III, p. 168, Fig. 52. STONE, 1936, Proc. Acad. Nat. Sci. Phila., LXXXVIII, p. 560 (Kasenyi).—*Macrodipteryx* CHAPIN, 1915, A. M. Journ., p. 290.—*Macrodipteryx macrodipterus* CHAPIN, 1916, Bull. A. M. N. H., XXXV, p. 81 (Uelle); 1916, A. M. Journ., p. 543.—*Macrodipteryx vexillarius* SCHUBOTZ, 1921, 'Tageb. Emin Pascha,' VI, p. 118, footnote (in part. Mangbetu country; Tunguru).

SPECIMENS.—Niagara, 3 ♂, Dec. 14, 17, 18. Dungu, ♂, Feb. 2. Faradje, 11 ♂, Jan. 6, 9, 16, 18, Mar. 1, 14, 17, 18, Dec. 31; 6 ♀ Jan. 30 Mar. 8, 25, Apr. 2, Dec. 3, 15; 2 ♂ im., Feb. 22, Mar. 16; ♂ juv., Feb. 17; ♀ juv., Mar. 23. Aba, ♂, Dec. 13; ♂ im., Dec. 20. Garamba, ♂ juv., Mar. 15.

ADULTS.—Iris brownish black, rim of eyelids light brown; bill brown with black tip; feet brown.

DISTRIBUTION.—Senegal to Asben, Sennar, Eritrea, and Abyssinia, limited on the south by the northern edge of the equatorial forests, but occurring occasionally along the western side of Lake Albert, in Toro, western Uganda, and at Kisumu and Marsabit, Kenya Colony.

In the northern part of its range, as in the Kassala Province of the Sudan, the standard-wing nightjar is present only in the rains, arriving about the last week in May.¹ In Darfur it appears in mid-April, and does not breed, but returns southward after August.² Along the southern edge of its range, on the other hand, *Macrodipteryx* is seen only in the drier half of the year, and there it nests. About Niagara and Faradje we noted that it arrived annually toward the first of December and remained until April. So the breeding range extends from the Gambia or Sierra Leone eastward to the Uelle and even to Gofa and Kosha, north of Lake Rudolf, where Neumann collected specimens in January and February. In the latter month he took a nesting female. The southernmost records from Uganda are all from January to March.

In this species the coloration is very constant, and adult males are usually darker than females. Second-year males, without long plumes, have the second primary (9th from outer side) narrowed, a little shorter than the first, with dark pattern less distinct at tip. Possibly males in

¹ Butler, 1905, Ibis, p. 345; 1908, idem, p. 240.

² Lynes, 1925, Ibis, p. 372.

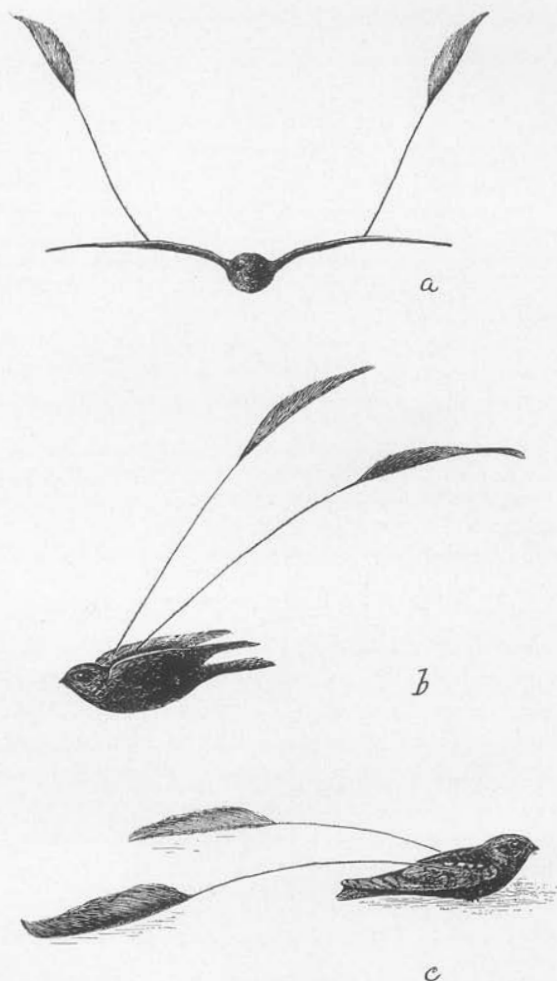


Fig. 27. Adult males of *Macrodipteryx longipennis* with fully developed ornamental primaries: *a*, in flight as seen from the front; *b*, from the side; *c*, at rest on the ground.

this plumage may breed, for the two taken in February and March showed some enlargement of the gonads.

The longest spatulate primary I have measured was 535 mm. from tip to base of swollen calamus,¹ and its fully webbed portion 170 mm.

¹ See remarks on this feather by Pycraft, 1904, B. B. O. C., XV, p. 22.

long. In nineteen adult males from the Uelle the broad tip measured 153–197 mm. in length. The variation is not due to wear, for plumes just growing out have shafts as bare as old ones.

The juvenal plumage, as shown by nestlings, is lighter than the adult, its pattern finer and less distinct, without oblique buff stripes on scapulars. Most of the upperparts are spotted with black, feather-tips light reddish. The belly is buff, chest lightly barred with dusky. From above such young birds remind one of *Caprimulgus inornatus*, and *Caprimulgus howyi* Neumann¹ was described from a specimen in this puzzling plumage.

When they return to the Uelle district in early December the adult males are renewing their ornamental primaries. The old plumes were shed in the Sudan, and Lynes tells of finding them on the ground in July.

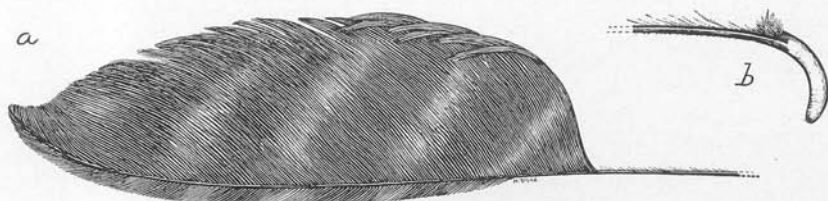


Fig. 28. Details of the elongated primary of the adult male of *Macrodipteryx longipennis*: a, its expanded tip ($\times 1/2$); b, the curved base or calamus ($\times 1$).

If this is the usual time of molt they must require at least four months for complete growth. While the new plumes are still enclosed in their basal sheath they lie more or less parallel to the adjacent quills. Later on, in January, when the sharply bent calamus is formed, the long plumes project outward, above the rest of the wing-feathers. They are firmly fixed, and only by twisting the outer part of the wing could the plumes be raised during courtship as described by Alexander.² This I have never seen done.

As others have already shown³ the picture in Newton's 'Dictionary of Birds,' p. 641, is most unnatural. The plumes would have to be bent upward by the surrounding grass, but Lang and I noticed that the birds always sought open spots in the herbage before alighting.

During the whole of the dry season the standard-wing is one of the common nightjars in the Uelle savannas. The birds alight at dusk

¹ 1915, O. Mb., p. 73 (Bodanga, E. Cameroon).

² 1902, Ibis, pp. 357, 358.

³ See Kemp, 1905, Ibis, p. 225; Butler, 1905, idem, p. 346; Lynes, 1925, idem, p. 372.

along paths or on freshly burned spots, and when it has rained they like the tops of mushroom-shaped termite nests. Only seldom do they perch on dead branches of trees.

Males with elongated primaries fly more slowly than the majority of nightjars, and their dancing racquets—as has often been remarked—remind one of two drongos darting down upon a hawk. Like the other species, *Macrodipteryx* deserts the roads after the first two hours of darkness, and then comes out again just before daybreak. Except for an occasional low “cuck” it seems to be mute. Grass-fires after dark attract small numbers of them, as well as of *Scotornis*.

Dissections indicated breeding from the end of January to early April. The eggs are laid on high ground, without nesting material, in sets of two. Their ground-color is pinkish buff, with spots of brown most numerous and heaviest on the larger end. The dimensions of a set from Faradje, March 25, are 25×18.7 and 25.9×18.9 mm. Bannerman's measurements for the species are $24.1\text{--}29$ mm. $\times 18.7\text{--}21$.

On March 4, 1912, a female *Macrodipteryx* was found sitting on two eggs in a spot where a fire had passed two weeks before, exposed to the full glare of the sun. Twelve days later two young had been hatched and had moved off about five feet to the base of a bush. They were clothed in buffy down, mottled above with black. The mother would flee but a short distance, dropping down in plain view to spread her wings and flutter about.

Eleven out of sixteen stomachs held beetles, often in numbers, while nine stomachs contained small hemiptera, equally numerous. The other insects devoured included 11 small grasshoppers, 6 moths, 6 winged driver ants, 4 other winged ants, 7 leaf-hoppers, a few small hymenoptera, 2 small flies, 2 small cicadas, and one earwig. Winged termites filled two stomachs, and one mosquito was seen in a bird's throat, as well as an ant with jaws buried firmly in the flesh.

***Cosmetornis vexillarius* (Gould)**

Semeiophorus vexillarius J. GOULD, 1838, 'Icones Av.,' II, Pl. XIII (type locality: Sierra Leone¹).—*Cosmetornis spekkii* ANTINORI, 1868, Boll. Soc. Geogr. Ital., I, p. 116 (Niam-Niam land, near present Bafuka). PETERMANN, 1868, in Petermann's Mitteil., p. 416. EMIN, 1919, in Stuhlmann, 'Tageb. Emin Pascha,' II, p. 466 (Tingasi).—*Macrodipteryx sperlingi* SHARPE, 1873, P. Z. S. Lond., p. 716 (Congo R.).—*Cosmetornis vexillarius* Sharpe, 1884, Journ. Linn. Soc. Lond., Zoöl., XVII, p. 434 (Semio); 1890, in Jameson, 'Story of Rear Column,' p. 405 (Yambuya). DUBOIS, 1886, Bull. Mus. Roy. Hist. Nat. Belg., IV, p. 148 (L. Tanganyika). SCHALOW, 1886, J. f. O., pp. 415, 418 (E. Marungu; Kauè R.; Lufuku R.); 1887, idem, p.

¹ See Sclater and M.-Praed, 1919, Ibis, p. 659.

237. MATSCHIE, 1887, J. f. O., p. 152 (Mpala; Masembe; Kauwire). SHELLEY, 1888, P. Z. S. Lond., p. 40 (Tingasi); 1890, Ibis, p. 167 (Aruwimi R.). HARTLAUB, 1891, Abhandl. Naturwiss. Verein Bremen, XII, p. 32 (Buguera). HARTERT, 1892, 'Cat. Birds Brit. Mus.,' XVI, p. 595. JACKSON, 1906, Ibis, p. 520 (Ruwenzori). NEAVE, 1907, Mem. Proc. Manchester Lit. Phil. Soc., LI, No. 10, p. 39 (Ndola); 1910, Ibis, p. 113 (Lufupa R.). WOLLASTON, 1908, 'From Ruwenzori to the Congo,' p. 121 (Mokia). O.-GRANT, 1910, Tr. Z. S. Lond., XIX, p. 430 (Mubuku Valley, 5000 ft.). SALVADORI, 1911, Ann. Mus. Civ. Stor. Nat. Genova, (3) V, p. 447 (Uelle). CHAPIN, 1916, Bull. A. M. N. H., XXXV, p. 74, Fig. 1, p. 75, p. 76, map (Lukolela; Bolengi; Medje; Avakubi; Nyangwe; Bukama; Faradje; Nzoro; Aba; Garamba; Niangara); 1916, A. M. Journ., p. 543; 1931, Nat. Hist., p. 607. SCLATER AND M.-PRAED, 1919, Ibis, p. 659 (Mt. Baginzi). EMIN, 1919, in Stuhlmann, 'Tageb. Emin Pascha,' II, p. 463 (Tingasi). SCHOUTEDEN, 1923, Rev. Z. A., XI, p. 327 (Luebo); 1929, Bull. C. Z. C., V, p. 79; 1930, Rev. Z. A., XVIII, p. 283 (Elisabethville); 1933, idem, XXII, p. 378; 1936, Ann. Mus. Congo, Zool., I, f. 2, p. 95 (Buta; Mauda; Niarembe). W. L. SCLATER, 1924, 'Syst. Av. Æth.,' pt. 1, p. 255. WETMORE, 1926, 'The Migration of Birds,' p. 157. BANNERMAN, 1933, 'Birds Trop. W. Afr.,' III, p. 172.—*Cosmetornis* sp. JOHNSTON, 1884, 'River Congo,' p. 366 (Catact distr.).—*Cosmetornis* SCHALOW, 1886, J. f. O., pp. 416, 417, 418 (Manda).—*Cosmetornis spekei* JUNKER, 1890, 'Reisen in Afr.,' II p. 227 (Lacrima Station near Doruma).—*Macrodipteryx vexillarius* REICHENOW, 1902, 'Vög. Afr.,' II, p. 371; 1911, 'Wiss. Ergeb. D. Z.-Afr. Exp.,' III, p. 295 (Kisenyi). DUBOIS, 1905, Ann. Mus. Congo, Zool., I, f. 1, p. 33 (Katanga; Mahagi; L. Leopold II). MOURITZ, 1914, Ibis, p. 29 (S. E. Katanga). CHAPIN, 1915, A. M. Journ., p. 287, Fig.; 1935, Bull. C. Z. C., XII, p. 72. SCHOUTEDEN, 1918, Rev. Z. A., V, p. 254 (Beni; Baraka); 1932, Bull. C. Z. C., IX, p. 9 (Lomami distr.). SCHUBOTZ, 1921, 'Tageb. Emin Pascha,' VI, pp. 118, 120 (in part. Buguera). DE RIEMAECKER, 1927, Rev. Z. A., XIV, p. 275 (Kifumanshi R.).—*Macrodipteryx vexillarius* SASSI, 1912, Ann. Naturh. Hofmus. Wien, XXVI, p. 373 (Kasindi).—*Cosmetorais vexillarius* SALVADORI, 1914, Ann. Mus. Zool. Napoli, IV, No. 10, p. 19 (Lobo, Luapula Valley).—*Macrodipteryx (Cosmetornis) vexillarius* LÖNNBERG, 1917, Arkiv f. Zool., X, No. 24, p. 22.—*Macrodipteryx macrodipterus* SCHUBOTZ, 1921, 'Tageb. Emin Pascha,' VI, p. 119, footnote (Mangbetu country).

SPECIMENS.—Near Bolengi, ♂, July 20. Avakubi, ♂, Feb. 24; ♀, Mar. 20; ♂ im., Mar. 12. Medje, ♀, Mar. 23; ♀ im., Mar. 6. Niangara, ♂, June 22. Nzoro, ♂, Apr. 9; ♀, Apr. 10. Faradje, 5 ♂, Mar. 13, July 4, Aug. 3, 8; 3 ♀, Mar. 16, Aug. 15, Sept. 26; 2 ♂ im., Mar. 13, 16. Aba, 2 ♂, July 11. Garamba, 5 ♂, July 5, 10, 18, 19, 22.

ADULTS.—Iris dark brown, edge of eyelids very light brown; bill blackish at tip, light brown at base; feet light brown to pinkish brown.

DISTRIBUTION.—From Zululand and Damaraland north to Tanganyika Territory, Uganda, Kulme in Darfur, the Benue River, and west to Accra on the Gold Coast, perhaps to Sierra Leone. Said to have been taken once near Nairobi in Kenya Colony, and has also been found on Fernando Po.

The generic distinction of *Cosmetornis* from *Macrodipteryx* is based almost entirely on the form of the wing and its ornamental quills in adult males. It would be almost as well to unite the two. There can be no doubt that they are intimately related, *M. longipennis* having evolved north of the forest belt, and *C. vexillarius* to the south of it. I can see no very close affinity between these two African nightjars and *Eleothreptus* of South America.

Coloration is much less constant in *vexillarius* than in *longipennis*, and a few adult males of the former are strongly marked with rufous above, especially on the crown. Adult females are less variable. Young males in March, which still retain the soft under tail-coverts of the juvenal plumage and are not more than five and a half months old, have already molted the first (innermost) primary; and this has been replaced by a relatively large blackish feather. It may be that males of *Cosmetornis* are more precocious than those of *Macrodipteryx* and assume their nuptial plumage before the end of the first year.



Fig. 29. Adult male of *Cosmetornis vexillarius* resting on ground. $\times 1/8$.

One of the most extraordinary things about the pennant-winged nightjar is its extensive and regular migration. All examples found in the equatorial forest or north of it are migrants, for the breeding range is entirely in the southern savannas, from Angola, the southern half of Lake Tanganyika, and Tanganyika Territory south to Damaraland and the Transvaal. To that area it is restricted from October to early February. In the latter month a northward migration begins which takes the great majority of the birds, young and old, to the grasslands on the opposite side of the equator. There they spend the early part of the rainy season. Then from July to September they make their return journey southward to breed.

The records from the Cameroon and Congo forests all fall within the two periods of migration, when the birds spend the day in clearings or any natural openings in the forest. The first one I ever saw was an adult male at dusk over Lukolela, on July 18, 1909. Two days later a specimen was secured at a wood-post below Bolengi. Months passed

before we found the species again, some females in native farms near Medje, the following March.

In October, 1910, we left the Ituri forest for the savannas of the Uelle, and there we saw no pennant-wings until March 13, 1911, when I shot an immature male and an adult male with broken streamers. In 1912, the first one was observed on March 11. During three years we ascertained that the "pennants" are regularly broken short before the male birds reach the Ituri and the Uelle. In May or early June they are shed, and the new ones grow so slowly that their basal sheath is usually still present in August. Many of the males have returned to their nesting grounds before the growth of these plumes is completed.

From the latter part of May to the first of September, in the Uelle, is the season when pennant-winged nightjars display themselves aloft. At sundown they leave their refuge in the bushes amid the grasslands where they have been squatting on the ground or some flat stone, and start out to feed. At first they fly high, even a full hundred yards above the earth, a female not infrequently following in the wake of an adult male. Later in the evening they come lower, but rest on the roads mainly in the middle of the night, and at dawn are seen flying actively again. When put up in the daytime this nightjar may take refuge in a low tree, sitting more or less lengthwise on a bough, otherwise it seems never to perch.

When winged termites are swarming at dusk it is not uncommon to see a flock of ten to thirty *Cosmetornis* of both sexes gather over the spot. These insects are their favorite food. At such times I heard the only note they gave in the Uelle, a single hoarse syllable. Of all the males we collected there none had its "pennants" fully grown. The longest plumes were those of a male from Garamba on July 10, measuring 593 mm. The full-grown plumes of two males from the Katanga measure 725 and 740 mm. but 610-660 mm. is the usual maximum.

While pennant-wings are still numerous at Faradje in August, the southward migration has already begun. The birds have become excessively fat. We saw the last adult male there on September 3 and the last female on September 26. Near Avakubi in 1914 migrants on their way north were again collected between February 24 and March 20. During their return trip they were noted between July 23 and August 16. When traveling southward they were often seen in pairs, the female following the male; and their direction was clearly south or southwest.

My paper of 1916 on the migration of *Cosmetornis* was based on the foregoing observations and all the published records with dates. Since

that year nothing has come to my notice that does not tend to confirm my conclusions.

In 1926, I found pennant-wings common at Kasenyi on Lake Albert in the latter part of August, but saw none there after September 2, nor any on the northern shore of Lake Edward in January, 1927. At Beni in February, I promised Sage they would soon reappear, and on February 23 we took a male with broken pennants. During March a number of others were seen along the road through the mountains west of Lake Edward, some at an altitude of 7600 feet. By the end of that month the northward migration seemed finished, and none was seen near Rutshuru or in the Rutshuru Plain in April and May. In July none was seen in the Ruzizi Valley, or in early August along the Lualaba River, so I believe that few remain south of the forest between May and early August.

At Lukolela in 1931, I caught an immature male of *Cosmetornis* in my hand on February 21, with the aid of a flashlight. Four more examples were seen there between March 3 and 24. So the dates of passage are much the same there as in the Ituri.

Dr. Schouteden's four adult males from Elisabethville were taken in April, but the Congo Museum has no specimens from the southern Congo after that month until July 30, when a male was taken by Father Callewaert at Luluabourg. There is also a female from Luluabourg on August 4. From Kinda, Lulua district, the earliest date is August 5, and from Kanzenze, Katanga, August 18. These indicate the approximate dates of arrival.

In Marungu Böhm found *Cosmetornis* very abundant in September, and on September 8 took the first set of two eggs. In the same district Rockefeller and Murphy collected a number, including females and young, between February 22 and March 18. The first migrants reach the Uelle before the last stragglers quit the breeding area. The pennants are not molted on the breeding grounds, but many of them break off and are found lying on the ground. The voice of the male on its nesting ground is described as a faint piping or twittering squeak, given in flight.

This nightjar does not breed in the Lower Congo, nor probably in the Kasai or northern Tanganyika district. Near Sandoa in the southern Lulua, Lynes found a female with two eggs, half-incubated, on September 8. Eggs have been reported from Matabeleland as late as November 29.

The eggs of *Cosmetornis* are pinkish white to buffy salmon-pink with

rusty reddish spots or blotches and secondary violet-gray, measurements 26.4–34 mm. \times 19.4–22.8.

Three stomachs of migrating birds from the forest area contained numbers of beetles, some crickets, and a few small grasshoppers. In the case of fifteen other birds from the Uelle, seven stomachs were filled mainly with winged termites. While beetles were present in thirteen cases, they were usually few in number and mainly of small size. Other insects noted were 15 small hemiptera, 7 small grasshoppers, some winged ants, 4 leaf-hoppers, 2 small cicadas, 3 roaches, a small mantis, an earwig, and a moth. The average dimensions of insects eaten by pennant-wings are not great, and I still believe that their fondness for winged termites is correlated with their migration.

FAMILY Micropodidæ. SWIFTS

KEY TO THE AFRICAN GENERA OF MICROPODIDÆ

- 1.—Tarsus feathered; tips of rectrices normal, tail square or forked.....2.
Tarsus naked; tail more or less square, rectrices with stiff shafts projecting beyond the webs.....3.
- 2.—Toes in pairs, the third and fourth pointing outward, the first and second inward; tail deeply forked, with outermost rectrices more than 2/3 as long as wing.....CYPURIUS, p. 464.
Toes all pointing more or less forward; tail deeply forked (but less than 2/3 as long as wing), moderately forked, or even very nearly square. MICROPUS, p. 448.
- 3.—Wing more than five times as long as tail.....NEAFRAPS, p. 445.
Wing less than five times as long as tail.....CHÆTURA, p. 441.

Subfamily Chæturinæ

KEY TO THE CONGO SPECIES OF CHÆTURA

- 1.—Upper and under tail-coverts entirely white, though often with fine black shaft-streaks.....*C. sabini*.
Upper and under tail-coverts largely or entirely black.....2.
- 2.—No white band on rump or base of upper tail-coverts; abdomen and under tail-coverts entirely blackish.....*C. melanopygia*.
A white band across rump or base of upper tail-coverts; under tail-coverts and abdomen entirely dusky, save for a little whitish across the lower abdomen.....*C. ussheri*.

Chætura sabini ogowensis Neumann

Chætura sabini ogowensis NEUMANN, 1908, B. B. O. C., XXI, p. 69 (type locality: L. Onange, Ogowe R., Gaboon).—*Chætura sabinei* SHELLEY, 1890, Ibis, p. 168 (Yambuya). SHARPE, 1890, in Jameson, 'Story of Rear Column,' p. 406, REICHENOW, 1903, 'Vög. Afr.,' II, p. 388. CHAPIN, 1915, Bull. A. M. N. H., XXXIV, p. 510 (Ituri R.). BANNERMAN, 1920, Rev. Z. A., VII, p. 295 (Bosabangi on Ituri R.).—*Chætura sabini* BEQUAERT, 1922, Bull. A. M. N. H., XLV, p. 310. BANNERMAN,

1933, 'Birds Trop. W. Afr.,' III, p. 202, Fig. 63.—*Chætura sabinei ogowensis* SCHOUTEDEN, 1924, Rev. Z. A., XII, p. 415 (Tondou).—*Alterapus sabini ogowensis* W. L. SCLATER, 1924, 'Syst. Av. Æth.,' pt. 1, p. 263. SCHOUTEDEN, 1936, Ann. Mus. Congo, Zool., I, f. 2, p. 96 (Panga).

SPECIMENS.—Avakubi, 2 ♀, Aug. 24. Ngayu, 6 ♂, July 28, Dec. 12, 15, 19; 4 ♀, July 27, 28, Dec. 15, 18. Niangara, ♀, June 1.

ADULTS.—Iris dark brown, bill black, feet dusky purplish.

DISTRIBUTION OF THE SPECIES.—Sierra Leone eastward to the Cameroon and Upper Congo forest. To the southward it reaches the Lower Congo, and it has been found on Fernando Po. *C. s. sabini* Gray, known only from Sierra Leone, is said to have the wing 132 mm. long. *C. s. ogowensis* differs only by its supposedly shorter wings, 115–126 mm., and is found from Fernando Po, the Gaboon, and Landana eastward across the forested Cameroon and Congo to the Upper Uelle, the Semliki Valley, and probably to the northern Kasai district. *C. thomensis* Hartert of São Tomé is a very close ally, smaller and with less white.

At Avakubi in the Ituri forest Sabine's swift was the most abundant of the spine-tailed species, as it probably is throughout the heavier forests of the Upper Congo. At Ngayu parties of a dozen or more used to be seen passing over, especially in the morning before the sun was high, and again toward sunset. If they gave any call-note it was so weak as to escape my ear.

About Niangara this swift was not common, and we saw it only near some swampy woods. A small flock was noted along the Uelle River between Niangara and Dungu, but none were ever seen farther to the northeast.

The range seems to stop at the eastern margin of the forest. Along the road between Irumu and Beni the species was common in September, 1926, and at Masimango's in the forest east of the Semliki River I saw a party of ten on February 10, 1927.

About Lukolela in 1930–31, they were observed occasionally in groups of two to eight, and near Ganda Sundi in the Mayombe two couples were noticed on April 20, 1931.

Sabine's swift breeds and roosts in hollow forest trees, Bates having secured two nests, shaped like half-cups, made of small bits of twigs glued together, at Bitye in southern Cameroon. One set was of two, the other of three, pure white eggs, measuring 17–18 mm. × 12–12.5.¹

In the northeastern Congo the breeding season cannot extend through

¹ Ibis, 1911, p. 517. For the nesting of two Indian species of *Chætura*, see Stewart, 1913, Journ. Bombay Nat. Hist. Soc., XXII, pp. 393, 394.

any considerable part of the year, for only one of our specimens showed enlargement of the reproductive organs—a female from Niangara, on June 1. It seems almost certain that in the Ituri the breeding season must fall within the months between January and June, a period during which we secured no specimens.

With regard to the usual food we can be more precise, for of eight individuals (from three different localities), the stomachs in every case were found to contain only winged ants, often being completely filled with them.

Chætura ussheri sharpei Neumann

Chætura ussheri sharpei NEUMANN, 1908, B. B. O. C., XXI, p. 57 (type locality: Efulen, S. Cameroon). BEQUAERT, 1922, Bull. A. M. N. H., XLV, p. 310. GYLDENSTOLPE, 1924, K. Svenska Vet. Akad. Handl., (3) I, No. 3, p. 263 (Kampi na Mambuti).—*Chætura stictilæma* CHAPIN, 1915, Bull. A. M. N. H., XXXIV, p. 510 (Ituri R.).—*Telacanthura ussheri sharpei* W. L. SCLATER, 1924, 'Syst. Av. Æth.,' pt. 1, p. 262. SCHOUTEDEN, 1936, Ann. Mus. Congo, Zool., I, f. 2, p. 96.—*Chaetura ussheri* SCHOUTEDEN, 1935, Bull. C. Z. C., XII, p. 35 (Buta).

SPECIMENS.—Avakubi, 2 ♂, July 3, Aug. 21; ♀, July 3. Bafwabaka, ♂, July 22. Babonde, 2 ♂, July 17, 19; ♀, July 17. Medje, ♂, ♀, Jan. 19. Isiro, ♂, ♀, July 4. Faradje-Aba, ♀, Oct. 5.

ADULTS.—Iris dark brown; bill black; feet bluish gray, light above, becoming dusky on toes.

DISTRIBUTION OF THE SPECIES.—Senegal to Angola, and eastward to the Uelle, Mombasa on the East Coast, and the Zambesi River. Four races are recognized, differing in the size of the white patch on the abdomen, the scaly or streaky pattern of throat and fore-neck, and the blackness of the upperparts.¹

C. u. ussheri Sharpe extends from Senegal to the Gold Coast and Kano in Northern Nigeria. *C. u. sharpei* of Lower Guinea ranges from southern Cameroon and the Lower Congo eastward to the Upper Uelle, the plateau west of Lake Albert, and probably the Manyema district. On the south it reaches the central Kasai district. *C. u. benguellensis* Neumann is found in northern and central Angola, while *C. u. stictilæma* (Reichenow) is locally distributed from Mt. Kenya and Mombasa south to Zumbo on the Zambesi. The Kwango district is about the only part of the Congo where *benguellensis* may possibly occur. It differs from *sharpei* in the more streaked, less scaly pattern of the fore-neck, and by its browner upperparts. Its wing is apparently a little shorter than that of *sharpei*, the latter measuring 142–152 mm.

¹ Grant and Mackworth-Praed, 1937, B. B. O. C., LVIII, p. 51, admit a fifth, *C. u. marwitzi* Reichenow, from Mkalama, Tanganyika Territory.

Chætura ussheri sharpei is a rather common bird over the whole low-land forest area of the Congo, extending well out into savannas with gallery forests, but it does not ascend above 5400 feet in the highlands. This is usually the first of the spine-tails to attract attention, because of its visits to villages and posts. It does not travel in flocks. Pairs are the rule, and seldom are six seen together. Often they fly low over an open clearing merely to feed, at other times they come closer about the houses, in which occasionally they nest.

At Ganda Sundi in the Mayombe, I saw a few of these swifts, and the Congo Museum has a mummified specimen from Lukula. At Boma they are common, and they were noted also at Leopoldville and Lukolela. In the Ituri district we saw them frequently, even along the road between Irumu and Beni. A pair was seen at Djugu on the Lendu Plateau, and the specimen taken between Faradje and Aba was flying on the outskirts of a strip of heavy forest. Father Callewaert collected a pair for the American Museum at Luluabourg in the Kasai.

Dissections, as well as their behavior, showed that in the region from Avakubi to Medje breeding takes place in January as well as in July and August. At Lukolela a male in full readiness for reproduction was collected on August 28.

These swifts undoubtedly nest in hollow trees, and near Avakubi in March we watched a pair dropping into the hollow core of a great tall stump, but no nest could be found there. Vacant houses are occasionally chosen also as nesting places. At Okondo's village near Niangara in early July a couple were flying about the great meeting hall as though they might have a nest under the peak of the roof. At Avakubi in April a pair was found clinging side by side to the inner wall of an empty house.

At Babonde in July, I discovered an occupied nest in a rest-house that was used only occasionally by Europeans. Between the gabled roof and the front wall there was a large open space for the entry of the swifts, and the nest was glued to the inner wall at a height of fifteen feet. Although the set of four pure white eggs was complete, the male was carrying a small dry twig in his beak, to be added to the half-saucer-shaped nest. This was built mainly of small twigs glued together, though the part closest to the wall consisted of small bits of dry banana leaf. Both male and female birds had salivary glands highly developed, as is the case only in the breeding season. Their four eggs measured 20.6–21 mm. \times 13.8–14.3.

These nesting birds approached the house in long, graceful arcs, and kept quite silent. The voice of *C. ussheri* is a rasping "kāk-k-k-k,"

which I could hear only up to fifty yards. Its flight is more like that of *Micropus affinis* than that of *Neafrapus cassini*.

At Coquilhatville in 1931, I found an abandoned nest of *C. ussheri sharpei* ten feet up on the inner wall of an unused garage. Old feathers on the floor below confirmed the identification.

Without exception the eight stomachs of this swift which I have examined contained winged ants. Often they were entirely filled with them, and the only other insects recognized were three flies.

***Chætura melanopygia* Chapin**

Chætura melanopygia CHAPIN, 1915, Bull. A. M. N. H., XXXIV, p. 509 (type locality: Avakubi, Ituri distr., Congo). BEQUAERT, 1922, Bull. A. M. N. H., XLV, p. 310. GYLDENSTOLPE, 1924, K. Svenska Vet. Akad. Handl., (3) I, No. 3, p. 264 (Simbo).—*Telacanthura melanopygia* W. L. SCLATER, 1924, 'Syst. Av. Æth.,' pt. 1, p. 263.

SPECIMEN.—Avakubi, ♂, Aug. 15.

ADULT.—Iris dark brown; bill black; feet bluish, shading to dusky brown on tips of toes and claws.

DISTRIBUTION.—Known only from the Ituri Forest.

This large dark swift, of which but two specimens have been taken, is related to *C. ussheri*, and has a similar scaly pattern on fore-neck and chest, though even more extensive, and no white on either rump or abdomen. The wing of the type measures 164 mm., tail 49.5. Count Gyldenstolpe's specimen, also a male, had the wing 165 mm., tail 50.

The type specimen was one of two or three flying about over the Ituri River, some two miles above Avakubi, in company with several *Neafrapus cassini*. On a few other occasions in this vicinity I saw large swifts I believed to be *melanopygia*, but did not succeed in killing any more. In July, 1921, Count Gyldenstolpe obtained a second example, and reported that he saw others on several occasions, flying over clearings in the Ituri Forest west of Irumu. There is no reason to think that the species is restricted to the Ituri, and I expect that sooner or later it will turn up in other parts of the Upper Congo forest.

Our specimen had the testes enlarged as though certainly breeding, and its stomach contained a number of winged ants.

KEY TO THE SPECIES OF *NEAFRAPUS*

- | | |
|-----------------------------|---------------------|
| Wing 150 mm. or longer..... | <i>N. cassini</i> . |
| Wing less than 140 mm..... | <i>N. böhmii</i> . |

***Neafrapus böhmi* (Schalow)**

Chaetura böhmi SCHALOW, 1882, Orn. Centralbl., p. 183 (type locality: "Rakowa" = Kakoma, Tanganyika Terr.).—*Chaetura anchietae* DE SOUSA, 1887, Jorn. Sci. Lisboa, XII, No. xlvi, pp. 93, 105 (type locality: Quissange, Benguela).

DISTRIBUTION.—From the Ugalla River, east of Lake Tanganyika, south to the Zambesi at Tete and Sesheke, and probably to Beira; thence west to Quissange in Benguela, Cassualalla in northern Angola, and the central Kasai district of the Congo.

Both in color and pattern this small swift is a copy of *Neafrapus cassini*, save that there are no fine dark streaks on throat or breast. Even the proportions of wing and tail are similar, though the wing here measures but 121–130 mm., and the tail 18–20 (inclusive of the spiny tips of the rectrices). Three males from northern Angola have wings 121–122 mm., a male and a female from the Kasai 122.5 and 122 mm., and a male from the Upper Katanga 130 mm. I doubt the distinctness of *Notafrapus sheppardi* Roberts,¹ since it does not differ in color from *böhmi*, and the measurements given are only slightly different: wing 116–123, tail 20–22 mm.

This small stub-tailed swift is rather common in the Upper Katanga, where I collected a male at the Etoile Mine in August, 1927. It was toward the end of July at Elisabethville that Admiral Lynes found it, and at the end of August at Kayoyo in the southern Lulua district. The species extends into the Kasai district as far as Luluabourg, where Father Callewaert obtained a male in September and a female in December, 1924.

They feed in very small parties, often only two or three; and their flight is as irregular as that of their large counterpart, *cassini*. The wings appear unusually broad for a swift's, so their erratic movements suggest somewhat the flight of a butterfly. No doubt they nest in hollows in trees of the thickly wooded savanna.

***Neafrapus cassini* (Sclater)**

Chaetura cassini P. L. SCLATER, 1863, P. Z. S. Lond., p. 205, Pl. xiv, fig. 2 (type locality: Gaboon). SHELLEY, 1890, Ibis, p. 168 (Yambuya). SHARPE, 1890, in Jameson, 'Story of Rear Column,' p. 409. HARTERT, 1892, 'Cat. Birds Brit. Mus.,' XVI, p. 488 (Landana); 1895, Nov. Zool., II, p. 56. REICHENOW, 1903, 'Vög. Afr.,' II, p. 388. CHAPIN, 1915, Bull. A. M. N. H., XXXIV, p. 510 (Ituri R.); 1921, A. M. Nov., No. 17, p. 15 (Bengamisa; Avakubi; Ngayu; Medje). BANNERMAN, 1920, Rev. Z. A., VII, p. 294 (Poko); 1933, 'Birds Trop. W. Afr.,' III, p. 201, Fig. 62. BEQUAERT, 1922, Bull. A. M. N. H., XLV, p. 310. GYLDENSTOLPE, 1924, K. Svenska Vet. Akad. Handl., (3) I, No. 3, p. 262 (Kampi na Mambuti; Simbo).—*Chaetura*

¹ 1922, Ann. Transvaal Mus., VIII, p. 218 (Beira).

brevicauda SASSI, 1912, Ann. Naturh. Hofmus. Wien, XXVI, p. 373 (Moera).—*Neafrapus cassini* W. L. SCLATER, 1924, 'Syst. Av. Æth.,' pt. 1, p. 263. SCHOUTEDEN, 1936, Ann. Mus. Congo, Zool., I, f. 2, p. 96.

SPECIMENS.—Bengamisa (Lindi R.), ♂, Sept. 29. Avakubi, 3 ♂, July 31, Aug. 9, Nov. 5; ♀, Jan. 3. Ngayu, 2 ♂, July 28, Dec. 12; ♀, July 28. Medje, ♂, Sept. 4.

ADULTS.—Iris very dark brown; bill black; feet purplish black, or dark blue becoming blackish on toes.

DISTRIBUTION.—From Fernando Po, Bipindi in southern Cameroon, the Gaboon Coast, and Landana, eastward across the Congo forest to Poko on the Bomokandi River and to the neighborhood of Beni. At Ganda Sundi in the Mayombe I saw four within a few days, and at Lukolela it is of regular occurrence. Very probably its range extends to the upper Lukenie River and the forested Manyema. On the northeastern edge of the forest we never observed it beyond Bafwabaka and Medje, so it would seem more closely restricted to the heavy forest than either *Chætura ussheri* or *sabini*.

Seven males from the northeastern Congo have wings 150–161 mm., tails 23.5–27.5 mm. Three females from the same region: wings 155–161, tails 24–26. The wings of four specimens from the Gaboon measure 146–155 mm.

With its long wings and stubby tail, *Neafrapus cassini* exaggerates all that is peculiar to the flight of swifts, until it seems almost as though its wings were out of joint. Its progress is nevertheless extremely rapid, and I was much surprised at finding one in the crop of a peregrine falcon. One morning in early January I watched a gathering of fully forty of these swifts over the Ituri River at Bosobangi, with only a very few *Chætura sabini* about; but usually it is the smaller species that shows the larger numbers, while more than a half-dozen *cassini* is exceptional.

Only once did I secure good evidence as to where this species nests. Near Avakubi, in late April, one was seen to fly out of a tree standing alongside a forest road. The trunk was hollow, opening below from the ground up to a height of eight feet. Examination of the ground beneath disclosed a piece of white egg-shell and a couple of old feathers from a swift. In a forest clearing near the Loya River, south of Irumu, on September 29, 1926, I watched a swift of this species as it dropped into the hollow top of a tree which had been broken off by the fall of its neighbors. This of course did not prove that nesting was in progress just then. I have no evidence that this species ever attempted to nest in houses.

In the Ituri district we took non-breeding individuals in November, December, and January, and others ready to breed in July and September. This indicates that nesting is carried on during the rains, commencing perhaps as early as April.

The contents of nine stomachs showed that the food consists mainly of winged ants, which were found in eight of them, often in such numbers as to fill the stomach. The ninth stomach contained many small black beetles, of which one other bird had eaten a few. Winged termites were also found mixed with ants in one case.

Subfamily **Micropodinae**

KEY TO THE CONGO SPECIES OF **MICROPUS**

- 1.—Wing 190 mm. or longer.....2.
Wing less than 190 mm. in length.....3.
- 2.—Lower breast and abdomen entirely white, a blackish or brown band across chest.....*M. melba*.
Lower breast and abdomen blackish brown, each feather usually tipped with whitish, and black subterminally; abdomen only barred, at most, with whitish.....*M. æquatorialis*.
- 3.—With a white band across rump.....4.
No white band across rump.....6.
- 4.—Tail square or very slightly emarginate, not exceeding 45 mm. in length....
.....*M. affinis*.
Tail forked, its outermost feathers longer than 49 mm.....5.
- 5.—Depth of fork in tail not over 20 mm., malar region grayish.....*M. horus*.
Depth of fork in tail 25 mm. or more, malar region blackish.....*M. caffer*.
- 6.—Wing less than 138 mm. long.....7.
Wing more than 140 mm. long.....8.
- 7.—General color deep black, with a tinge of bluish on body plumage; throat sooty brown.....*M. batesi*.
General color blackish brown; throat paler.....*M. unicolor*.
- 8.—Wing less than 160 mm. long.....9.
Wing 160 mm. or longer.....11.
- 9.—Back bluish black; underparts, except throat, also black; tail not longer than 60 mm.....*M. toulsoni*.
Back brownish black or blackish brown; underparts, except throat, dark brown; tail exceeding 62 mm.....10.
- 10.—Back brownish black, often with faint greenish gloss.....*M. apus shelleyi*.
Back very dark brown, without noticeable gloss.....*M. pallidus miansæ*.
- 11.—General coloration dark grayish brown, back never blackish; outermost (10th) primary usually equal in length to 9th, occasionally a little longer.....
.....*M. pallidus brehmorum*.
General coloration darker, often blackish; back generally blackish; outermost (10th) primary usually a little shorter than 9th.....12.
- 12.—Fork of tail 20–27 mm. deep; throat-feathers usually with dusky shaft-streaks.....
.....*M. barbatus*.

Fork of tail 27–33.5 mm. deep; throat-feathers usually without dusky shaft-streaks.....*M. apus*.

***Micropus affinis affinis* (Gray)**

Cypselus affinis J. E. GRAY, 1832, 'Ill. Ind. Zool,' I, Pl. xxxv, fig. 2 (India; restricted type locality: Ganges Valley).—*Micropus affinis* HARTERT, 1892, 'Cat. Birds Brit. Mus.,' XVI, p. 452 (Landana). CHAPIN, 1921, A. M. Nov., No. 17, p. 14 (Piaggá). BEQUAERT, 1922, Bull. A. M. N. H., XLV, p. 310.—*Apus affinis affinis* HARTERT, 1928, Nov. Zool., XXXIV, p. 365.—*Colleoptera affinis abessynicus* BANNERMAN, 1933, 'Birds Trop. W. Afr.,' III, p. 191, Fig. 59.—*Micropus affinis affinis* SCHOUTEDEN, 1936, Ann. Mus. Congo, Zool., I, f. 2, p. 95.

SPECIMENS.—Matadi, ♂, Dec. 25. Piaggá (between Faradje and Dunga), 2 ♂, ♀, Feb. 20.

ADULTS.—Iris dark brown, bill black, toes dusky brown.

DISTRIBUTION OF THE SPECIES.—Almost the whole of Africa, islands in Gulf of Guinea, India, China, Malay Peninsula, Sumatra, and Borneo. Five or six races are recognized. *M. a. affinis* occupies the western and central provinces of India to Deccan, also southern Arabia, and Africa from the Gambia, Northern Nigeria, and Abyssinia south to Cape Province. It is found along the western coast as well as in eastern Africa, but is very rare within the limits of the Upper Congo forest. Birds from tropical Africa have often been separated as *M. a. abessynicus* (Streubel), but the difference is exceedingly slight. In North Africa dwells a lighter race, *M. a. galilejensis* (Antinori), which extends south to Timbuktu and Asben. *M. a. bannermani* Hartert¹ of São Tomé, Príncipe, and Fernando Po is blacker in color than typical *affinis*, with wings 134–142.5 mm. Those of African specimens of *affinis* measure 122–137 mm.

The localized distribution of this square-tailed swift in the Congo is doubtless due to the kind of nesting sites it requires, overhanging rocks or substantial buildings. I have found it at only three localities in the Congo, and no others are on record.

About the hills near Matadi, *M. affinis* is seen in some numbers, and in December, 1914, there were two large clusters of nests beneath a high overhanging rock along the river just above the town. The specimen collected there was in breeding condition.

Between Dunga and Faradje, near a stream called the Gangu, there are several rocky hills about 200 feet high. One of them has an overhanging end, and there in February, 1913, I found a great slab of nests attached beneath the almost horizontal surface of the rock. They

¹ 1928, Nov. Zool., XXXIV, p. 365 (Pedroma, São Tomé.)

seemed rather old, and lower down, in a crack, were several more that looked newer. A few swifts were flying about in the afternoon, and at sundown twenty or thirty assembled, preparatory to going to roost. They gave some "churring" notes, not loud. Some of the specimens collected there had gonads enlarged, but I doubt if they were breeding actively at that time. The nests we dislodged were empty, and had been constructed of bits of grass, plant-down, and feathers, especially those of fruit-pigeons and of the swifts themselves.

The only place in the forest area where I have ever seen this species is at Coquilhatville. In March, 1931, some thirty pairs were breeding under the verandah of the brick post office, where they had built four groups of nests in the corners. There were also four isolated nests beneath iron eaves near a side door of the cathedral. One nest was found to have two white eggs, others held one or two young each. At night a few adults could be seen clinging on the outside of the nests, but the majority were inside. When disturbed they gave a weak trilling note. The nests at Coquilhatville were also made of grass and feathers. Mud certainly is never used in their construction, and they are almost always well closed, with an entrance at one side, occasionally prolonged as a short tube.

The season of reproduction is probably very long, for in West Africa, north of the equator, eggs or young have been found from September at least to March. Three eggs are sometimes laid, and measurements given by Bannerman are 20.4–23.5 mm. \times 13.7–15. Eggs found by Austin Roberts¹ at the Modder River, Orange River State, in February measured 22.5–24.5 mm. \times 13.8–15.

***Micropus horus* (Salvadori and Antinori)**

Cypselus affinis var. *horus* HEUGLIN, 1869, 'Orn. Nordost-Afr.,' I, p. 147 (*nomen nudum*).—*Cypselus horus* SALVADORI AND ANTINORI, 1872, Atti Accad. Sci. Torino, VIII, p. 94 (type locality: Blue Nile above Wadi-Medine).—*Cypselus sharpii* BOUVIER, 1876, Bull. Soc. Zool. France, I, p. 228 (Banana).—*Cypselus sharpei* SHARPE AND BOUVIER, 1876, Bull. Soc. Zool. France, I, p. 303. BOCAGE, 1881, 'Orn. Angola,' pt. 2, p. 543.—*Micropus horus* HARTERT, 1892, 'Cat. Birds Brit. Mus., XVI, p. 452 (Landana). W. L. SCLATER, 1924, 'Syst. Av. Æth.,' pt. 1, p. 261. SCHOUTEDEN, 1929, Bull. C. Z. C., V, p. 76 (Ngoma); 1932, Rev. Z. A., XXII, p. 125; 1933, idem, XXII, p. 378 (Kisenyi). FRIEDMANN, 1930, Bull. 153, U. S. Nat. Mus., p. 317. BANNERMAN, 1933, 'Birds Trop. W. Afr.,' III, p. 190, Fig. 58.—*Apus horus* REICHENOW, 1902, 'Vög. Afr.,' II, p. 381.

DISTRIBUTION.—From Darfur, the Blue Nile, and Abyssinia south to the eastern Congo border, Kilimanjaro, the Zambesi, and the Rusten-

burg district, Transvaal. Also west to the Congo mouth, but not in the region of heavy forest.

The validity of the three races, *beirensis*, *australis*, and *finschii*, recognized by Austin Roberts¹ in southern Africa, seems to me very doubtful. Four Abyssinian specimens have wings 149–160 mm., and are not smaller than those of the Transvaal. Eight specimens from Kenya Colony and the eastern Congo have wings 143–157 mm., tails 53.5–59, with depth of fork in tail 10–18 mm. Females average slightly smaller than males.

Recent records indicate that this white-rumped swift may occur rather commonly along the Albertine Rift and perhaps across all the savannas of the southern Congo. Without securing a specimen it is next to impossible to distinguish *horus* from *M. caffer*, in spite of the longer tail of the latter. Sometimes *horus* mingles with flocks of other swifts as they feed, yet on August 26, 1926, I found a flock of fifteen or twenty of this species along the escarpment west of Kasenyi on Lake Albert, and secured two. Dr. Schouteden obtained three specimens on Lake Kivu in January, and Rockefeller and Murphy collected a female at Kitendwe, Marungu, 6050 feet, on February 23, 1929. Over a small grassy plain back of Lukolela a flock of about thirty appeared on October 10, 1930, from which I shot four. They were not in condition to breed, and were feeding on winged ants.

L. Petit,² who collected this swift at Landana, was surely mistaken about its breeding in nests of swallows on a rocky cliff. The eggs and young of *horus* have been found by other naturalists³ in tunnels in banks which may have been dug by bank swallows or bee-eaters. The eggs, laid on a pad of hair, hay, and feathers, are two in a set, glossy white and elongate, measuring 21.8–22.7 mm. \times 14.5–15. In the Transvaal, Roberts found several nests in the same bank on May 2, Belcher reported a nest from the Zambesi mouth on September 17, and Lynes mentioned a breeding male from Darfur in June. I collected a male ready to breed on July 11 near Naivasha, Kenya Colony.

***Micropus toulsoni* (Bocage)**

Cypselus toulsoni BOCAGE, 1881, 'Orn. Angola,' pt. 1, p. 158 (type locality: Loanda).—*Micropus toulsoni* HARTERT, 1892, 'Cat. Birds Brit. Mus.,' XVI, p. 453 (Landana). BANNERMAN, 1933, 'Birds Trop. W. Afr.,' III, p. 183.—*Apus apus toulsoni* MEINERTZHAGEN, 1922, Ibis, p. 42 ("Lower Congo").—*Micropus apus toulsoni* W. L. SCLATER, 1924, 'Syst. Av. Æth.,' pt. 1, p. 257.

¹ 1929, Ann. Transvaal Mus., XIII, p. 73; 1935, idem, XVI, p. 107.

² 1885, Ornith., p. 585; 1899, Mem. Soc. Zool. France, XII, pp. 74, 75.

³ Roberts, 1926, Ann. Transvaal Mus., XI, p. 235; 1935, idem, XVI, p. 107. Belcher, 1928, Ibis, p. 9.

DISTRIBUTION.—From Landana south to the vicinity of Lobito Bay, Angola.¹ Far from being a race of *M. apus*, the Loanda swift is almost exactly similar to *M. horus* except that it has no white on its rump, and the throat is not so pure white. The wing-length of the two species is similar, as is also the shape of their tails.

Only a very few specimens of *toulsoni* have ever been taken, but it is evident that this swift must occur at the Congo mouth. The British Museum specimen came from Landana, not from the Lower Congo.

***Micropus caffer streubelii* (Hartlaub)**

Cypselus streubelii HARTLAUB, 1861, J. f. O., pp. 418, 422 (type locality: Kérén, Eritrea).—*Micropus streubeli* BEQUAERT, 1922, Bull. A. M. N. H., XLV, p. 310.—*Micropus caffer streubeli* SCHOUTEDEN, 1936, Ann. Mus. Congo, Zool., I, f. 2, p. 95 (Poko).

SPECIMENS.—Avakubi, ♂, Jan. 19. Nala, ♂, July 3. Dungu, ♀, June 27. Niangara, ♀, June 23. Nzoro, 2 ♀, Aug. 6.

ADULTS.—Iris dark brown; bill black; feet brownish, dark above, light below, claws black.

DISTRIBUTION OF THE SPECIES.—From Cape Town north to the southern and eastern edges of the Congo forest, through eastern Africa to Eritrea and Darfur, also in the savannas of the Upper Uelle. Little more than accidental in the Congo forest.

M. c. caffer (Lichtenstein), from south of the Zambesi, has wings of 150–170 mm. It is believed to be migratory, and may possibly occur in the southern Congo between April and September. *M. c. ansorgei* of Angola, Lower Congo, and Landana, is somewhat blacker on the crown and perhaps more bluish on back and upper tail-coverts than the other races. Its wings measure 132–146 mm. *M. c. streubelii*, with wings 130–142 mm., ranges from Eritrea, Abyssinia, and the Anglo-Egyptian Sudan to the northeastern and eastern Congo, Uganda, Kenya Colony, and Tanganyika Territory. It does not ascend forested mountains, but occurs in East Africa up to 6000 feet.

In the Congo *streubelii* is found in the savannas of the Uelle and those about Lake Edward. Near Lemera, west of the Ruzizi Valley, I have also seen a swift of this species. The single occurrence at Avakubi seems purely accidental, a non-breeding bird that was feeding with a large flock of swallows and some European swifts.

An occasional individual might be seen anywhere in the grasslands of the Uelle, but they were of regular occurrence only about rocky hills,

¹ A supposed occurrence at Zomba, Nyasaland, was based on a misidentification. See Beicher 1930, 'Birds of Nyasaland,' p. 152.

where they were sure to find swallows' nests for their own use. At Aba we noticed only one, but at Mt. Ataramba near Dungu in the latter part of June six pairs were flying about the steep rocks overlooking the river, coming in toward the fissures where *Hirundo abyssinica unitatis* undoubtedly nests. There were only two pairs of these swallows about at the time. Near the foot of Mt. Gaima in early August two pairs of *streubelii* were flying about some huge boulders where under an overhanging ledge there were a couple of nests of the same streak-breasted swallows.

This was the time of year when they nested, for on July 3, 1913, at Nala, I found a pair occupying a nest built by *Hirundo semirufa gordonii* in an empty house. The exterior of this nest looked so fresh that I think the builders had been driven off before they could use it, and they now had a second nest in another house. Some dry grass in the nest had evidently been placed there by the swallows, but the swifts had added a soft bed of plant-down from the seed-pods of rubber trees (*Kibatalia*), as well as feathers. They had also lined the whole inside walls, right out to the edge of the tubular entrance, with feathers glued on by their saliva. The feathers had come from white chickens, fruit-pigeons, and weavers, as well as from the swifts themselves. A small bit of rag and a pinch of green moss were also noticed, and all these materials were undoubtedly secured in flight. The eggs were two, pure white, and measured 22.2×14.5 and 22.6×14.3 mm.

At Jinja, Uganda, I have found eggs and young of *M. c. streubelii* during July, in old nests of *Hirundo angolensis*. Near Kasindi in January a non-breeding pair was spending the night in an old swallows' nest beneath an overhanging rock, probably built by *Hirundo rufula emini*.

In the diet of this swift, winged ants take first place. Three out of four stomachs were filled with them, and the only other insect we could recognize was a small hemipter.

***Micropus caffer ansorgei* Sclater**

Micropus caffer ansorgei W. L. SCLATER, 1922, B. B. O. C., XLII, p. 63 (type locality: Ndala Tando, northern Angola). BANNERMAN, 1933, 'Birds Trop. W. Afr.,' III, p. 189.—*Micropus streubeli* HARTERT, 1892, 'Cat. Birds Brit. Mus.,' XVI, p. 452 (Landana).—*Apus streubeli* REICHENOW, 1902, 'Vög. Afr.,' II, p. 381.—? *Apus caffer* MOURITZ, 1914, Ibis, p. 32 (Kalonga, S. E. Katanga).

DISTRIBUTION.—From the Portuguese Congo to northern Angola, and supposedly eastward across the savannas of the southern Congo. In the Congo Museum there are two adults from Boma, wings 133 and 140 mm. Specimens from Landana are said to have wings of 132 and

135 mm. Those of northern Angola have them 140–146 mm., and an adult from Kasongo in the Congo Museum has the wing 140. We may expect this swift to occur in the Kasai district, but it is difficult to say what race Mouritz saw in the southern Katanga.

At Boma, where *Hirundo abyssinica* nested on the verandah of the American Consulate, Mr. Harry McBride told me that at times the swallows were evicted from their homes by a dark-colored swift. At that same town, some years later, Doctor Rodhain collected a nestling of *M. c. ansorgei*, with wings nearly full-grown, in August.

***Micropus batesi* (Sharpe)**

Cypselus batesi SHARPE, 1904, B. B. O. C., XIV, p. 63 (type locality: Efulen, Cameroon).—*Micropus batesi* GYLDENSTOLPE, 1924, K. Svenska Vet. Akad. Handl., (3) I, No. 3, p. 264 (Kartushi). BANNERMAN, 1933, 'Birds Trop. W. Afr.,' III, p. 186.—*Apus batesi* BATES, 1930, 'Handbook Birds W. Afr.,' p. 225.

DISTRIBUTION.—Bates's black swift was known only from one locality in forested southern Cameroon until Count Gyldenstolpe secured one male specimen at Kartushi in the forested section of the Semliki Valley. It was shot from a party of swifts flying over. It might therefore be expected that *M. batesi* would be generally distributed throughout the forests of the Upper Congo. Such is probably not the case, for it is a small swift, easily recognized. Bates's type, a female, had the wing 132 mm., tail 68, with depth of fork in tail 27. Gyldenstolpe's male had wing 132 mm., tail 71.

Along the forest road from Irumu to the new post of Beni, during the two days' march before reaching Moera, in early October, 1926, I noticed them flying over on at least three different occasions, perhaps twenty to thirty individuals in all. No specimen could be secured, they kept too high above the trees; but their small size, blackish color, and unusually rapid wing-beats are distinctive. The tail is rather long, and is usually held closed so that the fork is not apparent. Nowhere else have I seen the species.

Bates¹ reported that the type specimen was caught alive in an abandoned swallows' nest plastered beneath an overhanging rock in a patch of forest. It had two white eggs, about 21 × 14.5 mm.

***Micropus unicolor poensis* (Alexander)**

Cypselus poensis ALEXANDER, 1903, B. B. O. C., XIII, p. 33 (type locality: Sipo, Fernando Po).

DISTRIBUTION OF THE SPECIES.—Madeira, the western Canaries,

¹ 1905, *Ibis*, p. 91.

Cape Verde Islands, Fernando Po, southwestern Kivu district, and Mlanje district of southern Nyasaland. *M. u. unicolor* (Jardine) breeds on Madeira and the Canary Islands, *M. u. alexandri* Hartert on several of the Cape Verde Islands. *M. u. poensis* may be restricted to Fernando Po, but we have three specimens from the Kivu district which are closely allied to it. It seems to me that *poensis* may not be truly conspecific with *unicolor*, and *achimodzi* Vincent¹ of Nyasaland is certainly a race of the same species as *poensis*. In my opinion *M. myoptilus* (Salvadori) of southern Abyssinia and East Africa is also a very close relative of *poensis*, though it was said to be very much smaller.²

As compared with skins of *poensis* from Fernando Po, the three male specimens collected by Rockefeller and Murphy at Kitutu, just west of the mountains northwest of Uvira, are slightly more blackish on crown, back, wings, and posterior underparts. Their wings measure 127–136 mm., equaling almost exactly those of Fernando Po specimens. Tails 58–72 mm. long, with depth of fork 21–31 mm. Fernando Po birds have tails 63–70 mm., depth of fork 24–30 mm. The outer rectrices of Kitutu birds have slightly narrower tips than those of specimens from Fernando Po.

These Kivu birds are closer to *poensis* than to *achimodzi*, with the type of which I have compared them. This, the only known specimen of *achimodzi*, is somewhat lighter and more grayish in general coloration than the Fernando Po birds, and has a slightly longer tail with the tips of outer feathers much narrower.

Micropus pallidus niansæ (Reichenow)³

Cypselus niansæ REICHENOW, 1887, J. f. O., p. 61 (type locality: Kagehi, S. shore L. Victoria).

DISTRIBUTION OF THE SPECIES.—Madeira, Canary Islands, southern Europe, to Egypt, Somaliland, and Northwest India. Four races are recognized, of which two seem to migrate into tropical Africa. *M. p. pallidus* (Shelley) of Egypt is apparently not migratory; but *M. p. brehmorum*, which breeds in Northwest Africa and adjacent islands, is supposed to visit Damaraland. A small Somali race, with wings only 152–156 mm., and tail about 64–65 mm., seems certainly to migrate to Lake Victoria and the vicinity of Lake Edward. This race was named

¹ 1933, B. B. O. C., LIII, p. 171 (Palombe, Mlanje distr.).

² It now appears likely that these small swifts from tropical Africa and Fernando Po all belong to the species *M. myoptilus*, which may range widely over the African continent. See Meinertzhagen, 1937, Ibis, pp. 757, 758; and Grant and M.-Praed, 1938, B. B. O. C., LVIII, p. 50.

³ Possibly this form is really a race of *M. apus*, and *shelleyi* synonymous with *niansæ*. See Grant and M.-Praed, 1938, B. B. O. C., LVIII, p. 50, who regard *niansæ* however as a distinct species.

somalicus by Stephenson Clarke,¹ but *M. p. niansæ* seems to be a much older name.

The type of *niansæ* has kindly been loaned to me in Belgium by Professor Stresemann, and I find its wing to measure 152 mm., tail 64, with fork 19 mm. deep. It was collected on November 16. The only Congo specimen of which I know is a non-breeding female which I obtained near the upper Semliki River on January 26, 1927. Its wing measures 157 mm., tail 65, with fork 19 mm. deep. I regret that I have not been able to compare it directly with the type, but feel that they must belong to the same race. My example was feeding over a grassy plain in company with a number of palm-swifts.

[*Micropus pallidus brehmorum* (Hartert)]

Apus apus brehmorum HARTERT, 1901, in Naumann, 'Naturg. Vög. Mitteleuropas,' New Ed., IV, p. 233 (type locality: Madeira).

The breeding range of *M. p. brehmorum* is in North Africa from Tunis to Morocco, Madeira, and the Canaries, and perhaps includes the southern Sahara. This race is migratory and has been found as far south as Benguela and Damaraland.² It may therefore be expected during the northern winter in the Lower Congo. In color it is rather dark, with wings 164–178 mm., and is not readily distinguished from *M. apus*,

***Micropus apus apus* (Linnæus)**

Hirundo apus LINNÆUS, 1758, 'Syst. Nat.,' 10th Ed., p. 192 (Europe; restricted type locality: Sweden).—*Cypselus apus* SHELLEY, 1890, Ibis, p. 168 (Yambuya). SHARPE, 1890, in Jameson, 'Story of Rear Column,' p. 416.—*Micropus apus* HARTERT, 1892, 'Cat. Birds Brit. Mus.,' XVI, p. 442. BEQUAERT, 1922, Bull. A. M. N. H., XLV, p. 310.—*Apus apus* REICHENOW, 1902, 'Vög. Afr.,' II, p. 377. MOURITZ, 1914, Ibis, p. 33 (Kalonga). DROST, 1933, Vogelzug, IV, p. 33 (Tumba Kapia near Luebo).—*Apus apus apus* MEINERTZHAGEN, 1922, Ibis, p. 36. GROMIER, 1924, Rev. Fr. O., VIII, p. 461 (Kivu Volcanoes). GROTE, 1930, Mitt. Zool. Mus. Berlin, XVI, p. 54. DUPOND, 1935, Gerfaut, p. 123 (Djongo Sanga near Basongo). FAKLER 1935, Vogelzug, VI, p. 132.—*Micropus apus apus* W. L. SCLATER, 1924, 'Syst. Av. Æth.,' pt. 1, p. 256. SCHOUTEDEN, 1936, Ann. Mus. Congo, Zool., I, f. 2, p. 95 (Uelle).

SPECIMENS.—Avakubi, 2 ♂, Feb. 4, Oct. 4; ♀, Feb. 4. Medje, ♂, Oct. 11. Dungu, ♀, Feb. 23. Faradje, ♂, Mar. 20. Immature specimens, which cannot be identified positively as to subspecies, were collected as follows: Avakubi, 2 ♂ im., Oct. 10, 13; 3 ♀ im., Oct. 10, 22. Medje, 2 ♂ im., Oct. 11. Some of these may be *M. a. pekinensis*.

¹ 1919, B. B. O. C., XL, p. 49 (Bihendula, Brit. Somaliland).

² Hartert, 1912, 'Vög. pal. Fauna,' II, p. 839.

DISTRIBUTION OF THE SPECIES.—Europe and Asia, from Great Britain to eastern China, breeding also in North Africa and from Abyssinia to Kenya Colony. Palaearctic birds migrate to South Africa. In my opinion there are scarcely more than three races, for I regard the *barbatus* group as specifically distinct.¹ *M. a. apus* breeds over the whole of Europe north to 70° in Scandinavia and Archangel in Russia, also from Morocco to Tunis. *M. a. pekinensis* breeds from the southern Caucasus and Persia to eastern China. In this eastern race all the upperparts, but especially the forehead, are lighter than in the European form. The wings, and the secondaries in particular, are of a lighter, grayer brown, and the white throat-patch extends higher up toward the cheeks. *M. a. shelleyi*, which breeds from northern Abyssinia to Kenya Colony, resembles *pekinensis* in color, though sometimes slightly blacker, but has wings only 150–159 mm. long. The wings of *apus* and *pekinensis* collected by me in the Congo measure 162–174 mm.

In life the eastern and western Palaearctic races cannot be distinguished. In the Congo they may mingle in the same flock. While these swifts pass the northern winter in Africa, the great majority of them spend the middle of that season south of the equator. Thus in the northeastern Congo they are seen at two separate periods while passing through. They arrive early, reaching Faradje by August 10. It is in this month and again in March and April that *Micropus apus* is most abundant in the Uelle district. Yet it is a difficult bird to collect, usually flying high and at great speed.

Toward October most of them disappear from the Uelle, and the latest was noted on November 22. They reappear late in February or in early March, and then remain in evidence for about a month. The trip back to Europe seems to take but little time.

At Avakubi in the forest belt they also arrive in August—once as early as the 8th—and become more and more common up into October. Even there, however, only a few remain through the period of northern winter. The majority pass on to the region south of the forest, and then in early February return again on their way north. At Lukolela in 1930 they were first noted on August 30, a flock of fifty catching winged termites in the rain. Others were seen frequently until December 28, and then no more until February 26, 1931. *Micropus apus* reaches the Orange River and Natal, but the belief that it also goes to Madagascar

¹ See however Meinertzhagen, 1922, *Ibis*, pp. 36–43; Hartert and Steinbacher, 1935, 'Vög. pal. Fauna,' *Ergbd.*, p. 354.

is erroneous. Two specimens banded at different localities in Germany have been recovered in the Kasai district.

Even at seasons when they are present in the Congo they seem to appear very irregularly. None may have been noticed for weeks, then there comes a day when hundreds are seen in the sky and some come shooting down to within ten yards of the ground. This generally happens in the morning, or on cloudy or even rainy days, when winged ants or termites are swarming. Out of seventeen stomachs examined, twelve contained winged ants, five, winged termites, and in only one case were other small insects, probably beetles, mixed with the ants.

Shortly after sundown parties of European swifts are often seen passing over as if on the way to roost. Usually there are no cliffs where they could sleep, and I suppose they must go into hollow trees. Petit¹ told of seeing a flock of three hundred swifts, which he called "*caffer*," pass the night in a colony of weavers' nests. Nothing of this sort has ever come to my attention.

***Micropus apus pekinensis* (Swinhoe)**

Cypselus pekinensis SWINHOE, 1870, P. Z. S. Lond., p. 435 (type locality: Peking, China).

SPECIMENS.—Faradje, ♂, Apr. 12; 3 ♀, Mar. 17, 20, Apr. 12. Niangara, 2 ♂, Mar. 28.

DISTRIBUTION.—In nesting time from the southern Caucasus and Palestine to Eastern China. Migrates not only to northwest India, but in greater numbers to Africa, having been taken on the White Nile at Gondokoro, in the Upper Congo, Tanganyika Territory, the Transvaal, and the Kalahari.

Comparison of these six adults from the Uelle with specimens taken in June in China shows a close agreement in size and coloration. Two of the Uelle males are a little bit dark and might be regarded as *M. a. marwitzi* Reichenow, if that supposedly intermediate race could be upheld. The wings of the three males measure 166, 169, and 172 mm., those of the three females 162, 167, and 171.

On March 3, 1927, I collected two more males of *pekinensis* about 10 miles south of the new post of Beni; and it seems that this eastern race must be a common migrant in the southeastern Congo. It is very likely that some of the references in my synonymy of *Micropus a. apus* were really based on specimens of *pekinensis*.

¹ 1899, Mem. Soc. Zool. France, XII, p. 74.

[*Micropus apus shelleyi* (Salvadori)]¹

Cypselus shelleyi SALVADORI, 1888, Ann. Mus. Civ. Genova, XXVI, p. 227 (type locality: Dembi, Shoa).

Shelley's swift appears to breed from northern Abyssinia to the highlands of Kenya Colony. In the latter country I have taken specimens with enlarged gonads in June and July. It is not known to be migratory, and I doubt whether it reaches the eastern Congo. *Micropus nakuruensis* (van Someren) is almost certainly synonymous with *M. a. shelleyi*.

***Micropus barbatus roehli* (Reichenow)**

Apus roehli REICHENOW, 1906, O. Mb., p. 172 (type locality: Usambara).—*Cypselus apus* DUBOIS, 1905, Ann. Mus. Congo, Zool., I, f. 1, p. 33 (Ruzizi-Kivu).

DISTRIBUTION OF THE SPECIES.—Cape Province, Natal, and Transvaal, north to Kenya Colony and the Kivu district; also on Madagascar; and in the highlands of Cameroon and Fernando Po.

M. b. barbatus (Scater) of South Africa, heretofore often regarded as a race of *M. apus*, has wings 174–195 mm., tail about 75–80 mm. The shaft-stripes on throat are usually very distinct. That this swift is really specifically distinct from *apus* is indicated by the occurrence of a very similar form in East Africa, breeding alongside *M. apus shelleyi*. This is *M. barbatus roehli*, with wings 160–176 mm., tail 68–77. In color it resembles typical *barbatus*, but is slightly smaller. On the other hand, it is distinctly larger than *shelleyi* and usually blacker on the back. Other forms which I regard as races of *M. barbatus* are *M. b. lawsonæ* Vincent² of Nyasaland, *M. b. balstoni* (Bartlett) of Madagascar, and *M. b. sladeniæ* (O.-Grant) of Fernando Po and the Bakossi district of Cameroon.

The resemblance between *M. b. roehli* and *M. a. apus* is considerable, but in adults the feathers of the lower breast and flanks have more conspicuous light tips in *roehli*, and the fork of the tail is deeper in *apus*: 27–33.5 mm., as compared with 20–27 mm. in *roehli*.

Dr. van Someren³ first pointed out that this large swift nested in Kenya Colony together with *shelleyi*. Although Meinertzhagen⁴ denied this distinction, I convinced myself of its reality in 1926 by collecting breeding males of both species in Kenya Colony, near Lake Naivasha and at Maji Mazuri. *Micropus nakuruensis* (van Someren) is probably a synonym of *shelleyi*.

¹ Grant and M.-Praed, 1938, B. B. O. C., LVII, p. 50, are convinced that *shelleyi* is a synonym of *niansæ*.

² 1933, B. B. O. C., LIII, p. 240 (Palombe, Mlanje distr.).

³ 1922, Nov. Zool., XXIX, p. 87; 1932, idem, XXXVII, p. 291.

⁴ 1922, Ibis, pp. 39, 40.

In the original description of *roehli*, the wing-length was given as only 160 mm.; but it really is 165 mm., as I found on examining the type. I regard *kittenbergeri* Madarász¹ as a synonym of *roehli*, although the wing-length was stated as 175–180 mm.

Micropus b. roehli inhabits eastern Africa, from Usambara and the highlands of Kenya Colony to the Kivu district of the Belgian Congo. In the Congo Museum there are two mounted specimens from the "Ruzizi-Kivu" district. My own examples were taken as follows: two non-breeding females were shot from a party of about ten, feeding over a ridge at 5000 feet, some three miles east of Rutshuru, on April 2, 1927. On July 17 of the same year a male and a female were secured at 6900 feet in the mountains west of the Ruzizi Valley. The male showed slight enlargement of the testes, and was carrying a ball of insects in his mouth, as though to feed young. The female's ovary was small. These two birds, with a half-dozen others of their kind and a number of swallows, were attracted by a grass fire. The species may be expected to nest in crevices of rocky cliffs, and is certainly resident. It would seem to nest in the Kivu district toward June.

***Micropus æquatorialis æquatorialis* (von Müller)**

Cypselus æquatorialis J. W. VON MÜLLER, 1851, Naumannia, I, pt. 4, p. 27 (type locality: Abyssinia). O.-GRANT, 1908, Ibis, p. 313 (N. W. of L. Tanganyika). —*Apus schubotzi* REICHENOW, 1908, O. Mb., p. 161 (type locality: Ruwenzori, 2200 m.); 1911, 'Wiss. Ergeb. D. Z.-Afr. Exp.,' III, p. 295. SCHOUTEDEN, 1918, Rev. Z. A., V, p. 254 (Lufungula; Masidongo; Lume). —? *Micropus (æquatorialis?)* SCHOUTEDEN, 1923, Rev. Z. A., XI, p. 327 (Macaco). —*Micropus æquatorialis schubotzi* W. L. SCLATER, 1924, 'Syst. Av. Æth.,' pt. 1, p. 259.

DISTRIBUTION OF THE SPECIES.—From Eritrea and Abyssinia south to southern Rhodesia, Angola, and Southwest Africa; also Darfur and Sierra Leone. Largely restricted to high mountains and their vicinity, nesting only where there are high cliffs. *M. æ. æquatorialis* extends from northeastern Africa to Ruwenzori and Lake Tanganyika, and south of the Congo basin it extends westward to Tala Mugongo and Benguella; but within our limits it seems to occur only in the mountains along the eastern border. *M. æ. reichenowi* (Neumann) of Donye Erok, Tanganyika Territory, and perhaps Usambara appears to be a valid race, more brownish gray beneath. The type is not in normal adult plumage. The pale grayish *M. æ. bradfieldi* Roberts is restricted to Southwest Africa.

Well to the north of the Congo the species again extends westward,

¹ 1910, Archivum Zool. Budapest, I, p. 177 (Ngare Dobash, E. of L. Victoria).

reaching Sierra Leone; and *M. æ. lowei* Bannerman¹ is more whitish beneath than the typical race, with the white throat-patch clearly defined. *M. æ. furensis* Lynes² is remarkably whitish beneath, and breeds supposedly in the high mountains of Darfur, although non-breeding examples of typical *æquatorialis* have also been taken there.

The races do not differ appreciably in wing-length, and seven males from Ruwenzori have this measurement 204–210 mm., a female 204 mm.

On Ruwenzori *M. æ. æquatorialis* is very abundant and no doubt breeds in cliffs around 8000 or 10,000 feet. At Kalongi, a group of huts at 7000 feet overlooking the gorge of the Butahu, they would sometimes gather in flocks of a hundred or two, feeding mainly on bees closely allied to the hive-bee, but their appearances were irregular. Days might pass without their being seen, and they usually showed themselves only during the morning, from 8 to 10 o'clock. Sometimes they were accompanied by a few larger white-bellied swifts.

Doubtless they descend every day into the adjacent lowlands to feed, for we saw them also in the upper Semliki Valley and along the northern shore of Lake Edward. Despite the very large size of *æquatorialis*, it is not always readily distinguished at a distance from *Micropus apus*. So when parties of large black swifts were seen flying over the new post of Beni, some 35 miles from the base of Ruwenzori, late in the afternoon, I did not feel entirely sure of their identity until a specimen was shot. It proved to be *æquatorialis* and showed that the feeding range extends to the forest country west of Beni. Other swifts which appeared to be *æquatorialis* were also seen on the grassy highlands northwest of Lake Edward, at about 7800 feet. But none were noticed—or at least identified—among the Kivu Volcanoes, although they must occur in the mountains northwest of Lake Tanganyika. Carruthers's specimen was taken between Uvira and Baraka.

The seven examples taken on the western slope of Ruwenzori in December were all fully adult but non-breeding. A male secured at Beni on February 22 had gonads much enlarged, and salivary glands prominent; so by then breeding must have commenced.

***Micropus melba melba* (Linnæus)**

Hirundo melba LINNÆUS, 1758, 'Syst. Nat.,' 10th Ed., p. 192 (type locality: Straits of Gibraltar).—*Micropus melba melba* SCLATER AND M.-PRAED, 1919, *Ibis*, p. 653 (Ruwenzori). W. L. SCLATER, 1924, 'Syst. Av. Æth.,' pt. 1, p. 258 (Lado

¹ 1920, B. B. O. C., XLI, p. 2 (Mahera, Rokelle R.).

² 1920, B. B. O. C., XLI, p. 34 (El Fasher, Darfur).

distr.; Ruwenzori). SCHOUTEDEN, 1936, Ann. Mus. Congo, Zool., I, f. 2, p. 95 (Uelle).

SPECIMENS.—Faradje, 9 ♂, Jan. 14, Dec. 22, 26; 5 ♀, Jan. 14, Dec. 26.

DISTRIBUTION OF THE SPECIES.—Europe and North Africa, east to the Caucasus, Turkestan, Himalayas, India, and Ceylon. The Eurasian race, *M. m. melba*, migrates to tropical Africa, and there are other forms breeding in the mountains of northeast, east, and southern Africa, as well as on Madagascar. Eight or nine races are recognizable, of which at least four are resident in the Ethiopian Region.¹ *M. m. archeri* Hartert breeds in the mountains of Somaliland, *M. m. africanus* (Temminck) in those from Abyssinia to South Africa, *M. m. maximus* on Ruwenzori, and *M. m. striatus* Meinertzhagen² on Mt. Kenya. *M. m. marjoriæ* Bradfield³ is a doubtful race of Southwest Africa.

The characters of *archeri* are its paler color as compared with the typical race, and shorter wings, 195–207 mm. The coloration of *africanus* is deeper than that of *melba*, the brown on chest-band and flanks more extensive, and its wings shorter, 197–210 mm. Still deeper in color is *maximus*, with very long wings, 228–233 mm. The Mt. Kenya form, *striatus*, is known from only a single female, with underparts more streaked than *maximus*, and wing 220 mm. The supposed Kalahari race, *marjoriæ*, was described simply as paler than *africanus*.

All our specimens from Faradje are *M. m. melba*, with wings of males 218–225 mm., of females 212–224. This subspecies migrates south in Africa to the Uelle and Lado districts and Ruwenzori. The British Museum has single examples from Kajo Kaji in March and from Ruwenzori in February. Our observations during three seasons show that the Palaearctic race comes to the Uelle regularly and in numbers. I first noted these large swifts near Dungu on January 23, 1911. The following year, on the morning of January 14, a few were flying over just northwest of Faradje. Later came a flock of 50 or 60, and in the afternoon a grass-fire attracted hundreds. Most of them kept so high as to be far out of gunshot, but a few came lower, and two were shot. More were noticed in March, sometimes flocking with *Micropus apus*. The last mixed flock was seen on March 18, and a single *melba* on March 24, 1912. During the dry season of 1912–1913 the Alpine swift was first observed on December 22, and again on the 26th, when a flock of two or three hundred came down to feed over the Dungu River at Faradje. For

¹ See Meinertzhagen, 1922, Ibis, p. 34; 1925, Ibis, pp. 318, 319. Also Hartert, 1928, Nov. Zool., XXXIV, p. 363.

² 1937, B. B. O. C., LVII, p. 69 (Nanyuki, Kenya Colony).

³ 1925, 'Descr. New Races Kalahari Birds Mammals,' p. [1] (Quickhorn).

about half an hour they sped back and forth without a single call-note, dipping occasionally in the water.

The stomachs of the birds feeding above a grass-fire contained numbers of small grasshoppers, some small hemiptera, a few small beetles, and a leaf-hopper. In the case of eleven birds taken over the Dungu River, the stomach contents were almost exclusively of hemiptera, especially one bright green species which must have been present in enormous numbers.

[*Micropus melba africanus* (Temminck)]

Cypselus alpinus africanus TEMMINCK, 1815, 'Man. d'Orn.,' p. 270 (type locality: South Africa).—? *Cypselus africanus* JACKSON, 1906, *Ibis*, p. 521 (Katwe; Toro).

The Alpine swift of South Africa ranges northward to Mossamedes, and in the mountainous parts of eastern Africa to Abyssinia. The only specimens of *africanus* thus far recorded from the immediate vicinity of the Congo are those collected by Archer at Katwe and in Toro, on February 4 and March 22. He remarked that they were seen in large flocks, and I am inclined to think that they will prove to be *M. m. maximus*. On the Luvua River, September 28, 1883, Böhm¹ noted that he saw "large swifts, snow-white below, high in the air, calling like *Ceryle*." It would not be surprising if *M. m. africanus* inhabited the mountains of Marungu. Winterbottom² has reported it from the Loangwa Valley.

Micropus melba maximus (O.-Grant)

Cypselus maximus O.-GRANT, 1907, B. B. O. C., XIX, p. 56 (type locality: E. slopes of Ruwenzori, 10,000–12,000 ft.); 1910, Tr. Z. S. Lond., XIX, p. 428 (Mubuku Valley). HARTERT, 1912, 'Vög. pal. Fauna,' II, p. 836.—*Apus maximus* REICHENOW, 1911, 'Wiss. Ergeb. D. Z.-Afr. Exp.,' III, p. 295.—*Micropus melba maximus* W. L. SCLATER, 1924, 'Syst. Av. Æth.,' pt. 1, p. 259. GYLDENSTOLPE, 1924, K. Svenska Vet. Akad. Handl., (3) I, No. 3, p. 265, footnote (Birunga Mts.). CHAPIN, 1928, Nat. Hist., XXVII (1927), p. 623 (W. Ruwenzori). SCHOUTEDEN, 1932, Rev. Z. A., XXII, p. 125 (Mt. Niragongo?). BOWEN, 1933, Ecology, XIV, p. 261, Fig. 7A.—*Apus melba maximus* HARTERT AND STEINBACHER, 1935, 'Vög. pal. Fauna,' Ergbd., p. 354.

DISTRIBUTION.—The Ruwenzori Range, where it nests and roosts at altitudes above 10,000 feet, and possibly the Kivu Volcanoes. In the Mubuku Valley, East Ruwenzori, the British Museum Expedition found it about cliffs at 13,000 to 14,000 feet and coming down to others at 10,000 feet. In April or May Woosnam saw swifts over the plains near Lake Edward which he took to be *maximus*.

On the western slopes the Ruwenzori alpine swift is as common as on

¹ 1886, J. f. O., p. 420.

² 1936, *Ibis*, p. 775.

the eastern. Though seen only in relatively small numbers at Kalongi (7000 feet), in company with *æquatorialis*, it was abundant near the mountains rising to 14,900 feet just west of Mt. Stanley. Here almost every morning they would assemble in great numbers, a hundred or more, skimming and circling in the sun above the cliffs, and giving occasionally a series of rather weak chirps or peeps, repeated less rapidly than the call of the European black swift.

These assemblies began about 7 A.M., and lasted for an hour or two, the birds then disappearing for the rest of the day. Only occasionally would one be seen in the late afternoon. While disporting themselves in the morning sun the swifts did not feed, and perhaps there were few or no insects to be had at these cold heights.

We have plenty of evidence that this alpine swift spends most of its days, and gets most of its food, at lower levels. Besides seeing them at 7000 feet near the Butahu gorge, we noted them in small numbers over a grassy ridge at 5000 feet near the south end of the range, on the upper Semliki River at 3000 feet, and at Kasindi Landing on Lake Edward.

On the open grassy highlands northwest of Lake Edward, at about 7800 feet, it was a fairly frequent experience to see alpine swifts, singly or up to ten together, shooting by at terrific speed. Toward nine in the morning they were traveling westward, at three in the afternoon toward the northeast. After a few failures with the shotgun one was tempted to estimate their velocity at about a hundred miles per hour.

Sage saw one near the summit of Mt. Mapanda, west of Lake Edward; and a little after 8 o'clock on the morning of March 29, a party of a dozen appeared at the north end of the Kasali Mountains, in the Rutshuru Valley, where they were catching winged termites. This was at 3700 feet, and at least 80 miles from their home on Ruwenzori. But it would be only an hour's journey for them. I conclude these birds came from Ruwenzori, for none were seen during our stay on the Kivu Volcanoes.

Of the four specimens secured between December and March, none was in full condition to breed, so I do not feel certain as to the season at which they nest. No doubt they roost in fissures in the cliffs at all seasons, but I could not locate these retreats.

***Cypsiurus parvus brachypterus* (Reichenow)**

Tachornis parvus brachypterus REICHENOW, 1903, 'Vög. Afr.,' II, p. 386 (type locality: Chinchoxo, Portuguese Congo. Also from the Congo R.). LÖNNBERG, 1907, Arkiv f. Zool., III, No. 21, p. 10 (Mukimbungu or Kingoyi). SCHOUTEDEN, 1923, Rev. Z. A., XI, pp. 327, 394 (Luebo; Makumbi; Basongo; Kwamouth);

1924, idem, XII, p. 267 (Kisantu; Leopoldville); 1925, idem, XIII, p. 11 (Bolobo); 1926, idem, XIII, p. 193 (Banana; Tshela).—*Cypselus ambrosiacus* HARTLAUB, 1861, J. f. O., p. 103 (Congo R.).—*Cypselus parvus* SHARPE AND BOUVIER, 1876, Bull. Soc. Zool. France, I, p. 302 (Shiloango R.). SCHUBOTZ, 1921, 'Tageb. Emin Pascha,' VI, p. 252 (Bellima).—*Tachornis gracilis* HARTERT, 1892, 'Cat. Birds Brit. Mus.,' XVI, p. 464 (Landana).—*Tachornis parvus brachypterus* GRANT, 1915, Ibis, p. 310.—*Tachornis parvus* BEQUAERT, 1922, Bull. A. M. N. H., XLV, p. 310. SCHOUTEDEN, 1924, Rev. Z. A., XII, p. 415 (Eala).—*Tachynautes parvus brachypterus* BANNERMAN, 1922, Rev. Z. A., X, p. 134. W. L. SCLATER, 1924, 'Syst. Av. Æth.,' pt. 1, p. 261. SCHOUTEDEN, 1936, Ann. Mus. Congo, Zool., I, f. 2, p. 96 (Bambili; Poko; Rungu).—*Tachornis apus* SCHOUTEDEN, 1930, Bull. C. Z. C., VII, p. 64 (Buta).—*Cypsiurus parvus brachypterus* BANNERMAN, 1933, 'Birds Trop. W. Afr.,' III, p. 197.—*Cypsiurus parvus uamensis* STONE, 1936, Proc. Acad. Nat. Sci. Phila., LXXXVIII, p. 561 (Ekibondo).

SPECIMENS.—Kinshasa, ♂, Dec. 20. Bengamisa, ♀, Sept. 29. Avakubi, ♀, Sept. 2. Medje, 2 ♂, 2 ♀, Jan. 16, Mar. 23; 3 ♂ juv., Jan. 22, Sept. 22; 2 ♀ juv., Jan. 18, Sept. 22. Niangara, 2 ♂, Jan. 20, May 21. Dungu, ♀, June 23. Faradje, 2 ♀, Feb. 14, Oct. 20.

ADULTS.—Iris dark brown, bill black, feet blackish gray.

DISTRIBUTION OF THE SPECIES.—The greater part of tropical Africa, from Senegal to Darfur and Abyssinia, south to Damaraland and the lower Zambesi Valley; also on Madagascar. Seldom seen in highlands above 5000 feet.

There is certainly geographic variation in the length of wing and general coloration among the African palm-swifts, but the exact limits of the subspecies are difficult to outline. Four races are all I would recognize on the continent at present.

C. p. parvus (Lichtenstein)¹ is a light-colored, long-winged race, extending over the dry region from Senegal to the Blue Nile. Its wing measures about 126–140 mm.

C. p. brachypterus (Reichenow), of the western coastal region from Sierra Leone to northern Angola, also on Fernando Po, and inland from the Cameroon and Gaboon to the Upper Uelle, the whole Upper Congo forest, and the Kasai district, is dark-colored, with shorter wings, 120–135 mm.

C. p. myochrous (Reichenow), ranging from Lake Albert to Lake Tanganyika, the Zambesi, and perhaps southern Angola and northern Damaraland, is again lighter gray, but not so pale on the throat as *parvus*, with wings 124–143 mm. The throat in some specimens shows dusky streaking or mottling which resembles that of the following race.

¹ 1823, 'Verz. Doubl.,' p. 58 (Nubia).

C. p. læmostigma (Reichenow),¹ described from southern Somaliland, was supposed to differ from *myochrous* in the broad dusky streaking of its throat. This character is often, though not always, well marked in specimens from the coast of East Africa. Their wings measure about 125–135 mm., and their upperparts may be slightly darker than in *myochrous*. The validity of the race is still doubtful.

C. p. gracilis (Sharpe), living on Madagascar and the Cormoros, is a very dark form with heavily spotted throat.

In the northern Congo the average difference in wing-length between the sexes does not exceed 3 mm., males generally larger. Occasional specimens of all the races show exceptionally short wings, but this may often be due to retention of juvenal primaries. Within Congo territory the wing-length of *brachypterus* is about 120–125 mm. in the region from Banana to Stanley Pool, 122–132 between Lukolela and Lulua-bourg, and 127–135 between Medje and Faradje. I have been tempted to separate Uelle birds as *C. p. uamensis* (Reichenow), but I cannot draw a line to divide such a race from *brachypterus*. Lower Congo specimens seem a little paler and grayer than those of the forested Upper Congo, and there may be an unnamed pale grayish race from the coast of Angola to Swakopmund.

This palm-swift occurs both in savannas and in clearings of the Congo forest, especially where there are oil-palms. Its local abundance often depends very much upon the presence of palms, even in the Upper Uelle, although there it has learned to use the thatch of houses as a substitute nesting site. In many forested regions of the Congo it is a rare bird, and we noticed practically none during a long trip down the Aruwimi River. Bates saw palm-swifts for the first time at Bitye in the Cameroon forest in 1910.

Nowhere did we see greater numbers of these birds than over Banana Point, in June, 1909, circling about the cocoanut palms, where doubtless they breed abundantly. At Kinshasa and many places in the Lower Congo (Matadi, Boma, Malela) they are also common, and to make use of the fan palms (*Hyphæne guineensis*) as nesting sites. At Lukolela they use the *Borassus* palms.

At Stanleyville we found them common about the station, for it was well planted with oil-palms. They go chasing one another about in twos and threes, with shrill, protracted notes recalling those of *Micropus apus* about its nesting grounds, though weaker. At Avakubi, too, they were of fair abundance; but it is along the northern border of the forest,

¹ 1905, 'Vög. Afr.', III, p. 828 (Bardera, S. Somaliland).

so rich in oil-palms, that one finds them most numerous. On the northeastern frontier of the Congo they are again local, and most apt to be noted where there are *Borassus* palms. They may be seen at all times of day, but are most active, or perhaps they fly lower, in the early morning and late afternoon. In flight the tail is generally so tightly closed that the deep fork cannot be seen at all, though it is opened at times in making turns or quick descents.

In the Kasai district palm-swifts are likewise numerous, and Father Callewaert collected well-grown nestlings in June and July, the early part of the dry season. Nesting probably continues during a much longer period of the year, for at Kisantu Dr. Schouteden obtained nestlings in November, and at Lukolela I found them in March, September, and December.

In the Ituri and Uelle, likewise, the palm-swifts seem to nest throughout the year, for in the forest area we found nests in January and September, while in the savannas to the northward they were likewise breeding in January, February, May, June, and October. Their nests are not difficult to locate, for the old birds swoop upward and alight, from time to time, among the palm-leaves. Closer scrutiny usually reveals them clinging vertically against the nest, wing-tips and tail pointing downward. Nests are tiny hammock-shaped structures of feathers glued against the palm-leaves, in places where they offer good shelter from rain. They are so small—about 9 cm. high and 5.5 cm. broad—that the incubating bird could not sit in them, even if it knew how; and the normal set of two elongated white eggs, glued firmly with saliva in an upright position, fills them completely.¹ Two eggs of a set from Faradje both measure 18.4×12.3 mm. Bannerman gave measurements of 18.4×12.1 .

Several nests may be built close together, and the feathers employed must be caught in the air. In the northeastern Congo they were most often those of *Vinago calva*, but feathers of domestic fowls, of weavers, and other birds, as well as an occasional bit of plant pappus, were also noted. The under side of a *Borassus* leaf is an ideal location.

Where palms are scarce these swifts will sometimes nest in the grass thatch of houses. One such nest near Faradje held eggs with well-formed embryos, yet the birds came to it only in early morning and late

¹ The gluing of the eggs in the nest seems first to have been described by A. E. Brehm (1853 J. f. O. Extraheft, p. 95). It has since been confirmed by many observers. See especially Schuster, 1912, O. Mb., pp. 121-126; Loveridge, 1917, Mem. Proc. Manchester Lit. Phil. Soc., LXI, No. 7, pp. 1-3; 1919, Journ. E. Afr. Ug. N. H. Soc., No. 14, pp. 412-414; Butler, 1918, Sudan Notes, Khartoum, I, pp. 161, 162; 1919, Ibis, p. 654; Paget-Wilkes and Sladen, 1930, Ibis, p. 453; Belcher, 1930, 'Birds of Nyasaland,' p. 153; Moreau, 1932, Ibis, p. 657.

afternoon, as though the sun kept it properly warmed during most of the day. The incubating bird captured at night was a female. In another case, at Niangara, a male was found on the eggs at night.

Young nestlings are perfectly naked, with dusky skin and closed eyes. From the minute of hatching they instinctively grasp the nest so firmly that they cannot fall out. They do not sit crosswise in the nest, but squat with heads up and breasts against the back of the nest. There is no true natal down, but as the first plumage grows out there are pale gray downy feathers along the sides of the crown, scapulars, and rump, which seem to develop faster than the contour plumage. The juvenal plumage has every feather narrowly tipped or margined with rufous.

Our palm-swifts' stomachs contained small insects, sometimes winged ants in numbers, less often small beetles. The mouth of one female, evidently feeding young, was filled with small flies, winged ants, tiny beetles, and other minute insects.

Cypsiurus parvus myochrous (Reichenow)

Cypselus myochrous REICHENOW, 1886, J. f. O., p. 116 (type locality: Karema, Tanganyika Terr.). DUBOIS, 1886, Bull. Mus. Roy. Hist. Nat. Belg., IV, p. 148 (L. Tanganyika). MATSCHIE, 1887, J. f. O., p. 152 (Lusinga).—*Cypselus parvus* SCHALOW, 1886, J. f. O., p. 417.—*Tachornis parvus myochrous* REICHENOW, 1903, 'Vög. Afr.', II, p. 385; 1911, 'Wiss. Ergeb. D. Z.-Afr. Exp.', III, p. 296 (Semliki Plain on L. Albert). SCHOUTEDEN, 1918, Rev. Z. A., V, p. 254 (Masidongo; Lume).—*Tachornis parva* var. *myochrous* DUBOIS, 1905, Ann. Mus. Congo, Zool., I, f. 1, p. 33 (Karema).—*Tachynautes parvus myochrous* GYLDENSTOLPE, 1924, K. Svenska Vet. Akad. Handl., (3) I, No. 3, p. 264 (Beni).

DISTRIBUTION.—Uganda, interior of Kenya Colony, and Tanganyika Territory, southward to the lower Zambesi, and westward apparently to Benguella and Damaraland. In Congo territory it occurs along the eastern border, from Lake Albert and the Semliki to the western shore of Lake Tanganyika; but records are wanting from the Kivu highlands, as well as those of the Upper Katanga.

Professor Reichenow reported two specimens from the lower Semliki Valley, but added that in body-color they inclined toward the darker *brachypterus*, though the wings measured 130 and 132 mm. I have also taken a female at Kasenyi on Lake Albert, with wing 133, which is slightly lighter than *brachypterus*, and a male and female on the upper Semliki River, both with wings 131 mm. A male secured by Pilette in the Semliki Valley has wing 140. A male from the northeast shore of Lake Tanganyika has dusky mottling on the throat, wing 136 mm. So also

has one from Moba, on the southwest shore, with wing 137. In Marungu, Rockefeller and Murphy collected a series of ten, at altitudes between 3800 and 4550 feet. Of these, five adult males have wings 124–143 mm., four adult females 126–132. Their throats are rather uniform gray, but in a few cases show signs of dusky mottling. Somewhere near the Lualaba River *myochrous* must intergrade with *brachypterus*.

The habits of *myochrous* are exactly like those of *brachypterus*. Its eggs may be slightly larger. From Nyasaland, Belcher gave dimensions as 19×12.5 mm.

ORDER COLIIFORMES

FAMILY Coliidae. COLIES OR MOUSE-BIRDS

KEY TO THE GENERA OF COLIIDÆ

- Rectrices extremely narrow, median pair less than 8 mm. wide at base; wing-tip more pointed, outermost primary extending to within less than 17 mm. of longest primaries; lower mandible black, base of maxilla soft and red (in life) *UROCOLIUS*, p. 447.
- Rectrices broader, median pair more than 8 mm. wide at base; wing-tip more rounded, outermost primary more than 22 mm. shorter than longest primary; lower mandible light-colored, base of maxilla not soft or red . . . *COLIUS*, p. 469.

KEY TO THE CONGO SPECIES OF COLIUS

- Whole rump bright chestnut *C. castanotus*.
- Rump dull brown like the back *C. striatus*.

Colius striatus nigricollis Vieillot

Colius nigricollis VIEILLOT, 1817, 'Nouv. Dict. Hist. Nat.,' VII, p. 378 (type locality: Malimbe, Portuguese Congo). HARTLAUB, 1857, 'Syst. Orn. Westafr.,' opp. p. lix (Congo). SHARPE, 1873, P. Z. S. Lond., p. 717 (Congo R.); 1890, in Jameson, 'Story of Rear Column,' p. 399 (Matadi—Stanley Pool); 1892, 'Cat. Birds Brit. Mus.,' XVII, p. 341 (in part). SHELLEY, 1890, Ibis, p. 168 ("Yambuya"). OUSTALET, 1893, Naturaliste, VII, p. 126 (Ubangi R.; Kemo R.). REICHENOW, 1902, 'Vög. Afr.,' II, p. 203 (in part). DUBOIS, 1905, Ann. Mus. Congo, Zool., I, f. 1, p. 34 (in part. Kisantu; Mayombe). LÖNNBERG, 1907, Arkiv f. Zool., III, No. 21, p. 8 (Kingoyi; Mukimbungu). SCHOUTEDEN, 1920, Rev. Z. A., VII, p. 190 (Temvo); 1926, idem, XIII, p. 193 (Ganda Sundi; Moanda).—*Colius leucotis* (?) JOHNSTON, 1884, 'River Congo,' p. 367.—*Colius striatus nigricollis* NEUMANN, 1904, J. f. O., pp. 404, 405 (in part). C. GRANT, 1915, Ibis, p. 401 (in part). SCHOUTEDEN, 1923, Rev. Z. A., XI, p. 394 (Kwamouth). W. L. SCLATER, 1924, 'Syst. Av. Æth.,' pt. 1, p. 265 ("lower Ubangi R."). CHAPIN, 1929, J. f. O., Festschrift E. Hartert, pp. 175, 179, 181, map (Boma). FRIEDMANN, 1930, Bull. 153, U. S. Nat. Mus., p. 324. BANNERMAN, 1933, 'Birds Trop. W. Afr.,' III, p. 140, Fig. 40. STONE, 1936, Proc. Acad. Nat. Sci. Phila., LXXXVIII, p. 583 (Fort Sibut).—*Colius nigricollis nigricollis* SCHOUTEDEN, 1924, Rev. Z. A., XII, p. 267 (Kidada; Leopoldville).

SPECIMENS.—Boma, ♂, Jan. 21; 2 ♀, Jan. 11, 25. Leopoldville, 2 ♂, July 2, 3.

ADULTS.—Iris rather dark brown, naked skin behind eye light blue-gray, that in front black; bill black above, but with a gray patch on culmen, lower mandible yellowish gray, becoming black at base; feet coral red, with black claws.

DISTRIBUTION OF THE SPECIES.—Cape Province and Natal north to Somaliland, Eritrea, the Sudan, Cameroon, and perhaps Nigeria. Wanting in the desert country of southwestern Africa, and in all the central part of the Upper Congo forest; but ascends mountains of eastern Africa to 8000 feet where not heavily forested.

About thirteen races are recognized, for there is marked geographic variation in general color, barring, whiteness of ear-coverts, blackness of throat, and in eye-color. Five of the forms are known to occur in the Belgian Congo, and two others near its borders. For a complete review see Friedmann (1930).

C. s. nigricollis, ranging from Northern Nigeria through the Cameroon to the Lower Congo and Kwango district, has black face and throat, chest barred, and no gray patch on ear-region. *C. s. leucophthalmus* of the Uelle and eastern Ituri is very like *nigricollis*, but the crest is noticeably paler, the hind-neck more barred, and the iris whitish instead of dark brown. *C. s. erlangeri*, southwestern Abyssinia to the Lado district, has a silvery gray patch on ear-region, crest gray-brown, darker than in *leucophthalmus*, throat dark gray, not black, and barred with light gray. *C. s. jebelensis* of the Lake Albert region and Uganda has a similar gray patch over the ear, but its throat is more blackish than that of *erlangeri*, upperparts deeper in color, and upper back less barred. *C. s. kiwuensis* of the Kivu district is similar to *jebelensis*, but slightly darker. The chest in both is barred with blackish brown. *C. s. congicus* ranging from Lake Tanganyika to the Katanga and Kasai districts, has the throat blacker than in *kiwuensis*, not spotted with gray, the gray of the ear-region a little darker, and its chest is practically unbarred. Specimens from Marungu show some approach to *C. s. berlepschi* of Nyasaland and southwestern Tanganyika Territory, which is slightly paler than *congicus*, with grayer throat and chest somewhat more distinctly barred.

C. s. nigricollis is found in savannas and in clearings near the border of the forest, in the Cameroon, Gaboon, and Lower and Middle Congo. The Congo Museum has a specimen from Baaba in the Kwango district, but I have never seen any coly along the Congo River above Kwamouth. Shelley was mistaken in recording a specimen as taken at Yambuya. Jameson's only bird having been secured in the Cataract district. It

would seem that *nigricollis* must reach the vicinity of Bangui, for an example from Fort Sibut in the Philadelphia Academy was labeled as having the iris dark brown.

We found this the common coly in the Mayombe, at Boma, Matadi, Leopoldville, and Kwamouth, going about in flocks of five to ten, keeping generally in rather dense vegetation. In behavior and voice they are exactly like the allied race of the Uelle. A nest found at Kwamouth on December 19 was of open cup-shape, built like that of *C. s. leucophthalmus* in a bush nine feet from the ground. The three eggs were colored like those of *leucophthalmus*. A female collected at Boma on January 11 was found on dissection to be laying, and yet she was found amid a party of six. A male at Leopoldville in early July was found to be in breeding condition, and the season of reproduction must be very long and irregular.

Of three stomachs examined, two contained fruit, noted in one case as a species of *Ficus*. One of these also held a piece of leaf, and the third stomach contained only leaves.

Colius striatus leucophthalmus Chapin

Colius nigricollis leucophthalmus CHAPIN, 1921, A. M. Nov., No. 7, pp. 2, 4, Fig. 1 (type locality: Niangara, Uelle distr.). GYLDENSTOLPE, 1924, K. Svenska Vet. Akad. Handl., (3) I, No. 3, p. 261 (Irumu).—*Colius nigricollis* SHARPE, 1884, Journ. Linn. Soc. Lond., Zool., XVII, p. 434 (Doruma); 1892, 'Cat. Birds Brit. Mus.,' XVII, p. 341 (in part). SHELLEY, 1885, Ibis, p. 310. REICHENOW, 1902, 'Vög. Afr.,' II, p. 203 (Duki R.; Buesa). DUBOIS, 1905, Ann. Mus. Congo, Zool., I, f. 1, p. 34 (in part. Niam-Niam). SALVADORI, 1909, Ann. Mus. Civ. Stor. Nat. Genova, (3) IV, p. 321 (Buta-Dungu); 1911, idem, (3) V, p. 446. SCHOUTEDEN, 1914, Rev. Z. A., III, p. 264 (Kilo); 1918, idem, V, p. 244. W. DEW. MILLER, 1924, Bull. A. M. N. H., L, p. 330.—*Colius striatus nigricollis* NEUMANN, 1904, J. f. O., pp. 404, 405 (in part. Battaiba-Buehssa on upper Ituri R.). C. GRANT, 1915, Ibis, p. 401 (in part). SCLATER AND M.-PRAED, 1919, Ibis, p. 650 (Meridi; Mt. Baginzi).—*Colius leucotis affinis* SCHOUTEDEN, 1914, Rev. Z. A., III, p. 264 (Kilo).—*Colius affinis* SCHOUTEDEN, 1918, Rev. Z. A., V, p. 245 (in part. Kilo).—*Colius leucotis* SCHUBOTZ, 1921, 'Tageb. Emin Pascha,' VI, pp. 102, 244 (Dungu; Mangbetu).—*Colius striatus leucophthalmus* W. L. SCLATER, 1924, 'Syst. Av. Æth.,' pt. 1, p. 266. CHAPIN, 1929, J. f. O., Festschrift E. Hartert, pp. 175, 177, 178, Fig. 1 (Djugu; Kifuku on Ituri R.; new post of Beni). FRIEDMANN, 1930, Bull. 153, U. S. Nat. Mus., p. 324. SCHOUTEDEN, 1936, Ann. Mus. Congo, Zool., I, f. 2, p. 96 (Buta; Titule; Poko; Medje; Mauda; Djalasinda; Mahagi Port). STONE, 1936, Proc. Acad. Nat. Sci. Phila., LXXXVIII, p. 561 (Ekibondo).

SPECIMENS.—Bafwabaka, 4 ♂, Jan. 10, Dec. 31. Medje, 5 ♂, Jan. 15, 17, 18, Sept. 14; 3 ♀, Jan. 18, 22, June 7; 3 ♂ juv., Mar. 10, 15, July 25; 3 ♀ juv., Mar. 10, 15, Aug. 18. Niangara, 2 ♂, Nov. 16, Dec. 3; 4 ♀, Nov. 7, 11, 16, 28. Nzoro,

3 ♂, Aug. 6, 7; 2 ♀, Aug. 6. Faradje, 3 ♂, Feb. 26, Mar. 8, Oct. 14; ♀, Sept. 2. Garamba, ♀ juv., July 6.

ADULTS.—Iris grayish white, naked skin in front of eye, as well as the rim of eyelids, black, skin behind eye light bluish gray. Maxilla black, with a blue-gray patch above, and two smaller spots of the same color at the sides near base. Mandible light yellowish gray, changing to bluish posteriorly, and black at the base. Feet coral red, with black claws.

NESTLINGS.—Iris dark grayish brown; maxilla green with dusky tip, mandible black; eyelids green, skin behind eye gray; feet red with claws black.

DISTRIBUTION.—Savanna region of the northeastern Congo Basin from the edge of the forest near the Nepoko River north to Meridi and Kojali in the southern Bahr-el-Ghazal. Probably extends westward at least to Yakoma, and certainly southeast to the Lendu Plateau, Irumu, and the new post of Beni. Close to the margin of the forest it may continue a little farther southward, but it certainly does not occur on the shores of Lake Kivu. That this white-eyed race interbreeds with *jebelensis* and *kiwuensis* is proved by the occurrence of birds with intermediate eye-color at Bogoro and near Beni.

In the northern Ituri district the white-eyed coly does not penetrate far into the clearings near the edge of the forest. We found it about a native village four hours' march south of Medje, and at Bafwabaka, but never at Ngayu, Gamanguï, or along the lower Ituri River. Out in the savannas of the Uelle it is an abundant and characteristic bird, living in companies of three to six, climbing about in bushes and low trees, where it assumes positions that are most grotesque. Sometimes it hangs down from a horizontal twig, less often sitting upright on it, and occasionally walks right up a small perpendicular branch, propping itself with its long tail. The foot of a dead coly seems to have all four toes pointing more or less forward, but a live bird on the ground spreads its toes in an X. When clinging to a branch it holds its second and third toes forward, sometimes even the fourth, but the first is little used.

The flight of these birds is characteristically direct and rapid, but not protracted, spells of energetic wing-beats alternating with periods of gliding on open wings. The usual call-notes are hoarse and not loud, but a weak whistle may be heard occasionally. Small flocks roost together in some dense bush or on the vine-clad trunks of oil-palms, whence they go whirring away explosively when disturbed.¹

Many young were brought to us by natives, and I examined seven nests. These are never built in large trees, but in second-growth scrub, or in bushes and low trees in dry savanna, and occasionally even in a

¹ In captivity they sleep in a dense cluster, according to Pechuël-Loesche, 1888, 'Loango Expedition,' III, pt. 1, p. 266.

bunch of green plantains in a garden. The nest is remarkably like that of many Passeres, bowl-shaped with a rather bulky foundation, and composed of dry plant-stems, thin vines, grass, leaves, soft fibres from bark, and even bits of moss. It may measure 6 1/2 or 7 inches across the top, and is generally placed in a fork from 5 to 12 feet above the ground, well hidden by foliage. The set is always of two eggs, in color a lack-luster buffy whitish, covered all over as if soiled by faint specks of greenish brown. Eight eggs measure 19.3–22 mm. \times 16.6–18.

In the vicinity of Medje breeding takes place throughout the year, adults with enlarged gonads or nesting birds having been taken in January, March, July, August, September, and December. In the savannas of the Uelle it certainly goes on from June to November, but only adults in non-breeding condition were taken in February and March. At that season their food supply would be at low ebb.

Both sexes incubate, and sociable habits persist even during nesting. I have frightened a bird from its nest and seen it join at once a party of four or five others. Birds with enlarged gonads are commonly found in such groups.

The food consists largely of fruits both wild and cultivated, guavas and papayas being especially favored. Of sixteen stomachs examined, eleven contained fruit, including that of *Musanga Smithii* and a small red pepper. In one case there were also small green leaves. Five stomachs contained nothing but red earth. These were of colies captured in a small cave in the bank of a wooded ravine near Mt. Gaima. Almost every day the birds came there, and often they were caught by natives. In one day I have known thirty colies and a dove to be taken, yet the next day I saw a dozen or more colies waiting outside. The earth was a laterite containing dark fragments that held some manganese. In addition it was found to have 4/10 of one per cent of soluble inorganic salts, chiefly chloride, some sulphate, but no nitrate. The birds seem to eat it for its salt content.

[*Colius striatus erlangeri* Zedlitz]

Colius striatus erlangeri ZEDLITZ, 1910, O. Mb., p. 58 (type locality: Djam Djam, S. W. Abyssinia). SCLATER AND M.-PRAED, 1919, Ibis, p. 649 (Yei).—*Colius leucotis* var. *affinis* DUBOIS, 1905, Ann. Mus. Congo, Zool., I, f. 1, p. 34 (in part. "Ituri"; "Uelle").—? *Colius affinis* SALVADORI, 1911, Ann. Mus. Civ. Stor. Nat. Genova, (3) V, p. 446 ("Uelle").

This relatively pale race extends from southwestern Abyssinia and the upper White Nile to the Lado district, and was collected by Dr.

Christy at Yei. One of Christy's skins is in the Congo Museum, where there are also two formalized specimens of *erlangeri* labeled as coming from the Uelle and the Ituri. We may be sure they were really collected near the Bahr-el-Jebel, and not in Congo territory. In Abyssinia Dr. Mearns noted the iris of *erlangeri* as "bluish black."

Colius striatus jebelensis Mearns

Colius striatus jebelensis MEARNs, 1915, Proc. U. S. Nat. Mus., XLVIII, p. 394 (type locality: Gondokoro, Bahr-el-Jebel). FRIEDMANN, 1930, Bull. 153, U. S. Nat. Mus., p. 323. SCHOUTEDEN, 1936, Ann. Mus. Congo, Zool., I, f. 2, p. 97 (Mahagi Port). STONE, 1936, Proc. Acad. Nat. Sci. Phila., LXXXVIII, p. 561 (Kasenyi).—*Colius leucotis affinis* REICHENOW, 1902, 'Vög. Afr.,' II, p. 205 (in part. Nyangabo); 1911, 'Wiss. Ergeb. D. Z.-Afr. Exp.,' III, p. 284 (in part. L. Albert).—*Colius affinis* SCHOUTEDEN, 1918, Rev. Z. A., V, p. 245 (in part. Boga).—*Colius striatus ugandensis* VAN SOMEREN, 1919, B. B. O. C. XL, p. 26 (type locality: Chagwe, Uganda). W. L. SLATER, 1924, 'Syst. Av. Æth.,' pt. 1, p. 265. CHAPIN, 1929, J. f. O., Festschrift E. Hartert, pp. 176, 177, Fig. 1 (in part. Kasenyi).—*Colius leucotis* SCHUBOTZ, 1921, 'Tageb. Emin Pascha,' VI, p. 102 (in part. Mswa).

DISTRIBUTION.—Upper Bahr-el-Jebel, Uganda, shores of Lake Albert, and savanna of the lower Semliki. This race is not easily distinguished from *kiwuensis*, though it averages a little lighter in color. It has the same parti-colored iris as *kiwuensis*, rich yellow above the pupil, more greenish yellow beneath it, and usually dark gray-green in front of and behind pupil. The inner rim of the iris is often brown.

It is regrettable that the type locality of *jebelensis* is on the very northern edge of its range; and in case this race is merged with the Kivu race, the name *kiwuensis* has seven years' priority.

Of five specimens collected at Mahagi Port by Dr. Schouteden, four are clearly *jebelensis* and one shows some approach to *leucophthalmus*. Along the west shore of Lake Albert *jebelensis* is common, but to the west of the escarpment it is replaced by *leucophthalmus*. There are examples of *jebelensis* in the Congo Museum from Boga near the lower Semliki Valley.

Colius striatus kiwuensis Reichenow

Colius kiwuensis REICHENOW, 1908, O. Mb., p. 191 (type locality: Lake Kivu); 1911, 'Wiss. Ergeb. D. Z.-Afr. Exp.,' III, p. 284.—*Colius affinis* SHELLEY, 1899, Ibis, p. 376 (L. Edward). O.-GRANT, 1910, Tr. Z. S. Lond., XIX, p. 426 (Mubuku Valley, 6000 ft.; Mokia). SCHOUTEDEN, 1918, Rev. Z. A., V, p. 245 (in part. Beni; Uvira; Mai-na-Ivi; Mai-na-Kwenda; Old Mission St. Gustave; Ruwenzori; Wima).—*Colius nigricollis* REICHENOW, 1911, 'Wiss. Ergeb. D. Z.-Afr. Exp.,' III, p. 283 (Kisenyi).—*Colius leucotis affinis* REICHENOW, 1911, 'Wiss. Ergeb. D. Z.-Afr.

Exp.,' III, p. 284 (Kifumbiro; Kisenyi). SASSI, 1912, Ann. Naturh. Hofmus. Wien, XXVI, p. 373 (Usumbura; Uvira; Kisenyi). LÖNNBERG, 1917, Arkiv f. Zool., X, No. 24, p. 19 (Rutshuru; Beni).—*Colius striatus affinis* C. GRANT, 1915, Ibis, p. 403 (Ruwendzori).—*Colius striatus ugandensis* GYLDENSTOLPE, 1924, K. Svenska Vet. Akad. Handl., (3) I, No. 3, p. 260 (Mt. Muhavura, 2000 m.; Kibati; Goma; Sake). CHAPIN, 1929, J. f. O., Festschrift E. Hartert, pp. 176, 177 (in part. W. Ruwendzori; Rutshuru Plain). SCHOUTEDEN, 1932, Rev. Z. A., XXII, p. 124 (Nya-Muzinga); 1933, idem, XXII, p. 377 (Byihayi).—*Colius striatus kiwuensis* W. L. SCLATER, 1924, 'Syst. Av. Æth.,' pt. 1, p. 266 (L. Kivu). CHAPIN, 1929, J. f. O., Festschrift E. Hartert, pp. 178, 181, map. FRIEDMANN, 1930, 'Afr. Rep. Liberia Belg. Congo,' II, p. 756 (Kamaniola; Lulenga); 1930, Bull. 153, U. S. Nat. Mus., p. 323.—*Colius striatus jebelensis* BERLIOZ, 1932, Bull. Mus. Hist. Nat. Paris, (2) IV, p. 377 (Kadjudju).—*Colius striatus kivuensis* SCHOUTEDEN, 1935, Rev. Z. A., XXVII, p. 401 (Gabirol; Rutshuru bridge; Luvungi).

DISTRIBUTION.—From the lower slopes of Ruwendzori and the vicinity of Beni south through the Kivu district and Ruanda to the northern end of Lake Tanganyika. It ascends the escarpment southwest of Lake Edward, where I have seen it at Luofu. On Ruwendzori and other high mountains it occurs up to 7000 feet where woods are not too dense.

The iris of *kiwuensis* is parti-colored as in *jebelensis*. West of the upper Semliki Valley one finds some individuals which have the iris whitish with an inverted crescent of yellow above the pupil. Their plumage approaches that of *leucophthalmus*. Others, even on the western base of Ruwendzori, have the plumage of *kiwuensis*, and the iris with some whitish below the pupil.

I have compared the type of *kiwuensis* with three other skins from Kisenyi which Reichenow identified as *nigricollis*, and can see no racial difference. It must be admitted that *C. s. kikuyuensis* van Someren of the East African highlands differs little if at all from *C. s. kiwuensis*, and the latter name is the older.

In choice of haunts, voice, and nesting, this subspecies is exactly similar to *leucophthalmus*. It lives in lowland savannas, especially where there are many trees and bushes, but also ascends the slopes of mountains, profiting by clearings made by natives. On the western slope of Ruwendzori it was common about Kalongi, but did not range higher because of the dense mountain forest. It occurs also about the bases of the Kivu Volcanoes, and ranges south to the northern end of Lake Tanganyika. The Congo Museum has two skins from Uvira with normal barring on the chest.

Birds ready to breed were taken in the region near Ruwendzori in October, November, and March; and it seems likely that they nest there throughout the year.

***Colius striatus congicus* Reichenow**

Colius leucotis congicus REICHENOW, 1923, Mitt. Zool. Mus. Hamburg, LX, p. 63 (type locality: Lupungu in Lomami distr.).—*Colius leucotis* DUBOIS, 1886, Bull. Mus. Roy. Hist. Nat. Belg., IV, p. 147 (L. Tanganyika). SCHALOW, 1886, J. f. O., p. 418 (Lufuku R.). MATSCHIE, 1887, J. f. O., p. 149 (Kauè Brook).—*Colius leucotis affinis* REICHENOW, 1902, 'Vög. Afr.,' II, p. 205 (in part). NEAVE, 1910, Ibis, p. 114 (Bunkeya R.; Lufupa R.). DE RIEMAECKER, 1927, Rev. Z. A., XIV, p. 272 (Kongolo).—*Colius leucotis* var. *affinis* DUBOIS, 1905, Ann. Mus. Congo, Zool., I, f. 1, p. 34 (in part. L. Tanganyika).—*Colius affinis* NEAVE, 1907, Mem. Proc. Manchester Lit. Phil. Soc., LI, No. 10, p. 41 (Ndola). SALVADORI, 1907, Boll. Mus. Zool. Anat. Torino, XXII, No. 570, p. 2 (near Lukonzolwa). SCHOUTEDEN, 1918, Rev. Z. A., V, p. 245 (in part. Baraka; Mazonde).—*Colius striatus berlepschi* C. GRANT, 1915, Ibis, p. 403 (S. E. Belg. Congo). W. L. SCLATER, 1924, 'Syst. Av. Æth.,' pt. 1, p. 265 (Katanga). CHAPIN, 1929, J. f. O., Festschrift E. Hartert, pp. 175, 179, map (Lomami distr.; Luluabourg). FRIEDMANN, 1930, Bull. 153, U. S. Nat. Mus., p. 321.—*Colius leucotis berlepschi* SCHOUTEDEN, 1923, Rev. Z. A., XI, p. 327 (Ngombe in Kasai; Lusambo; Luebo; Basongo; Kabambaie).—*Colius striatus congicus* W. L. SCLATER, 1930, 'Syst. Av. Æth.,' App., p. 858 (Lualaba distr.).

DISTRIBUTION.—Western shore of Lake Tanganyika to Basongo in the Kasai district, and south to the Upper Katanga, possibly northern Rhodesia. It is readily distinguished from *kiwuensis* by the lack of gray spotting on the throat and dark barring on the chest. In the Congo Museum there are two skins of *congicus* from as far north as Baraka, and a large series from Moba, Kiambi, Kansenia, and the Kando River near Tenke. Two single specimens come from Kapolowe and the upper Luapula River.

Specimens from the Kasai district have wings 92–97 mm. long, whereas those of the Katanga, Marungu, and the shore of Lake Tanganyika have them 95–105 mm. Some examples from Marungu show a tendency toward *berlepschi* in color, but their throats are usually blacker.

According to Neave (1910) the iris of *congicus* in the Katanga is yellow on the upper half, brown on the lower. This has been confirmed by Rockefeller and Murphy for Marungu specimens; but Father Callewaert at Luluabourg noted the eye-color as green or greenish.

In the Upper Katanga Neave found this coly not uncommon, generally seen in flocks, and inhabiting the bush on the banks of streams. In the Kasai district it is certainly common, and young colies just out of the nest were taken at Luluabourg in May and October. There is a surprising lack of any record for a coly between Basongo and Kwamouth. Intergrades between *congicus* and *nigricollis* are as yet unknown.

[*Colius striatus berlepschi* Hartert]

Colius leucotis berlepschi HARTERT, 1899, in Ansorge, 'Under the African Sun,' App. Birds, p. 333 (type locality: New Helgoland, N. E. shore L. Nyasa).

This name has often been applied to specimens from the southeastern Congo, but I find specimens from the northern end of Lake Nyasa lighter-colored than *congicus*, with throats less black, chests more barred. Marungu specimens are somewhat intermediate, and if *berlepschi* occurs at all in Congo territory I should expect it near Moliro. Its range is from Nyasaland north to Ujiji on the eastern shore of Lake Tanganyika and to Uhehe. Vincent described the iris of *berlepschi* as sepia around pupil, and with a narrow outer rim of cadmium yellow.

[*Colius castanotus* Verreaux]

Colius castanotus J. AND E. VERREAUX, 1855, Rev. Zool., Paris, p. 351 (type from "Gaboon," see Sharpe, 'Cat. Birds Brit. Mus.,' XVII, p. 343). CHAPIN, 1929, J. f. O., Festschrift E. Hartert, p. 181, map. BANNERMAN, 1933, 'Birds Trop. W. Afr.,' III, p. 145.

Closely allied to *Colius striatus*, but with a large patch of deep chestnut covering the whole rump. Chin blackish, and forehead black with gray-feather-tips; no barring on fore-neck; wing 95-106 mm. Iris, according to label by Dr. W. J. Ansorge, chrome-yellow above and below pupil, greenish yellow at sides.

From Mossamedes and Benguella it extends to Duque de Bragança in northern Angola and, it has been said, to the Gaboon. Thus it might seem as though its range overlapped with that of *C. striatus nigricollis*. Verreaux's type was supposedly from the Gaboon, where Marche and Compiègne were also reported to have obtained a specimen. But none has been collected there recently, and we have sought in vain for the species in the Lower Congo. There is of course a possibility of its reaching the southern Kwango district.

Verreaux's well-known inaccuracy as to localities raises a suspicion that his type came really from Angola, and that the range of *castanotus* may be complementary to those of the races of *striatus*.

KEY TO THE SPECIES OF *UROCOLIUS*

With a light blue patch on the nape.....*U. macrourus*.
No blue nape-patch.....*U. indicus*.

***Urocolius macrourus griseogularis* van Someren**

Urocolius macrurus griseogularis VAN SOMEREN, 1919, B. B. O. C., XL, p. 27 (type locality: S. shore L. Edward).—*Colius macrurus* O.-GRANT, 1910, Tr. Z. S. Lond., XIX, p. 427 (Mokia). SCHOUTEDEN, 1918, Rev. Z. A., V, p. 245 (S. W.

Ruwenzori).—*Colius macrourus* SASSI, 1912, Ann. Naturh. Hofmus. Wien, XXVI, p. 374 (Kasindi).—*Colius macrourus pulcher* C. GRANT, 1915, Ibis, p. 406 (Ruwenzori).—*Colius macrourus griseogularis* VAN SOMEREN, 1922, Nov. Zool., XXIX, p. 72 ("Lakes Edward and Kivu to N. Tanganyika"). W. L. SCLATER, 1924, 'Syst. Av. Æth.,' pt. 1, p. 268. FRIEDMANN, 1930, Bull. 153, U. S. Nat. Mus., p. 333.—*Colius macrourus griseogularis* HARTERT, 1924, Nov. Zool., XXXI, p. 129.—*Urocolius macrourus griseogularis* GYLDENSTOLPE, 1924, K. Svenska Vet. Akad. Handl., (3) I, No. 3, p. 262 (Masidongo). CHAPIN, 1929, J. f. O., Festschrift E. Hartert, p. 180.

DISTRIBUTION OF THE SPECIES.—Senegal to Lake Chad, Eritrea, Somaliland, grasslands of the eastern Congo border, and East Africa south to the region north of Nyasa.

U. m. macrourus (Linnæus), of very pale color, ranges from Senegal east to the Egyptian Sudan, northern Abyssinia, Somaliland, and probably to the coast of Kenya Colony. *U. m. pulcher* (Neumann), slightly deeper in color, occupies the region from southern Abyssinia to interior Kenya Colony, the Kavirondo district, and Tanganyika Territory. *U. m. griseogularis*, the darkest race of all, with grayish throat, is found along the eastern edge of the Congo, near Lake Albert and Lake Edward. It appears to range northward along the Bahr-el-Jebel to Lado; and was said by van Someren to reach Lake Kivu and the north end of Tanganyika. While the species is rather numerous in the lower Rutshuru Plain, I cannot find any published record from south of the post of Rutshuru; but there are two specimens in the Rothschild Collection obtained by Grauer near Lake Urigi and the Kagera River. Iris rather dull dark red (perhaps a little browner in females), orbit and gape-region dark crimson; base of maxilla rose-red, hard sheath of maxilla black, blue-gray at posterior margin, mandible black; feet purplish red, claws black.

The blue-naped coly requires a relatively dry open country, and thus its distribution in the Congo is far more restricted than that of the brown colies. The two species are found together on the plains in the Albertine Rift. The blue-naped species is a far more wary bird, going in parties of four to ten, and usually flying long distances when disturbed. Their flight is swift and direct, the narrowness of their tails very striking, suggesting comparison with the stick of a rocket. The wings beat rapidly, or are held rigid during spells of gliding flight. Often they sit very upright in the tops of thorn-trees, or "hitch" their way along the branches, resembling the brown colies in their unusual attitudes.

The only notes I have heard are single long whistles, with considerable carrying power, given both from the perch and on the wing. The

pitch of the whistle is sometimes rather high, less often lower. Small fruits, with the addition of bits of green leaf, form their food.

The nest is cup-shaped, and built of twigs, grass, bark-fibre, and rootlets, at a height of ten or fifteen feet in a bush. Eggs two to three, whitish with rufous or brown blotches or streaks, dimensions about 20.3×14.5 mm.

The breeding season appears to be much shorter than in the case of *Colius striatus*. From seeing non-breeding adults accompanied by young in September, I believe that the breeding season near Kasenyi, Lake Albert, must come about May.

[*Urocolius indicus angolensis* (Reichenow)]

Colius indicus angolensis REICHENOW, 1902, 'Vög. Afr.,' II, p. 209 (type locality: Kwanza distr., Angola).—*Colius senegalensis* HARTLAUB, 1857, 'Syst. Orn. Westafr.,' opp. p. lix ("Congo"). JOHNSTON, 1884, 'River Congo,' p. 367 ("Lower Congo").

The four races of this species occupy the greater part of southern Africa, from Cape Province north to the Rovuma River, the north end of Lake Nyasa, Northern Rhodesia, and the Kwanza River in Angola. The Angolan subspecies is very light in color.

The supposed records from the Lower Congo have not been confirmed by recent collecting; and while the species might be expected somewhere along the southern border of the Belgian Congo, it has never been met with. Pitman¹ reported *C. i. indicus* as common about Broken Hill, Northern Rhodesia.

ORDER TROGONIFORMES

FAMILY Trogonidæ. TROGONS

KEY TO THE AFRICAN GENERA OF TROGONIDÆ

- Bill relatively large, lower edge of maxilla more or less serrate, large patches of naked skin beneath eye; outer rectrices not banded with black. APALODERMA, p. 479.
 Bill smaller, maxilla slightly or not at all serrate, small naked areas below eye; outer rectrices conspicuously banded with black. HETEROTROGON, p. 486.

KEY TO THE SPECIES OF APALODERMA

- The two patches of naked skin beneath the eye are completely separated by a feathered line extending from the ear-coverts obliquely upward and forward to the lores. In life they are light green, or even washed with blue. *A. narina*.
 The naked skin beneath the eye is not completely divided in two, for the feathered line extending upward from the ear-region is incomplete just below the eye. In life the skin is lemon- to light cadmium-yellow. *A. æquatoriale*.

¹ 1934, 'Rep. Faunal Survey N. Rhodesia,' p. 228.

***Apaloderma narina narina* (Stephens)**

Trogon narina STEPHENS, 1815, in Shaw, 'General Zool.,' IX, p. 14 (type locality: Anteniquoi, i.e., Knysna distr., S. Africa, ex Levaillant). SCHALOW, 1886, J. f. O., p. 422 ('Lualaba' [= Luvua R.]).—*Apaloderma narina* ANTINORI, 1868, Boll. Soc. Geogr. Ital., I, p. 117 (Niam-Niam Land, near present Bafuka). PETERMANN, 1868, in Petermann's Mitteil., p. 416. DUBOIS, 1886, Bull. Mus. Roy. Hist. Nat. Belg., IV, p. 147 (L. Tanganyika). REICHENOW, 1902, 'Vög. Afr.,' II, p. 212 (in part. Semio; Mpala; Kwango); 1911, 'Wiss. Ergeb. D. Z.-Afr. Exp.,' III, p. 284 (in part. Wau Is., L. Kivu). SCHOUTEDEN, 1918, Rev. Z. A., V, p. 245 (in part. Baraka; Moganga forest; Dogodo R.); 1935, Bull. C. Z. C., XII, p. 9 (Gabi-ro).—*Hapaloderma narina* BÖHM, 1884, Zeitschr. Ges. Orn. Budapest, I, p. 110 (Mpala). SHARPE, 1884, Journ. Linn. Soc. Lond., Zool., XVII, p. 434 (Semio). SCHALOW, 1886, J. f. O., pp. 414, 416 (E. Marungu; Manda); 1887, idem, p. 234. MATSCHIE, 1887, J. f. O., p. 149 (Mpala). O.-GRANT, 1892, 'Cat. Birds Brit. Mus.,' XVII, p. 477 (Semio). DUBOIS, 1905, Ann. Mus. Congo, Zool., I, f. 1, p. 35 (in part. Tanganyika). NEAVE, 1910, Ibis, p. 115 (Bunkeya R.). DE RIEMAECKER, 1927, Rev. Z. A., XIV, p. 273 (Lufira R.).—*Hapaloderma rufiventre* DUBOIS, 1896, P. Z. S. Lond., p. 999 (type locality: region of L. Tanganyika); 1905, Ann. Mus. Congo, Zool., I, f. 1, p. 35.—*Apaloderma rufiventre* REICHENOW, 1902, 'Vög. Afr.,' II, p. 215; 1911, 'Wiss. Ergeb. D. Z.-Afr. Exp.,' III, p. 285.—*Apaloderma narina narina* CHAPIN, 1915, Bull. A. M. N. H., XXXIV, p. 512 (Faradje—Aba); 1923, A. M. Nov., No. 56, pp. 2, 3, map, Fig. 2. SCHOUTEDEN, 1926, Rev. Z. A., XIII, p. 193 (Lundu in Upper Mayombe); 1932, idem, XXII, p. 124 (Burunga); 1933, idem, XXII, p. 377 (Kisenyi); 1935, idem, XXVII, p. 404 (Katana). FRIEDMANN, 1930, Bull. 153, U. S. Nat. Mus., p. 337.

SPECIMEN.—Madrapili, between Faradje and Aba, ♂, Oct. 4.

DISTRIBUTION OF THE SPECIES.—Cape Colony to Eritrea and Liberia, including the West African forests. As I pointed out in 1923, the typical, long-tailed form of this species is a bird of heavy woods and gallery-forests in southern and eastern Africa, extending northward to Eritrea and Darfur. Females have the chest brownish. Along the East Coast from southern Somaliland to eastern Usambara lives a small race, *A. n. littoralis* van Someren,¹ with the underparts of females paler. In the forests of Uganda, as well as the equatorial belt of the Congo and of the Cameroon, the species is represented by the short-tailed *A. n. brachyurum*, the female of which has a grayish chest. A fourth race, *A. n. constantia*, also short-tailed, but the male with more extensive white vermiculation on the wings, inhabits the forest areas from Togoland to Liberia. The tail-length in *A. n. narina* varies from 165 to 200 mm., in *brachyurum* from 145 to 170. *Apaloderma æquatoriale* is a distinct species, as will be explained later.

In Congo territory *A. n. narina* occurs only in the extreme northeast,

¹ 1931, B. B. O. C., LI, pp. 80, 81 (Sokoke Forest).

the east, and the south. I found only a single example in the Uelle, between Faradje and Aba. In the eastern highlands it occurs in wooded places above 5000 feet, and I have seen specimens from the Mokoto Lakes, Kamatembe, Burunga near Mt. Miken, the vicinity of Kisenyi and Katana on Lake Kivu, Gabiro in Ruanda, and the highlands near Baraka. There is also a male in the Congo Museum from the Dogodo River between Baraka and Kasongo. This is the only race occurring in the Katanga, where Neave obtained it on the Bunkeya River and De Riemaecker on the Lufira. Böhm saw it at Mpala and on the Luvua River, and farther to the west de Witte collected three specimens at Dilolo.

In the Kasai district *narina* is found in the south and *brachyurum* in the north. They meet near Luluabourg, where Father Callewaert collected two males of *narina* (tails 168 and 170 mm.) and two of *brachyurum* (tails 148 and 150 mm.). At Katabwa he secured a female of *narina* with light brown chest (tail 182 mm.). One would scarcely expect the long-tailed race in the Lower Congo, and although a male collected by Dr. Schouteden in the Upper Mayombe has the tail 168 mm. I doubt if it should be referred to typical *narina*. A similar intermediate has been reported from the Amboim province of Angola,¹ but *A. n. narina* is known to occur at Duque de Bragança in northern Angola.

The bare skin of the face in this race is rather similar in color to that of *brachyurum*. The anterior patch, near the base of the bill, is greenish yellow with narrow blue margin, while the posterior one is bluish in front, shading to green behind.

In the Upper Uelle we found the Narina trogon anything but common. Our only specimen was taken in a patch of tall forest, where it was feeding among the boughs at middle height. It was in non-breeding condition (October), and had eaten three small caterpillars, some beetles, a bug, and other insects.

In the Katanga this trogon is never seen in the savanna woods, but only in the thicker growth of trees in ravines or along streams. At various places in the Kivu it occurs in patches of forest around 5000 and 6000 feet, but probably never ascends above 7000 feet. Its call is a low coo, repeated in leisurely fashion, and not doubled as is that of *A. n. brachyurum*. The nesting habits are the same as those of *brachyurum*, two to four glossy white eggs being laid in a hole in a dead tree. Chubb² gave measurements of South African eggs as 26.4–27.9 mm. \times 22.8–23.3.

¹ Sick, 1934, O. Mb., p. 168.

² 1914, Ann. Durban Mus., I, p. 62.

***Apaloderma narina brachyurum* Chapin**

Apaloderma narina brachyurum CHAPIN, 1923, A. M. Nov., No. 56, p. 4, Fig. 1B, map (type locality: Avakubi, Ituri distr., Congo. Also from Banalia; Gamangui; Bafwabaka; Pawa; Medje; Poko; Kilo; forest N. of Beni). SCHOUTEDEN, 1923, Rev. Z. A., XI, p. 327 (Basongo; Kamaiembi; Dumbi; Luebo); 1936, Ann. Mus. Congo, Zool., I f. 2 p. 97 (Kotili; Buta; Popoie; Panga; Poko; Bondo Mabe). GYLDENSTOLPE 1924 K. Svenska Vet. Akad. Handl., (3) I, No. 3, p. 259 (Kartushi; Lesse). SASSI, 1924, Ann. Naturh. Mus. Wien, XXXVIII, p. 74 (Beni; Mawambi; Ukaika). W. L. SCLATER, 1924, 'Syst. Av. Æth.', pt. 1, p. 268 (Ituri). FRIEDMANN, 1930, Bull. 153, U. S. Nat. Mus., p. 338. BANNERMAN, 1933, 'Birds Trop. W. Afr.', III, p. 357. BOUET, 1934, Ois. R. F. O., (N. S.) IV, p. 634.—*Trogon narina* EMIN, 1894, J. f. O., p. 166 (old Irumu).—*Hapaloderma narina* FLOWER, 1894, P. Z. S. Lond., pp. 597, 606 (Indekaru village; Muyeméma or Kinnene). DUBOIS, 1905, Ann. Mus. Congo, Zool., I, f. 1, p. 35 (in part. Ituri; Kisantu). O.-GRANT, 1908, Ibis, p. 312 (Ponthierville); 1910, Tr. Z. S. Lond., XIX, p. 426 (Mpanga forest near Fort Portal). SCHOUTEDEN, 1935, Bull. C. Z. C., XI, p. 68 (Buta).—*Apaloderma narina* REICHENOW, 1902, 'Vög. Afr.', II, p. 212 (in part. Muyomema); 1911, 'Wiss. Ergeb. D. Z.-Afr. Exp.', III, p. 284 (in part; forest N. of Beni). SASSI, 1912, Ann. Naturh. Hofmus. Wien, XXVI, p. 374 (in part. Beni; Mawambi; Ukaika). SCHOUTEDEN, 1914, Rev. Z. A., III, p. 265 (Kilo); 1918, idem, V, p. 245 (in part. Kilo; Masidongo; Baraka; Bolovet; Lesse). W. DEW. MILLER, 1924, Bull. A. M. N. H., L, p. 330.—*Apaloderma narina* (*æquatoriale*?) CHAPIN, 1915, Bull. A. M. N. H., XXXIV, p. 512 (Ituri distr.).

SPECIMENS.—Banalia, ♂, Sept. 25. Avakubi, 8 ♂, Feb. 26, June 3, Aug. 16, Sept. 8, 9, 18, 20, 27; 5 ♀, Apr. 17, July 9, Aug. 15, Sept. 20, Nov. 4; ♂ im., Nov. 9; ♀ im., July 10. Bafwabaka, 2 ♂, Jan. 7, July 24. Gamangui, 2 ♂, Jan. 28, Feb. 8; ♀, Jan. 28. Medje, ♀, 2 ♂ juv., Mar. 24. Pawa, ♂, July 10.

ADULT MALE.—Iris red-brown, naked patch above eye pale bluish green, the two below eye light green, with a little light blue along their upper borders. Skin of throat (hidden by feathers in life) light blue, that of hind-neck pale pinkish. Basal portion of bill deep cadmium-yellow, distal portion light greenish gray. Feet brownish pink.

ADULT FEMALE.—Iris dark brown or red-brown, naked spot above eye light blue, those below light green, or light blue washed with green. Bill greenish yellow basally, pale greenish gray beyond. Feet brownish pink.

IMMATURE MALE.—Iris brown, naked patches below eye light green, each with a little light blue anteriorly. Bill light yellowish green at base, outer part of maxilla gray, becoming blackish above, tip of mandible light greenish gray. Feet grayish flesh-color.

IMMATURE FEMALE.—Similar to young male, but cheek patches noted as dull grayish green.

DISTRIBUTION.—From the coast of southern Cameroon and Gaboon eastward through the rain forest of the Congo basin to the Uelle district, Semliki Valley, and the heavier forests of Uganda as far as Chagwe. In the Congo its northern limit is not far beyond the edge of the unbroken forest. I believe this race inhabits the Mayombe forest, though the

single example I have seen from there has a rather long tail. It certainly occurs at Lemfu near Kisantu, where Father Goossens collected two with short tails. In the Kasai it ranges southward in gallery forests to Luluabourg, and the Congo Museum has also a male collected by Pauwels at Baraka on Lake Tanganyika. In the Kivu district this race may occur where there is suitable forest below 5000 feet, as on the eastern edge of the Rutshuru Valley.

One never sees trogons in the clearings of the Congo forest; and in the woods these are not conspicuous birds, despite their rosy breasts. They perch in the taller undergrowth and the lower boughs of the great trees, and are not especially tame, so that at first one is apt to get only fleeting glimpses as they fly off silently amid the foliage. Knowledge of their voice gives a better introduction; and following up the rather dove-like cooing, one may find the male sitting with drooping tail, repeating his double "cu-coo," starting faintly, but increasing in strength, and stopping after about four seconds. Each "cu-coo" is accompanied by a slight wag of the tail. I have also heard the male of this trogon utter a low triple note, almost a grunting sound, not at all apt to attract attention. Females seem to be silent.

Dissections indicate that the breeding season extends throughout the year, for in the Ituri we took females with ovary enlarged in January, April, and September. Males seemed never to have greatly enlarged gonads, but some slight development was noticed in January, February, June, July, August, and September, this again pointing to a very prolonged season of reproduction.

Our two nestlings (Medje, March) were brought to us with an adult female by a native, who said he had taken them from a cavity in a tree. Their eyes were still closed, and they assumed a most unusual posture, sitting very upright, with the bill pointing vertically or even inclined slightly backward. They even seemed to like to rest the back against some perpendicular surface, doubtless from being used to the wall of the nesting hole. The eggs are undoubtedly pure white and glossy.

Many of the trogons of the New World eat fruit, but those of Africa do not touch it. Caterpillars, in the present instance, form the greater part of the food, for we found them in sixteen of the twenty stomachs examined. Six caterpillars were the largest number noted in a single stomach, and seldom if ever were they hairy ones. Orthoptera were next in order of abundance, usually rather large green jumping forms, and they were present in ten cases, though seldom more than one at a time. Two large mantises were also noted. Some insect eggs in one

stomach came probably from the bodies of orthoptera which had been swallowed. Among the additional insects eaten may be mentioned four hemiptera, two beetles, and a large moth (swallowed without removing the wings).

Apaloderma æquatoriale Sharpe

Hapaloderma æquatoriale SHARPE, 1901, B. B. O. C., XII, p. 3 (type locality: Efulen, S. Cameroon).—*Apaloderma narina* SASSI, 1912, Ann. Naturh. Hofmus. Wien, XXVI, p. 374 (in part. Moera; Mawambi; Ukaika).—*Apaloderma minus* CHAPIN, 1915, Bull. A. M. N. H., XXXIV, p. 510 (Avakubi; Nepoko R.; Banalia).—*Heterotrogon vittatum minus* VAN SOMEREN, 1922, Nov. Zool., XXIX, p. 73. *Apaloderma æquatoriale* CHAPIN, 1923, A. M. Nov., No. 56, p. 1, Fig. 1B, map (Ituri); 1927, Bull. A. M. N. H., LIII, p. 478. SASSI, 1924, Ann. Naturh. Mus. Wien, XXXVIII, p. 75. W. L. SCLATER, 1924, 'Syst. Av. Æth.,' pt. 1, p. 269. BANNERMAN, 1933, 'Birds Trop. W. Afr.,' III, p. 356. SCHOUTEDEN, 1936, Ann. Mus. Congo, Zool., I, f. 2, p. 97 (Poko; Bondo Mabe).

SPECIMENS.—Banalia, ♂, Sept. 26. Avakubi, 8 ♂, Feb. 26, Mar. 29, July 14, 20, Aug. 13, 15, 28; 3 ♀, Apr. 11, July 23, Aug. 22; ♂ im., Oct. 2. Ngayu, 2 ♂, Dec. 13. Medje, ♂ juv., Aug. 31.

ADULT MALE.—Iris red-brown, naked patches above and below eye deep chrome- or light cadmium-yellow, like the base of bill. Distal portion of bill pale grayish green or greenish gray. Naked skin on fore-neck light blue. Feet pale flesh-color, grayish on upper surface of toes.

ADULT FEMALE.—Iris red-brown, cheek-patches lemon-yellow, base of bill slightly deeper yellow, tip of bill light green, shading to dusky on culmen. Feet flesh-color, claws gray.

IMMATURE MALE.—Iris dark brown; maxilla dusky, but its base greenish yellow like the naked cheek-spots, mandible light yellowish green, with light gray tip. Feet pinkish.

DISTRIBUTION.—Rain forest of Lower Guinea, from Victoria, near the base of Mt. Cameroon, southward to Spanish Guinea and perhaps the Gaboon, eastward to Poko in the southern Uelle district and Moera in the vicinity of Beni. It must extend southward across the whole Upper Congo forest, for we now have one adult male from Luluabourg in the Kasai district.

My measurements of 28 males of *Apaloderma æquatoriale* from the Congo, Cameroon, and Spanish Guinea show that their wings vary from 115 to 126 mm. in length, their tails from 136–161. Seven females from the Ituri and the Cameroon have wings 110–125 mm., tails 140–156.

My attention was first called to the distinctness of this small species by its voice, a series of longer, more mournful notes than those of *A. narina*, each of a single syllable that I first wrote "kwaw!" In later

years it has sounded to me more resonant, less like a coo, and from a distance rather like "owng." Usually this is repeated slowly about seven times, and all but the first note are nearly disyllabic. At short range it might be written: "Ow, oodle, oodle, oodle," The bird, always a male, keeps its bill tightly closed, and at each note the throat swells markedly, exposing the blue skin, while the tail is wagged downward to the vertical.

To a great extent the haunts of the two species are the same, but *narina* was to be found at times in areas of tall second-growth, whereas *æquatoriale* seemed never to leave the virgin forest. The latter species was far shyer, too, for it was often difficult to come within sight of the birds; and then they had to be shot at 35 or 40 yards, even in thick forest. They usually perch on lianas or branches without leaves, at five or six yards above the ground. In the forest north of the Ituri River, above Avakubi, I have heard as many as five in one morning. During the short dry period of December and January both species of trogons were found to be rather silent, and *æquatoriale* was most noisy near Avakubi in late July, August, and September. Once in April, I shot a female, whose mate at a little distance was giving his usual loud reiterated call, while she answered in a much lower tone. The rainy season would seem to be the time of reproduction; and this is rather long in the Ituri, for we took breeding females in April and August, a nestling in August, and an immature bird in October. Two non-breeding males were taken in December, and one in March and one in July as well, while a non-breeding female was also secured in July. Like males of *Apaloderma n. brachyurum*, those of the present species never showed any great enlargement of the testes, though several of them seem to have been breeding birds.

In feeding habits this trogon is similar to the race of *A. narina* with which it lives, for of twelve stomachs ten were noted as containing caterpillars or their remains, and in one case the caterpillars were certainly hairy. Orthoptera were present in seven cases, usually large green jumping forms, though it was rare to find more than one in a stomach. The flat eggs of some orthopter were also noted once, but I think they were swallowed inside the body of a female insect. No fruit is eaten by this trogon, either; and the only other things found were one chrysalis and a snail (doubtless a *Helixarion*) with soft flat shell. The excrement of both species of *Apaloderma* has a much more foul odor than is usual among small birds.

Heterotrogon vittatus camerunensis Reichenow

Heterotrogon vittatus var. *camerunensis* REICHENOW, 1902, 'Vög. Afr.,' II, p. 216 (type locality: Cameroon).—*Hapaloderma vittatum* O.-GRANT, 1910, Tr. Z. S. Lond., XIX, p. 426 (Mpanga forest near Fort Portal; "Congo forest").—*Heterotrogon vittatum* SASSI, 1912, Ann. Naturh. Hofmus. Wien, XXVI, p. 374 (forest N. W. of L. Tanganyika; Mts. E. of Rutshuru Plain). SCHOUTEDEN, 1918, Rev. Z. A., V, p. 245 (near Baraka). BERLIOZ, 1936, Bull. Mus. Paris, (2) VIII, p. 328 (Mbwhi).—*Heterotrogon vittatus vittatus* CHAPIN, 1923, Am. Naturalist, LVII, p. 117, Fig. 9, map.

DISTRIBUTION OF THE SPECIES.—East African mountains where forested, from Uluguru, Sotik, Mt. Kenya, and Mt. Elgon to Toro highlands of the eastern Congo border, the mountains south of Lake Nyasa and Mt. Moco in Angola; also Mt. Cameroon, Manenguba Mts., and Fernando Po.

Heterotrogon v. vittatus (Shelley),¹ from Nyasaland to Mt. Kenya and Marsabit, has relatively long wings, 123–131 mm. While the bird of Fernando Po has been separated as *francisci* Alexander,² I believe it is the same as *H. v. camerunensis* of Mt. Cameroon, which has the wing 112–121 mm. Specimens from the eastern Congo are intermediate in length of wing, 115–125 mm., but probably best placed with *camerunensis*. A male from the highland of Angola, collected by Boulton, has the wing 122 mm. *H. v. keniensis* Bowen seems not to be a valid race.

Heterotrogon differs from the genus *Apaloderma* principally by its smaller, more depressed bill. The serration of the border of the maxilla is rather variable in *Apaloderma*, wanting in the young. Traces of serration, on the other hand, are sometimes recognizable in *Heterotrogon*. The latter bird also has small naked areas on the cheeks, homologous with the larger spaces in *Apaloderma*.

The adult male has the iris red-brown, above eye a small bare spot of yellow or gray, two patches beneath eye rich orange; bill chrome-yellow; feet dull pinkish yellow, with larger scales olive-gray, claws brownish. In the female the patches below the eye are not quite so bright; the bill dull lemon-yellow, culmen and distal half of maxilla brownish black.

The bar-tailed trogon is confined to mountain forest and known so far from only a few localities above 5000 feet in the eastern Congo. It is to be expected on the western slope of Ruwenzori; and I once thought I heard it there, at 7000 feet, but never saw one. I have collected specimens, however, in the forest near Djugu on the Lendu Plateau, 5400 feet, and at Mulu, northwest of Lake Edward, 8000 feet. Later I

¹ 1882, P. Z. S. Lond., p. 306 (Mamboio, Tanganyika Terr.).

² 1903, B. B. O. C., XIII, p. 33 (Mt. Sta. Isabel).

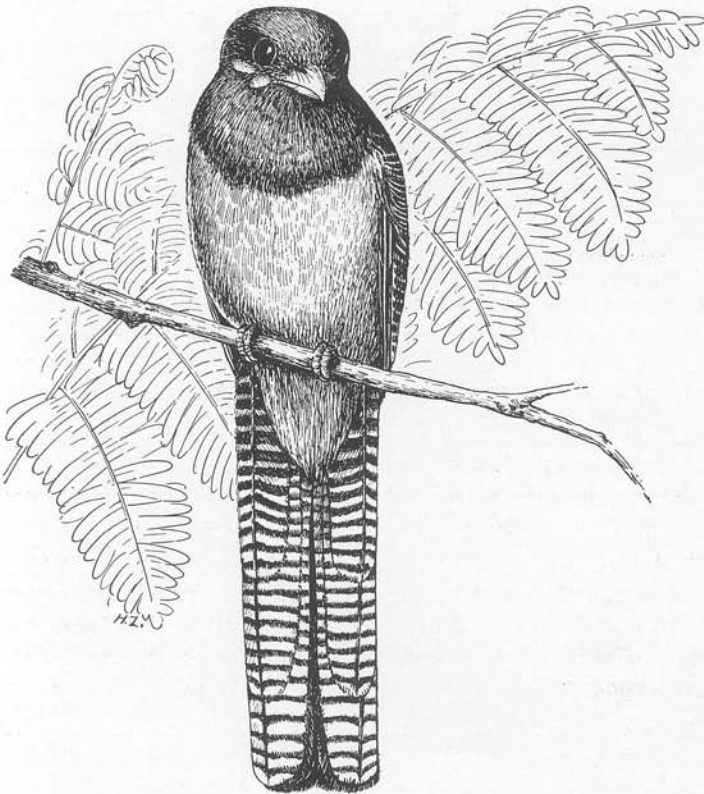


Fig. 30. *Heterotrogon villatus*, male. $\times 1/2$, approximately.

heard its voice at 5300 feet in the mountains east of the Rutshuru Plain. Never could I find it on the Kivu Volcanoes. The casual remark of Woosnam (1910) that he saw this trogon in the Ituri forest was certainly incorrect, as was also the statement by Lönnberg¹ that it is widespread in West African forests.

The usual call of *Heterotrogon* is a rather loud "how," slightly prolonged and slowly repeated, very different from that of either species of *Apaloderma*. It is given by the male, who also seems to be the author of a lower, hoarser, "what-what-what—" uttered more rapidly. Follow these notes and you may find the trogon perched high in some great forest tree, or on a low bough among the tree-ferns, with sometimes a female nearby. In general behavior there is a great similarity to *Apalo-*

¹ 1911, K. Svenska Vet. Akad. Handl., XLVII, No. 5, p. 69.

derma, and in three stomachs examined I found only naked caterpillars. Nothing seems to be known of the nest or eggs.

ORDER PICIFORMES

FAMILY Capitonidæ. BARBETS

GENERIC KEY FOR THE BARBETS OF THE CONGO

- 1.—Bill with one or more tooth-like projections on cutting edges of the maxilla¹ 2.
Cutting edges of maxilla straight 5.
- 2.—A deep groove from the nostril to the lower edge of the maxilla just in front of the first "tooth"; very strong bristles on the chin; plumage largely black, with white patches on lower back and flanks, belly red
..... POGONORHYNCHUS, p. 534.
Maxilla not grooved as above 3.
- 3.—Bill light-colored, whitish to cream or buff; conspicuous patches of silky white feathers on flanks or sides of lower breast MELANOBUCCO, p. 529.
Bill dark-colored, no white flank-patches 4.
- 4.—Chest-feathers usually with long hair-like tips; no red on head unless restricted to forehead, and head never entirely white TRICHOLEMA, p. 516.
Chest-feathers without elongated tips; head with red not restricted to forehead, or else entirely white LYBIUS, p. 521.
- 5.—Thick tufts of bristly feathers over nostrils or beneath chin; crown sometimes bare; plumage mostly brown GYMNOCUCCO, p. 510.
Only scattered bristles about base of bill, crown never bare 6.
- 6.—Wing less than 70 mm.; first toe less than half as long as fourth toe 7.
Wing more than 70 mm. long 8.
- 7.—Bill small, culmen (to base) less than 12 mm.; a yellow stripe extends from forehead along middle of crown to back and rump VIRIDIBUCCO, p. 492.
Bill larger, culmen (to base) more than 12 mm. long; no continuous yellow stripe along midline of upperparts, though there may be a golden spot on fore-crown POGONIULUS, p. 494.
- 8.—Tail not exceeding two-thirds the length of wing 9.
Tail approximately as long as wing 10.
- 9.—Black-and-yellow, with forehead and part of crown red
..... BUCCANODON, p. 507.
Body largely blackish brown, face and throat pale yellow
..... STACTOLEMA, p. 509.
- 10.—Crown-feathers short; feathers of fore-neck decomposed, stiffened, and bifurcate; upperparts glossy black TRACHYLEMUS, p. 488.
Crown-feathers longer, sometimes forming a well-marked crest; upperparts spotted or banded, at least on wings TRACHYPHONUS, p. 491.

Trachylæmus purpuratus purpuratus (Verreaux)

Trachyphonus lurpuratus (i.e., *purpuratus*) J. AND E. VERREAUX, 1851, Rev. Mag. Zool., Paris, p. 260 (type locality: Gaboon).—*Trachyphonus purpuratus* SHELLEY,

¹ In young birds the "teeth" are often wanting.

1890, Ibis, p. 169 (Yambuya). SHARPE, 1890, in Jameson, 'Story of Rear Column,' p. 419 (Yambuya). OUSTALET, 1893, Naturaliste, VII, p. 60. DUBOIS, 1905, Ann. Mus. Congo, Zool., I, f. 1, p. 35 (in part. Kisantu; Mayombe).—*Trachylaemus purpuratus* REICHENOW, 1902, 'Vög. Afr.,' II, p. 159 (in part. Yambuya; "Ubangi R.") LÖNNBERG, 1907, Arkiv. f. Zool., III, No. 21, p. 8 (Kingoyi).—*Trachylaemus purpuratus purpuratus* SCHOUTEDEN, 1923, Rev. Z. A., XI, p. 328 (Tshikapa; Luebo); 1924, idem, XII, pp. 267, 415 (Kidada; Bikoro). W. L. SCLATER, 1924, 'Syst. Av. Æth., pt. 1, p. 286. GROTE, 1927, O. Mb., p. 52. BANNERMAN, 1933, 'Birds Trop. W. Afr.,' III, p. 400.—*Trachyphonus purpuratus purpuratus* SCHOUTEDEN, 1926, Rev. Z. A., XIII, p. 194 (Moanda; Temvo; Makaia Ntete).

DISTRIBUTION OF THE SPECIES.—Forests of Lower Guinea, from the Cameroon coast and Angola east to Uganda and the Mau Plateau. In Upper Guinea the genus is represented by *T. goffini* (Schlegel), which is regarded by Grote (1927)—probably with good reason—as conspecific with *purpuratus*.

T. p. purpuratus ranges from the base of Mt. Cameroon to the Gaboon coast and the lowland forests of Angola, south to the Amboim Province; also eastward in the Upper Congo forest to the vicinity of Yambuya on the Aruwimi River. The eastern race, *T. p. elgonensis*, is not conspicuously different, but exhibits less of the whitish appearance of the throat and fore-neck produced by the loose barbs of the feathers. The area of intergradation is very broad, and while the Congo Museum has undoubted examples of *purpuratus* from the Lower Congo and Kunungu near Bolobo, those from Luluabourg in the Kasai and Inkongo on the Sankuru River are certainly intermediate in color. In a series from Buta the margins of throat-feathers are a little more whitish than in birds from Mt. Elgon.

This barbet is less a bird of virgin forest than of second growth and tangled woods near old clearings. It keeps fairly well up in the trees, never showing itself near houses, and would generally escape notice were it not for its voice. It repeats a note like "cook" or "coop" about every two seconds, sometimes for a long period. Two birds may seem to answer each other, and the syllables are louder and terminate more abruptly than the soft coos of *Tricholæma hirsutum*.

In the Cameroon, Bates took an old bird with a single nestling from a hole in a tree, and caught a female in a nesting hole which contained four eggs. These were pure white, somewhat glossy, and measured 28.5–29.5 mm. \times 18–20.5. Most of the barbets in the forested Cameroon, he found, preferred the dry seasons for nesting. Reichenow found a nest with young on the Cameroon River on January, and at Lukolela a nestling with tail not yet half grown was collected on January 22.

Trachylæmus purpuratus elgonensis (Sharpe)

Trachyphonus elgonensis SHARPE, 1891, Ibis, p. 122 (type locality: Mt. Elgon). O.-GRANT, 1910, Tr. Z. S. Lond., XIX, p. 419 (Mpanga forest near Fort Portal).—*Trachyphonus purpuratus* FLOWER, 1894, P. Z. S. Lond., p. 601 (Ipoto). DUBOIS, 1905, Ann. Mus. Congo, Zool., I, f. 1, p. 35 (in part. Prov. Orientale).—*Trachylaemus purpuratus* REICHENOW, 1902, 'Vög. Afr.', II, p. 159 (in part. Ndussuma; Nyangabo; Ipoto; Kinyawanga); 1911, 'Wiss. Ergeb. D. Z.-Afr. Exp.', III, p. 280 (N. W. of Beni). SALVADORI, 1909, Ann. Mus. Civ. Stor. Nat. Genova, (3) IV, p. 321 (Buta-Dungu); 1911, idem, (3) V, p. 445 (Zone of Gurba-Dungu). SASSI, 1912, Ann. Naturh. Hofmus. Wien, XXVI, p. 386 (Beni; Moera; Irumu). SCHOUTEDEN, 1914, Rev. Z. A., III, p. 264 (Kilo); 1918, idem, V, p. 243 (Biogo; Bonzo). W. DEW. MILLER, 1924, Bull. A. M. N. H., L, p. 323.—*Trachylæmus purpuratus elgonensis* W. L. SCLATER, 1924, 'Syst. Av. Æth.', pt. 1, p. 286. CHAPIN, 1927, Bull. A. M. N. H., LIII, p. 478. SCHOUTEDEN, 1932, Rev. Z. A., XXII, p. 124 (Burunga; Lulenga). GRANVIK, 1934, Rev. Z. A., XXV, p. 48.—*Trachylaema purpuratus elgonensis* SCHOUTEDEN, 1936, Ann. Mus. Congo, Zool., I, f. 2, p. 99 (Buta; Titule; Poko; Mauda; Medje; Bondo Mabe).

SPECIMENS.—Panga on Aruwimi R., ♂, Sept. 14. Avakubi, 3 ♂, Feb. 5, Oct. 22, Dec. 7; 2 ♀, Feb. 26. Medje, 2 ♂, Apr. 15, Aug. 13; 3 ♀, Jan. 22, Apr. 13, Aug. 13; ♂ juv., Apr. 30; ♀ juv., May 13. Pawa, ♂, July 5. Niangara, ♂, Nov. 27.

ADULTS.—Iris dark red (deep carmine); bill and naked face light cadmium-yellow (bill sometimes a little more greenish); feet dark greenish or brownish gray with soft skin on outer side of metatarsus greener, and soles yellowish.

DISTRIBUTION.—From the Mau Plateau in Kenya Colony and Mt. Elgon westward through the forest areas of Uganda to the eastern Congo. Birds from the Ituri and southern Uelle belong to this subspecies, which may be expected southward to the Manyema. *Trachylæmus p. elgonensis* extends but little into the savanna district of the Uelle. At Avakubi it is a rather common, but retiring bird about plantations and former village sites, provided there are large trees left standing; and it cuts out its nests in dead trees. Along the Aruwimi it was heard commonly, and from Pawa north to Rungu it was still numerous, to judge from the frequency with which we heard its voice. It gives the same slowly repeated "cook—cook—cook—cook—" as *T. p. purpuratus*.

In the eastern Ituri, in 1926–1927, this barbet was noted as rather common in the forest between Irumu and Beni. It is strictly limited to the forest, however, and does not ascend the mountains very far. On the west slope of Ruwenzori, near the Luami River, I heard its call at 5750 feet; in the Kivu Dr. Schouteden and G. F. de Witte collected specimens a little above 6000 feet.

The majority of our adult examples were definitely in non-breeding

condition. Slight enlargement of the gonads was noted only in three birds, in April and August; so that what evidence there is, including newly fledged young, points to April (early part of the rains) as the breeding season in the northern Ituri.

Of eleven stomachs, ten contained fruit, often of a bright yellow color, but including also palm-nut pulp and berries. One bird had eaten only two snails, and another snail was found with the fruit.

KEY TO THE SPECIES OF *TRACHYPHONUS* IN OR NEAR THE CONGO

- 1.—Head conspicuously crested; ground-color of back and wing-coverts lustrous black. *T. vaillantii*.
- Crest not pronounced; ground-color of back and wing-coverts brown. *T. darnaudii*.

[*Trachyphonus darnaudii darnaudii* (Prévost and Des Murs)]

Micropogon darnaudii PRÉVOST AND DES MURS, 1850, Lefebvre, 'Voyage en Abyssinie,' VI, p. 133 (type locality: Kordofan).—*Trachyphonus arnaudi* SHELLEY, 1891, 'Cat. Birds Brit. Mus.,' XIX, p. 105 (Lado).

The species ranges from Kordofan and Shoa south to the dry region near the coast of Kenya Colony and the country south of Lake Victoria. It has three well-marked races, *T. d. darnaudii* showing a distinctly orange wash about the face, but crown not pure black; wing 71–77 mm. This race ranges from Kordofan, the Upper White Nile, and Shoa to the Rift Valley in Kenya Colony. Having been taken at Lado and Redjaf by Emin, it may possibly occur within our limits in the Lugware country or the vicinity of Mahagi Port.

[*Trachyphonus darnaudii usambiro* Neumann]

Trachyphonus darnaudi usambiro NEUMANN, 1908, B. B. O. C., XXIII, p. 30 (type locality: Usambiro, Tanganyika Terr.).

Larger than the typical race, with darker gray bill, larger black chest-patch, yellower head and nape, and more complete spotted breast-band. Wing 79–85 mm. This race occupies the region south of Lake Victoria, eastward to the Loita Plains and southern Guaso Nyiro in Kenya Colony. It may perhaps be looked for in Urundi or Ruanda.

Trachyphonus vaillantii suahelicus Reichenow

Trachyphonus suahelicus REICHENOW, 1887, J. f. O., p. 60 (type locality: Usegua, Tanganyika Terr.). DUBOIS, 1905, Ann. Mus. Congo, Zool., I, f. 1, p. 35.—*Trachyphonus cafer* DUBOIS, 1886, Bull. Mus. Roy. Hist. Nat. Belg., IV, p. 147 (L. Tanganyika). SHELLEY, 1901, Ibis, p. 166 (E. shore L. Moero). NEAVE, 1910, Ibis, p. 121 (Kambove). DE RIEMAECKER, 1927, Rev. Z. A., XIV, p. 275 (Elisabeth-

ville—Kafubu R.).—*Trachyphonus vaillantii suahelicus* W. L. SCLATER, 1924, 'Syst. Av. Æth.', pt. 1, p. 284.—*Trachyphonus vaillantii suahelicus* SCHOUTEDEN, 1930, Rev. Z. A., XVIII, p. 283 (Kafubu R.).

DISTRIBUTION OF THE SPECIES.—From Natal north to the Pangani River in East Africa, Lake Tanganyika, and Angola. *T. v. vaillantii* Ranzani inhabits southern Africa, north to about the Zambesi. From Lake Ngami Ogilvie-Grant described a subspecies *nobilis* from a single specimen with very stout bill, but it appears not to be valid, and typical *vaillantii* may reach southern Angola. *T. v. suahelicus* ranges from the Zambesi River north to the eastern coast near the Pangani River. It has a rather small bill, and is richly varied with red on face and breast. The bases of the frontal feathers are blackish, their tips red, and the intervening space yellowish. Grote would restrict *suahelicus* to the eastern coastlands, where the wing-length is said to be only 93–97 mm.; and he has described *T. v. suschkini*¹ as a larger inland race, with wings 100–104 mm., extending from Unyanyembe to Lake Tanganyika and northern Angola. I find that skins from the southeastern Congo have wings varying from 95 to 107 mm. There does seem to be an average difference in wing-length, but that is all. So I shall retain the name *suahelicus* for the birds occupying the southeastern Congo and ranging westward to northern Angola.

The Congo Museum has skins from Tembwe on Lake Tanganyika, Kabalo on the Lualaba, Kiambi on the Luvua, Lukafu, Elisabethville, Nieuwdorp, Kanzenze, and Funda Biabo. Rockefeller and Murphy collected three specimens in southern Marungu, at altitudes between 3600 and 5650 feet. At Kiambi it is evidently very numerous, and Neave mentioned this barbet as fairly common in the Upper Katanga, more often heard than seen. It is doubtless a bird of savanna woods, and its voice was compared by Böhm and by Ayres to the sound of an alarm clock. The notes are repeated every few minutes, and sometimes become almost a trill.

Levaillant's barbet occasionally joins mixed bird-parties and its diet includes insects as well as fruit. Its nest is in a hole in a tree, the eggs numbering three or four. They are smooth and white, measuring, in the South African race, 29.2–30.2 mm. × 20.6–20.8.

Viridibucco coryphæus jacksoni Sclater

Viridibucco coryphæa jacksoni W. L. SCLATER, 1930, B. B. O. C., LI, p. 16 (type locality: Kanyango, Toro). BOULTON, 1931, Ann. Carnegie Mus., XXI, p. 47 (Kalongi on Ruwenzori; Lubero; Mt. Mikenno).—*Barbatula coryphæa* REICHENOW,

¹ Grote, 1929, O. Mb., p. 76 (Tabora, Unyamwezi).

1911, 'Wiss. Ergeb. D. Z.-Afr. Exp.,' III, p. 280 (Base of Mt. Karisimbi).—*Viridibucco coryphæa* W. L. SCLATER, 1924, 'Syst. Av. Æth.,' pt. 1, p. 280. SCHOUTEDEN, 1932, Rev. Z. A., XXII, p. 124 (Nya-Muzinga; Lulenga).—*Viridibucco coryphæus* CHAPIN, 1927, Ibis p. 359 (W. slope of Ruwenzori).

DISTRIBUTION OF THE SPECIES.—Highlands encircling the Congo basin; Mt. Cameroon, the highlands of northern Cameroon, Ruwenzori, the mountains west of Lake Edward, the Kivu Volcanoes, and the plateau region of Benguella. Though confined to woods, it is unknown in areas below 5000 feet, at least in the Congo.

V. c. coryphæus Reichenow is restricted to the highlands of Cameroon, and has bright chrome-yellow on crown, middle of back, rump, and wings. *V. c. jacksoni*¹ of the highlands of the eastern Congo differs in having the yellow of upperparts a little more greenish. *V. c. angolensis* Boulton² is known only from the plateau of Benguella.

For many years this species was known only from Cameroon. Then the Mecklenburg Expedition obtained a single specimen in the Kivu. I found it rather common on Ruwenzori, and the race *jacksoni* was described by Sclater from a single specimen collected by Jackson many years before. Meanwhile Boulton had discovered the race he later named *angolensis*.

On Ruwenzori I shot my first specimen in July, 1926, at 7800 feet on Mt. Musandama, near the northeastern end of the range. In December of the same year, I found it fairly common on the western slope of Ruwenzori, at 7000–8000 feet, near the Butahu River. Nowhere, however, was it so numerous as in the mountains northwest of Lake Edward, at an elevation of about 7000 feet. Here I have heard as many as six in a day's march.

Among the Kivu Volcanoes the species is not rare. Two were collected on the northwest slope of Mikenno at 7900 feet, and others were heard in woods north of Kibati, 6700 feet, and on the southeast flank of Mt. Niragongo at 6800 feet. It seems certain to occur in the mountains northwest of Lake Tanganyika, and possibly some form of this species lives in small patches of forest at high levels in the Upper Katanga.

Even less apt to be seen than the species of *Pogoniulus*, this diminutive tinker-bird will usually escape observation if one does not purposely listen for its call. Instead of repeating a single "tok," it gives a short series of such sounds, three to seven in number, but run together rapidly. This sharp "ik-k-k-k," of almost frog-like character, is repeated

¹ For this race G. M. Mathews, 1934, B. B. O. C., LV, p. 34, proposed the substitute name *kildamariae*, but it need not be used if the genus *Viridibucco* is considered valid.

² 1931, Ann. Carnegie Mus., XXI, p. 46 (Mombolo, Benguella).

slowly a number of times, but never for such protracted periods as the voice of *Pogoniulus leucolaima*.

The birds we saw calling were all males, females are found only by good luck. They frequent scrubby woods especially, and keep from 8 to 30 feet above the ground. In eight stomachs examined there was always yellow or orange pulp from fruit, and in five cases bits of small insects were noted as well. Some of the latter seemed to be small beetles.

KEY TO THE CONGO SPECIES OF *POGONIULUS*

- 1.—With a white or yellow malar stripe.....2.
Without any well defined malar stripe; feathers of upperparts dusky with yellowish or greenish edgings throughout.....*P. scolopaceus*.
- 2.—Fore-crown with a yellow or orange patch.....*P. chrysoconus*.
Crown wholly black.....3.
- 3.—Rump with a red patch-stripes on side of head yellow.....*P. erythronotos*.
Rump with yellow patch.....4.
- 4.—Superciliary and malar stripes yellow, throat yellow.....*P. subsulphureus*.
Superciliary and malar stripes white, throat white or pale gray.....5.
- 5.—Rump-patch golden yellow.....*P. bilineatus*.
Rump-patch lighter, sulphur-yellow.....*P. leucolaima*.

Pogoniulus scolopaceus flavisquamatus (Verreaux)

Barbatula flavisquamata J. AND E. VERREAUX, 1855 J. f. O. p. 101 (type locality: Cape Lopez, Gaboon). O.-GRANT, 1908, Ibis, p. 310 (below Kasongo). BANNERMAN, 1920, Rev. Z. A., VII, p. 293 (Poko).—*Lignobucco scolopaceus* REICHENOW, 1887, J. f. O., p. 299 (Manyanga).—*Lignobucco consobrinus* REICHENOW, 1887, J. f. O., p. 309 (Kibondo).—*Barbatula scolopacea* SHELLEY, 1890, Ibis, p. 169 (Yambuya). SHARPE, 1890, in Jameson, 'Story of Rear Column,' p. 415 (Yambuya). EMIN, 1894, J. f. O., p. 167 (old Irumu). DUBOIS, 1905, Ann. Mus. Congo, Zool., I, f. 1, p. 35 (Ituri). LÖNNBERG, 1907, Arkiv f. Zool., III, No. 21, p. 7 (Lower Congo). BERLIOZ, 1925, Bull. Mus. Hist. Nat. Paris, XXXI, p. 351 (Luluabourg).—*Barbatula (scolopacea ?)* FLOWER, 1894, P. Z. S. Lond., p. 600 (Ipoto).—*Barbatula scolopacea stellata* REICHENOW, 1902, 'Vög. Afr.,' II, p. 145.—*Barbatula scolopacea consobrina* REICHENOW, 1902, 'Vög. Afr.,' II, p. 145.—*Barbatula scolopacea flavisquamata* REICHENOW, 1911, 'Wiss. Ergeb. D. Z.-Afr. Exp.,' III, p. 278 (Irumu). SASSI, 1912, Ann. Naturh. Hofmus. Wien, XXVI, p. 386 (E. of Rutshuru Plain; Moera; Beni; Mawambi; Ukaika; Mawambi—Irumu). SCHOUTEDEN, 1918, Rev. Z. A., V, p. 242.—*Pogoniulus scolopaceus flavisquamatus* BANNERMAN, 1922, Rev. Z. A., X, p. 111. W. L. SCLATER, 1924, 'Syst. Av. Æth.,' pt. 1, p. 284. FRIEDMANN, 1930, 'Afr. Rep. Liberia Belg. Congo,' II, p. 756 (Efandu on Congo R.; Beni—Irumu). BANNERMAN, 1933, 'Birds Trop. W. Afr.,' III, p. 398 (Likandi R.).—*Pogoniulus scolopaceus flavisquamatus* SCHOUTEDEN, 1923, Rev. Z. A., XI, p. 328 (Luebo; Kabambaie; Tshikapa; Ngombe in Kasai).—*Pogoniulus scolopaceus flavisquamatus* SCHOUTEDEN, 1926, Rev. Z. A., XIII, p. 194 (Makaia Ntete); 1936, Ann. Mus. Congo, Zool, I, f. 2, p. 99 (Kotili; Buta; Nava R.; Rungu; Bondo Mabe).—*Pogoniulus scolopaceus aloysii* GYLDENSTOLPE, 1924, K. Svenska Vet. Akad. Handl.,

(3) I, No. 3, p. 244 (Kartushi).—*Pogoniulus scolopaceus consobrina* GLYDENSTOLPE, 1924, K. Svenska Vet. Akad. Handl., (3) I, No. 3, pp. 244, 245 (Mukimbungu).

SPECIMENS.—Avakubi, 2 ♂, Nov. 8. Gamangui, ♂, Feb. 10. Medje, 5 ♂, Mar. 31, May 14, July 12, Aug. 3, 21; 2 ♀, May 14, June 8. Niangara, ♀, Nov. 29. Penge, ♂, Apr. 18; ♀, Apr. 23.

ADULT MALE.—Iris light brownish gray to dirty grayish yellow, sometimes light brown, almost whitish exteriorly; eyelids dark gray; bill black; feet dark gray.

ADULT FEMALE.—Iris pale yellow.

DISTRIBUTION OF THE SPECIES.—Sierra Leone to northern Angola, Uganda, and the interior of Kenya Colony. Five subspecies are recognized. *P. s. scolopaceus* (Bonaparte) ranges from Sierra Leone to Calabar, and *P. s. stellatus* (Jardine and Fraser) is peculiar to Fernando Po. *P. s. flavisquamatus* extends from the Cameroon to the Lower Congo and eastward to the Uelle, the Semliki Valley, east Rutshuru Valley, the Manyema, and Kasai. The race *consobrinus* of Riechenow, described from Kibondo, between the Lualaba River and Tanganyika, seems not to be separable. I cannot find any constant difference in color between specimens from the Ituri and Uelle and those of Luluabourg in the Kasai. The northeastern specimens have wings 54–59 mm., those of the Kasai 57–60 mm. *P. s. aloysii* Salvadori,¹ with slightly whiter fore-neck and flanks more marked with black, ranges from Uganda to Lake Naivasha. Northern Angola has *P. s. angolensis* Bannerman, with feathers of upperparts all tipped with brighter greenish yellow than in any other race, underparts more uniform than in *flavisquamatus*. Three specimens collected by Dr. Schouteden at Kidada agree with *angolensis*, and two obtained by Dr. Schwetz near the Kwango River are probably of that race.

In the Congo this small barbet is resident in the lowland forest area and in the heavier gallery forests. It frequents old clearings with many trees standing, and the borders of forest, but is heard even in its more remote parts. When we first noticed its voice, Lang felt sure it must be that of a quail (*Coturnix*), and so close indeed is the resemblance that a few years later I immediately recognized the note of the quail in France. The barbet's notes differ however, in starting with a single syllable, "cok!" or "quip!" This is repeated slowly, then becomes doubled to "cokok," tripled, and gradually, as the repetition continues, it consists of four or five rapid syllables, and finishes as though the bird were out of breath. It is the middle part that most reminds one of the European quail. After a spell of calling, the bird generally remains quiet for a

¹ 1906, Boll. Mus. Zool. Anat. Torino, XXI, No. 542, p. 2 (Entebbe).

little time. L. Petit has likewise compared these notes with those of the quail.¹

Like all of the African barbets, *P. scolopaceus* usually perches, and is only occasionally noticed pecking at a tree in woodpecker fashion, probably when nest-building. Near Penge, April 23, I found a nest, the entrance to which was a round hole so small that it was astonishing to see how easily the female bird popped in and out of it. This was in a dry tree stub, only about twelve feet above the ground, in a clearing. There were three nestlings, with only the tips of the feather-sheaths showing through the skin. No special nesting material had been used. Nests are not always so low down, for at Avakubi I saw a pair going into a hole high up in a tree. Possibly four eggs are sometimes laid; they are white, and three secured by Bates² in the Cameroon measured 17–18.5 mm. \times 13.5–14.

Among the examples collected in the Ituri there were birds in breeding condition in February, March, April, and again in August. I should not be surprised if some were nesting at almost any season.

From seven stomachs examined, the diet appears to be a combination of fruit and insects, for small seeds were present in three stomachs, small fruits in four, and insects in four. One of the last-named was an earwig, which I saw captured on the wing.

[*Pogoniulus scolopaceus aloysii* (Salvadori)]

Xylobucco aloysii SALVADORI, 1906, Boll. Mus. Zool. Anat. Torino, XXI, No. 542, p. 2 (type locality: near Entebbe, Uganda).

This subspecies differs only slightly from *flavisquamatus*, and is found in Uganda and western Kenya Colony. Two specimens from the Semliki Valley were referred by Count Gyldenstolpe to *alloysii*. I have seen several specimens from Moera and Beni, including an unusually dark-colored female collected by myself; but I cannot distinguish them from *flavisquamatus*.

Pogoniulus scolopaceus angolensis Bannerman

Pogoniulus scolopaceus angolensis BANNERMAN, 1933, B. B. O. C., LIII, p. 184 (type locality: Ndala Tando, N. Angola).—*Pogoniulus scolopaceus flavisquamatus* SCHOUTEDEN, 1924, Rev. Z. A., XII, p. 267 (Kidada).

DISTRIBUTION.—Wooded areas of northern Angola, and apparently also near the Kwango River and in the Lower Congo, but not the Mayombe forest. Three examples from Kidada near Kitobola have been

¹ 1899, Mem. Soc. Zool. France, XII, p. 64.

² 1911, Ibis, p. 506.

positively identified as *angolensis* by Dr. Bannerman, so possibly the specimens recorded from Manyanga by Reichenow (1887), Lower Congo by Lönnberg (1907), and Mukimbungu by Gyldenstolpe (1924) also belong to this race. Two more, recently collected by Dr. Schwetz at Kasanga, just east of Kasongo-Lunda on the middle Kwango River, seem likewise to belong with *angolensis*.

***Pogoniulus chrysoconus centralis* (Reichenow)**

Barbatula centralis REICHENOW, 1900, O. Mb., p. 40 (type locality: Nyangabo, W. of L. Albert); 1902, 'Vög. Afr.', II, p. 150 ("Ubangi R."); 1911, 'Wiss. Ergeb. D. Z.-Afr. Exp.', III p. 280 (Kirk Falls on lower Semliki R.). O.-GRANT 1910 Tr. Z. S. Lond. XIX p. 418 (Mokia).—*Barbatula chrysocoma* SHELLEY, 1891, 'Cat. Birds Brit. Mus.', XIX, p. 42 (Kibiro). DUBOIS, 1905, Ann. Mus. Congo, Zool., I, f. 1, p. 35 (Uelle). SCHUBOTZ, 1921, 'Tageb. Emin Pascha,' VI, p. 101 (Tunguru).—? *Barbatula chrysocoma* OUSTALET, 1893, Naturaliste, (2) VII, p. 60 (no exact locality).—*Barbatula chrysocoma centralis* NEUMANN, 1904, J. f. O., p. 392 (L. Albert to L. Edward).—*Pogoniulus chrysoconus chrysoconus* C. GRANT, 1915, Ibis, p. 445 (Ubangi R.). BANNERMAN, 1933, 'Birds Trop. W. Afr.', III, p. 387, Fig. 115.—*Pogoniulus chrysoconus centralis* SCLATER AND M.-PRAED, 1919, Ibis, p. 637. W. L. SCLATER, 1924, 'Syst. Av. Æth.', pt. 1, p. 281 (Upper Uelle; Ruwenzori; "country W. of L. Tanganyika").—*Pogoniulus chrysoconus centralis* SCHOUTEDEN, 1936, Ann. Mus. Congo, Zool., I, f. 2, p. 99 (Mauda; Niarembe; Mahagi Port).

SPECIMENS.—Dungu, 2 ♂, Mar. 3, June 30; ♀, June 30.

ADULTS.—Iris dark brown, bill black, feet greenish black.

DISTRIBUTION OF THE SPECIES.—From Senegal to Abyssinia and south to Bechuanaland and the Transvaal, avoiding the whole of the West African forest. Seven races were recognized by Claude Grant (1915) and by Sclater (1924).

Pogoniulus c. chrysoconus (Temminck) ranges from Senegal to the Benue River, while the closely allied *P. c. centralis* extends from the savannas of the Ubangi and Uelle to Uganda, and south along the eastern Congo border to the plains about Lake Edward. In this race the crown-patch is bright chrome-yellow, the under surface bright lemon-yellow, the middle wing-coverts with pale yellowish borders, and inner secondaries only narrowly margined with whitish. Wings 57–61 mm. *P. c. schubotzi* (Reichenow), more broadly streaked with whitish on back, is found from Asben to the Bahr-el-Ghazal; *P. c. zedlitzi* (Neumann) near the White and Blue Niles; *P. c. xanthostictus* (Blundell and Lovat) in southern and central Abyssinia.

The race occupying the southeastern Congo is *P. c. rhodesiæ* Grant. Its crown-patch is deeper yellow than in *centralis*, middle and lesser wing-coverts washed with golden yellow, inner secondaries with broad

white external margins. The lower surface is paler yellow, and the breast usually has a conspicuous wash of ochre. Wings 55–64 mm. *P. c. extoni* (Layard) is the southernmost form, from southern Angola and southeastern Nyasaland to the Transvaal.¹

P. c. centralis was heard and observed at Aba, Piagga (near Faradje) Nzoro, and about Dungu. It was not a very common bird, nor very regularly distributed, but inhabited dry bushy savanna land, where the trees were fairly dense and high, seeming fond also of the neighborhood of rocky hills. My attention was attracted by its voice, which differs from that of *P. leucolaima* and *subsulphureus* in that there is no periodic pause after every four notes or more. The syllables do not increase in number, as with *P. scolopaceus*; but the same individual may have two or three styles of call. A common one is a double “cok-ok, cok-ok, cok-ok, cok-ok—”; and I have heard the same male bird change after a short silence to a simpler “cok, cok, cok, cok, cok,” not unlike that of the forest-haunting *erythronotos*. The third style for *chrysoconus* is a more rolling “cok-k-k-k, cok-k-k-k, cok-k-k-k—.”

The pair taken on June 30 were ready to breed, and the other male was also in similar condition in early March. The stomach contents in two cases were of fruit, in the third, beetle-remains.

In 1926 and 1927, I heard the yellow-fronted tinker-bird frequently at Kasenyi on Lake Albert, and about the southern base of Ruwenzori, near Kasindi. In these regions, too, it lives among the trees growing in a rather dry savanna, and does not ascend the higher mountains. Its notes seem to me almost indistinguishable from those of *Pogoniulus pusillus*, its red-fronted counterpart in the more easterly part of Africa, from Eritrea to eastern Cape Province.

The nest of the yellow-fronted species is a hole excavated in a rotten limb of a tree, with round entrance about 22 mm. wide. Lynes² reported a nest of *P. c. schubotzi* in Darfur on April 14, at a height of 15 feet in a large wild fig-tree. It contained two naked young.

***Pogoniulus chrysoconus rhodesiæ* Grant**

Pogoniulus chrysoconus rhodesiæ C. GRANT, 1915, B. B. O. C., XXXV, p. 100 (type locality: Chambezi Valley, N. E. Rhodesia); 1915, Ibis, p. 446 (E. Belgian Congo; W. of L. Tanganyika). W. L. SCLATER, 1924, 'Syst. Av. Æth.', pt. 1, p. 281 (southern Belg. Congo).—*Barbatula chrysocoma* DUBOIS, 1886, Bull. Mus. Roy. Hist. Nat. Belg., IV, p. 147 (L. Tanganyika).—*Barbatula extoni* O.-GRANT, 1908, Ibis, p. 310 (N. W. of L. Tanganyika). NEAVE, 1910, Ibis, p. 120 (Kambove; S. Kaluli R.). REICHENOW, 1911, 'Wiss. Ergeb. D. Z.-Afr. Exp.', III, p. 280. SASSI, 1912, Ann.

¹ The recent revision by Macdonald, 1938, Ibis, pp. 346–348, seems to me somewhat hasty.

² 1925, Ibis, p. 350.

Naturh. Hofmus. Wien, XXVI, p. 385 (Baraka).—*Pogoniulus chrysoconus rhodesiæ* SCHOUTEDEN, 1923, Rev. Z. A., XI, p. 328 (Luluabourg; Luebo ?); 1930, idem, XVIII, p. 283 (Elisabethville).—? *Pogoniulus chrysoconus* SCHOUTEDEN, 1923, Rev. Z. A., XI, p. 394 (Kwamouth).

DISTRIBUTION.—Northern Nyasaland, Northeast Rhodesia, and Angola, north to Lake Tanganyika, the Ruzizi Valley, and the Kasai district. Not yet reported from the Lower Congo. This race is very closely allied to *P. c. extoni*.

The ochreous-yellow wash on the breast is especially strong in five specimens collected at Luluabourg in the Kasai district by Father Callewaert. These have wings 55–60 mm. Ten specimens from Marungu, Upper Katanga, Kinda, and Dilolo are distinctly duller on the breast, with wings 59–62 mm. Kasai specimens are probably deserving of racial recognition.¹

According to Neave, this small barbet is not uncommon in the savanna woods of the Upper Katanga, occurring singly or in small family parties, one of them sometimes accompanying a bird party. I have seen the species in the Ruzizi Valley, and have little doubt that the subspecies *rhodesiæ* is the one living there, since specimens from the northwest side of Lake Tanganyika have been identified by Ogilvie-Grant and by Sassi as *extoni*.

A set of two white eggs of *rhodesiæ* was found by Lynes² in October near Serenje, Northern Rhodesia; average measurements 18.7 × 12.3 mm.

***Pogoniulus leucolaima leucolaima* (Verreaux)**

Barbatula leucolaima J. AND E. VERREAUX, 1851, Rev. Mag. Zool., Paris, p. 263 (type locality: Gaboon). REICHENOW, 1902, 'Vög. Afr.', II, p. 147 (in part); 1911, 'Wiss. Ergeb. D. Z.-Afr. Exp.', III, p. 279 (in part. N. W. of Beni); 1923, Mitt. Naturh. Mus. Hamburg, XL, p. 63 (Lupungu). LÖNNBERG, 1907, Arkiv f. Zool., III, No. 21, p. 7 (Mukimbungu). SASSI, 1912, Ann. Naturh. Hofmus. Wien, XXVI, p. 385 (in part. Moera; Beni; Mawambi; Ukaika). SCHOUTEDEN, 1914, Rev. Z. A., III, p. 264 (Kilo); 1918, idem, V, p. 242 (in part. Zambo).—*Megalaema bilineata* SCHWEINFURTH AND RATZEL, 1888, 'Emin Pascha,' German Ed., p. 403 (Monbuttu). EMIN, 1888, 'Emin Pasha Centr. Afr.,' p. 404 (Makraka); 1919, in Stuhlmann, 'Tageb. Emin Pascha,' II, p. 495. SCHUBOTZ, 1921, 'Tageb. Emin Pascha,' VI, p. 277 (Bellima).—*Barbatula leucolæma* SHELLEY, 1888, P. Z. S. Lond., p. 42 (Tomaya); 1891, 'Cat. Birds Brit. Mus.,' XIX, p. 45. EMIN, 1894, J. f. O., p. 167 (old Irumu). FLOWER, 1894, P. Z. S. Lond., pp. 603, 604 (Urumbi on Lenda R.). DUBOIS, 1905, Ann. Mus. Congo, Zool., I, f. 1, p. 35 (Lower Congo). O.-GRANT, 1908, Ibis, p. 311 (below Kasongo).—*Megalaema bilineata* EMIN, 1919, in Stuhlmann, 'Tageb. Emin Pascha,' II, p. 490.—*Megalaema* sp. SCHUBOTZ, 1921, 'Tageb. Emin Pascha,' VI, p.

¹ Admiral Lynes, 1938, Rev. Z. A. XXXI, p. 71, is of this same opinion.

² 1934, Ibis, p. 38.

257.—*Pogoniulus leucolaima leucolaima* BANNERMAN, 1922, Rev. Z. A., X, p. 108 (Ubangi R.); 1933, 'Birds Trop. W. Afr.,' III, p. 392. GYLDENSTOLPE, 1924, K. Svenska Vet. Akad. Handl., (3) I, No. 3, p. 241 (Molemba; Kartushi; Kampi na Mambuti). STONE, 1936, Proc. Acad. Nat. Sci. Phila., LXXXVIII, p. 563 (Eki-bondo).—*Pogoniulus leucolaima nyanzæ* BANNERMAN, 1922, Rev. Z. A., X, p. 109 (in part).—*Pogoniulus leucolaimus leucolaimus* SCHOUTEDEN, 1923, Rev. Z. A., XI, p. 328 (Ngombe in Kasai); 1924, idem, XII, p. 415 (Bikoro; Eala; Tondou).—*Pogoniulus leucolaimus* SCHOUTEDEN, 1923, Rev. Z. A., XI, p. 395 (Kwamouth); 1926, idem, XIII, p. 194 (Temvo).—*Pogoniulus leucolaima nyanzæ* W. L. SCLATER, 1924, 'Syst. Av. Æth.,' pt. 1, p. 282 (in part. Uelle).—*Pogoniulus leucolaimus* SCHOUTEDEN, 1925, Rev. Z. A., XIII, p. 11 (Kunungu).—*Pogoniulus leucolaimus togoensis* SCHOUTEDEN, 1926, Rev. Z. A., XIII, p. 194 (Kifuku on Banana Bay).—*Pogoniulus leucolaema* SCHOUTEDEN, 1936, Ann. Mus. Congo, Zool., I, f. 2, p. 99 (Kotili; Buta; Panga; Medje; Mauda; Abimva).

SPECIMENS.—Boma, ♂, Jan. 24. Lukolela, ♂, July 17. Avakubi, 3 ♂, May 29, Aug. 2, Dec. 19; 3 ♀, Jan. 20, Aug. 17, Oct. 16; ♀ juv., Aug. 20. Ngayu, ♀, Dec. 19. Gamangui, ♂, Feb. 3. Medje, 5 ♂, July 11, Aug. 14, 28, Sept. 20; 2 ♀, Aug. 3, Oct. 6. Niangara, ♀, May 4. Between Faradje and Aba, ♂, Dec. 2.

ADULT MALE.—Iris very dark brown; bill black; feet dusky with a slight tinge of bluish, soles yellowish.

DISTRIBUTION OF THE SPECIES.—Western forest region from Senegal to the Upper Uelle district and Uganda, and south to Urungu and central Angola, but not in the highlands of the Katanga or Marungu. It has been taken in the forest areas of the Kasai and Lomami districts, and is found nearly to the border of the Lado district, though there restricted to patches of heavy forest.

The Upper Guinea race is *P. l. togoensis* (Neumann), distinguished by its lower breast and belly being rather bright yellow, its wing usually short, scarcely exceeding 51 mm. *Pogoniulus l. leucolaima* is slightly larger, wing 50–54 mm., and more greenish yellow on lower breast and abdomen. Specimens from Boma, the Congo mouth, and northern Angola may be a little paler yellow beneath than those of the Upper Congo, but the range of typical *leucolaima* seems to extend from the Cameroon coast and Angola through the Upper Congo and Kasai to the northeastern Uelle and the Semliki Valley. *P. l. poensis* (Alexander) is a supposedly larger race of Fernando Po.

P. l. nyanzæ (Neumann), of Uganda and the western shore of Lake Victoria, is a trifle more greenish below than *leucolaima*, and has slightly longer wings, 52–56 mm. *P. l. mfumbiri* (O.-Grant), of the mountain forests along the eastern Congo border, is distinctly duller and greener below than any of the foregoing, as well as larger, its wing measuring 53–59 mm. *P. l. urungensis* (Reichenow) was described from the southern end

of Lake Tanganyika, and may extend westward to Dilolo. It may be synonymous with *nyansæ*.

The calling of these tiny barbets is so common and continuous in the Upper Congo forests that one soon ceases to notice it, as though it had become an integral part of the atmosphere. The natives of the southern Uelle say that they "beat bark-cloth," referring to the sound of the blows of an ivory mallet on fig-bark laid over a thin log. To this may be compared the English name of tinker-bird. An attentive listener will notice that such notes are sometimes produced very rapidly, with a slight pause as though for breath after eight or ten syllables, or at other times more slowly—only three per second—with the pause coming after four or five syllables. These slower notes are those of *Pogoniulus leucolaima*, as we ascertained by following up their authors, male birds perching almost motionless in a bush or tree. The sounds are not very loud, but have considerable carrying power, and are heard at all times of the day. I wrote them "cök cök cök cök, cök cök cök cök cök—" but the words "tonk-tonk-tonk" have been used by other observers. During the performance the head is raised somewhat and the neck swells, though the bill is little opened if at all. In the highlands of Kenya Colony sounds exactly similar are produced by *P. bilineatus jacksoni* (Sharpe).

P. leucolaima has another hoarser note, and the two birds I collected as they gave it proved to be females. This is best written "kkkkk, kkkkk, kkkkk, kkkkk—," and may be repeated some eight or ten times. It may be likened to one of the calls of *P. erythronotos*, but is uttered more rapidly, and is by no means so loud.

In the Ituri this species is abundant, and often seen in clearings. In the southern Uelle it is more restricted to woods, though common about Niangara. At Boma it is not uncommon and calls exactly as in the Ituri.

A nest, which I saw being excavated in a small tree near Medje, was like a diminutive woodpecker hole. From Avakubi northward it is clear from our dissections that the breeding season comes regularly in July, August, and September. Birds taken at other times of year showed little or no enlargement of the gonads. That the rainy season is thus their time of reproduction is upheld by my finding a breeding male at Boma (south of the equator) in January.

Mr. Bates¹ in the Cameroon found many nests with eggs and young, distributed among most of the months in the year. Tall stumps left in clearings were the usual nesting sites, and the holes were about 100 mm.

¹ 1909, *Ibis*, p. 18; 1911, *Ibis*, p. 507.

deep with round entrance 20 mm. in diameter. Two, or occasionally three eggs are laid, glossy white, 15–18 mm. \times 11.5–13 mm.

Eleven stomachs were examined by us, small fruits and insects often being found together. Thus nine stomachs contained insect-remains, six fruit, and two seeds, evidently from fruit. One bird was noted as having had an ant in its beak.

[*Pogoniulus leucolaima togoensis* (Neumann)]

Barbatula leucolaima togoensis NEUMANN, 1907, J. f. O., p. 347 (type locality: Togoland).—? *Pogoniulus leucolaima togoensis* BANNERMAN, 1922, Rev. Z. A., X, p. 107 (Ubangi R.; Guruba R.; Kibali R.); 1933, 'Birds Trop. W. Afr.', III, p. 393. W. L. SCLATER, 1924, 'Syst. Av. Æth.', pt. 1, p. 282 (in part. Uelle).

This race inhabits Togoland and the Gold Coast, extending westward to Senegal, and supposedly reaching the northern Congo. Sclater stated that "birds from the Uelle are intermediate between this and the other races." I do not find that specimens from the Uelle are yellower beneath than those of the central Congo, and our specimen from Lukolela is one of the yellowest in the series. Count Gyldenstolpe has already pointed out how variable the color-characters are among specimens from the northeastern Congo forest, and I agree with him in calling them *P. l. leucolaima*.

Pogoniulus leucolaima mfumbiri (O.-Grant)

Barbatula mfumbiri O.-GRANT, 1907, B. B. O. C., XIX, p. 107 (type locality: Mfumbiro Volcano, 6000 ft., N. W. of L. Kivu); 1908, Ibis, p. 311; 1910, Tr. Z. S. Lond., XIX, p. 417 (Mubuku Valley, 5500–7000 ft.).—*Barbatula leucolaima* REICHENOW, 1902, 'Vög. Afr.', II, p. 147 (in part. Mpororo); 1911, 'Wiss. Ergeb. D. Z.-Afr. Exp.', III, p. 279 (in part. Mt. Karisimbi, 2500 m.). SASSI, 1912, Ann. Naturh. Hofmus. Wien, XXVI, p. 385 (in part. N. W. of L. Tanganyika). SCHOUTEDEN, 1918, Rev. Z. A., V, p. 242 (in part).—*Barbatula leucolaima nyansæ* NEUMANN, 1907, J. f. O., p. 347 (in part. Migere in W. Mpororo). W. L. SCLATER, 1924, 'Syst. Av. Æth.', pt. 1, p. 282 (in part).—*Pogoniulus leucolaima nyanzæ* BANNERMAN, 1922, Rev. Z. A., X, p. 109 (in part. Ruwenzori distr.).—*Pogoniulus leucolaima mfumbiri* GYLDENSTOLPE, 1924, K. Svenska Vet. Akad. Handl., (3) I, No. 3, pp. 242, 243 (Kivu Volcanoes; Ruwenzori; W. Mpororo).—*Pogoniulus leucolaima nyanzæ* SCHOUTEDEN, 1932, Rev. Z. A., XXII, p. 124 (Lulenga; Mt. Karisimbi).—*Pogoniulus leucolaimus nyansæ* SCHOUTEDEN, 1935, Rev. Z. A., XXVII, p. 401 (Kako R. bridge).

DISTRIBUTION.—Mountain forests along the eastern Congo border, from Ruwenzori to the highlands northwest of Lake Tanganyika; usually at altitudes between 5000 and 8400 feet. In habits and voice there is no difference from the birds of the lowlands to the westward, but most of the mountain birds are larger and paler in color beneath. One female, however, from the Bugongo Ridge on West Ruwenzori, at 7100 feet, is

indistinguishable from *P. l. leucolaima*, and its wing measures only 51 mm.

Our five skins of *mfumbiri* come from Kalongi on West Ruwenzori, Mulu in mountains northwest of Lake Edward, and the northwest slope of Mt. Mikenno. Their wings vary from 53.5 to 57 mm. Judging from the frequency with which these tinkler-birds are heard, I regard them as common in the lower mountain forests on Ruwenzori, west of Lake Edward, the Kivu Volcanoes, and the mountains west of the Ruzizi Valley.

[*Pogoniulus leucolaima urungensis* (Reichenow)]

Barbatula leucolaema urungensis REICHENOW, 1915, O. Mb., p. 91 (type locality: Kitungulu in Urungu, near S. end of L. Tanganyika).

This subspecies was said to be similar to *P. bilineatus* "*kandti*," but with lemon yellow rump, wing 55–56 mm. While it may prove to be synonymous with *P. l. nyansæ*, its range may extend into the southeastern Congo. The Congo Museum has four skins from near Kinda in the eastern Lulua district and one from Dilolo which are slightly duller below than *P. l. leucolaima* and have wings 51–56 mm.

Pogoniulus bilineatus jacksoni (Sharpe)

Barbatula jacksoni SHARPE, 1897, B. B. O. C., VII, p. vii (type locality: Mau, in E. Africa).—*Barbatula kandti* REICHENOW, 1903, O. Mb., XI, p. 23 (type locality: L. Kivu); 1903, 'Vög. Afr.', II, p. 717; 1911, 'Wiss. Ergeb. D. Z.-Afr. Exp.', III, p. 279 (Kwidjwi Is.).—*Barbatula bilineata kandti* NEUMANN, 1907, J. f. O., p. 345.—*Pogoniulus bilineatus kandti* W. L. SCLATER, 1924, 'Syst. Av. Æth.', pt. 1, p. 283. FRIEDMANN, 1930, Bull. 153, U. S. Nat. Mus., p. 455.

DISTRIBUTION OF THE SPECIES.—Zululand north to Nyasaland, Mombasa, and Mt. Elgon. *P. b. bilineatus* (Sundevall) ranges from Southeast Africa to Nyasaland. On Zanzibar Island and the adjacent coast north to Mombasa lives a very small race, with wings only 48–52 mm., *P. b. fischeri* (Reichenow). Another very small race, *P. b. conciliator* Friedmann, inhabits the Uluguru Mts. *P. b. alius* Friedmann, with wings about 50–56 mm., is found in the Kenya highlands east of the Rift Valley. *P. b. jacksoni* of Mt. Elgon, the Mau plateau and adjacent highlands is clearer greenish yellow on abdomen than *alius* and has wings 54–59 mm.¹ There are few if any differences between *jacksoni* and the two known specimens of "*kandti*" from the Kivu, which have wings 54–58 mm. It seems permissible therefore to regard *kandti* as synonymous with *jacksoni*.

In view of the distribution of *P. leucolaima mfumbiri* in the eastern

¹ See Granvik, 1923, J. f. O., Sonderheft, p. 90.

Congo, it is most surprising that a race of *P. bilineatus* has been found on Kwidjwi Island in Lake Kivu. Besides the type, said to come from Lake Kivu, there is another example collected by von Stegmann on Kwidjwi in October, 1908.

During the brief call of the steamer at Bitoro on the west side of Kwidjwi Island, July 7, 1927, I noted that several barbets were heard calling like *P. leucolaima*. If this race of *P. bilineatus* does occur there, it is certainly a common bird in the woods. In Kenya Colony *jacksoni* behaves and calls exactly like *leucolaima* in the Congo, its "tok" or "cok" being repeated at moderate speed, with a brief pause after every three to five notes.

***Pogoniulus subsulphureus flavimentum* (Verreaux)**

Barbatula flavimentum VERREAUX, 1851, Rev. Mag. Zool., p. 262 (type locality: Gaboon).—*Barbatula subsulfurea* SHARPE AND BOUVIER, 1878, Bull. Soc. Zool. France, III, p. 78 (Condé).—*Barbatula subsulphurea* REICHENOW, 1887, J. f. O., p. 299 (Manyanga); 1902, 'Vög. Afr.', II, p. 148. HARTERT, 1900, Nov. Zool., VII, p. 32 (Kitima). SASSI, 1912, Ann. Naturh. Hofmus. Wien, XXVI, p. 385 (Beni; Mawambi; Ukaika). SCHOUTEDEN, 1918, Rev. Z. A., V, p. 242.—*Barbatula subsulphurea subsulphurea* NEUMANN, 1907, J. f. O., p. 344 (Manyanga; Ngombe).—*Barbatula subsulphurea ituriensis* NEUMANN, 1907, J. f. O., p. 344 (type locality: Kitima, Ituri R.).—*Pogoniulus subsulphureus subsulphureus* BANNERMAN, 1922, Rev. Z. A., X, p. 106 (Molegbwe on Ubangi R.); 1933, 'Birds Trop. W. Afr.', III, p. 394. GYL-DENSTOLPE, 1924, K. Svenska Vet. Akad. Handl., (3) I, No. 3, p. 243 (Kartushi; Kampi na Mambuti; Simbo). W. L. SCLATER, 1924, 'Syst. Av. Æth.', pt. 1, p. 283.—*Pogoniulus subsulphureus ituriensis* BANNERMAN, 1922, Rev. Z. A., X, p. 107. HARTERT, 1925, Nov. Zool., XXXII, 1925, p. 140.—*Pogoniulus subsulphureus* SCHOUTEDEN, 1923, Rev. Z. A., XI, pp. 328, 395 (Basongo; Macaco; Belenge; Makumbi; Kwamouth); 1924, idem, XII, p. 415 (Eala; Bikoro); 1924, idem, XII, p. 267 (Leopoldville; Kidada).—*Pogoniulus subsulphureus* SCHOUTEDEN, 1925, Rev. Z. A., XIII, p. 11 (Kunungu; Mongende).—*Pogoniulus subsulphureus* SCHOUTEDEN, 1926, Rev. Z. A., XIII, p. 194 (Temvo; Makaia Ntete; Ganda Sundi).—*Pogoniulus subsulphureus subsulphureus* SCHOUTEDEN, 1936, Ann. Mus. Congo, Zool., I, f. 2, p. 99 (Poko).

SPECIMENS.—Avakubi, 2 ♂, Sept. 14, Nov. 20; ♀, Sept. 14. Ngayu, 3 ♂ Dec. 11, 19; ♀, Dec. 19. Pawa, ♂, July 15. Nala, ♂, July 3.

ADULT MALE.—Iris dark brown, bill black, feet bluish gray.

DISTRIBUTION OF THE SPECIES.—West Africa from eastern Sierra Leone to the Gaboon and Lower Congo, including Fernando Po; thence eastward through the Congo forest to the Ituri and Semliki rivers, and Budongo, Mabira, and Kyetume in Uganda. In Sierra Leone, Liberia, and the Gold Coast Colony it is represented by *P. s. chrysopyga* (Shelley),

with whitish superciliary line. *P. s. subsulphureus* (Fraser),¹ apparently confined to the island of Fernando Po, has light yellow stripes on the side of the head, a large bill, throat pale yellow, and remaining underparts light grayish green with a wash of yellow. The wings, in a series of 18 skins, measure 48–52 mm.; culmen (to base) 12.5–14 mm.

Mainland birds from the Cameroon and Congo have wings of nearly the same size, 48–51 mm.; but their bills are smaller, culmen (to base) 12–12.7 mm.; throats deeper yellow, and lower parts more strongly washed with yellow. I cannot find any difference between Ituri specimens and those of the Cameroon, Gaboon, and Kasai, so the name *P. s. flavimentum* may be employed for the whole Lower Guinea race.

The present species is somewhat more closely restricted to heavy forests than *leucolaima*. Whereas the latter was rather common near Niangara, *P. s. flavimentum* was not heard north of the village of Kongoli, near Rungu. There are also specimens in the Hamburg Museum collected by Schubotz at Angu and Koloka, farther west. On the southern side of the Congo forest this species extends to Luluabourg, where Father Callewaert has obtained several specimens and to Kasanga near the middle Kwango River, where Dr. Schwetz secured one. On the east I have heard it in the forest of the Semliki Valley, but not on the mountains.

The more rapid calling of the yellow-browed tinker-bird has already been mentioned, its shrill little "cok" is repeated for long periods, but after every eight or ten syllables there is a slight though perceptible break. Such notes, I ascertained, are given by males. A less common note of the species is a series of similar sounds, increasing in rapidity and without a break, but gradually dying out. "Cok, cok, cok cok-cok-cok-cok-cok-cok-k-k." It is only uttered at considerable intervals.

So far as I can say, there is no difference in the general habits of *leucolaima* and *subsulphureus*. Breeding males of the latter were taken at Nala and Pawa in July, while nearer Avakubi there was little enlargement of the gonads in November and December. I think it possible, notwithstanding, that they may breed throughout the year on the equator. Nests found in the Cameroon by Bates² were like those of *P. leucolaima*, holes cut in dead limbs. Two eggs or young seemed to be the rule, and nestlings made a continual tinkling noise, much like that of adults.

In the four stomachs examined there were only small fruits, usually of orange-red color, such as are eaten also by *P. leucolaima* and by a small sunbird, *Anthreptes collaris*.

¹ 1843, P. Z. S. Lond., p. 3 (Clarence, Fernando Po).

² 1909, Ibis, p. 18; 1911, Ibis, p. 507.

***Pogoniulus erythronotos* (Cuvier)**

Bucco erythronotos CUVIER, 1817, 'Règne Animal,' 1st Ed., I, p. 428 (type locality: Africa, ex Levaillant, 'Barbus,' p. 132, Pl. LVII).—*Barbatula erythronota* SHELLEY, 1891, 'Cat. Birds Brit. Mus.,' XIX, p. 43 (Landana). REICHENOW, 1911, 'Wiss. Ergeb. D. Z.-Afr. Exp.,' III, p. 279 (W. Ruwenzori, 2000 m.). SASSI, 1912, Ann. Naturh. Hofmus. Wien., XXVI, p. 385 (Moera; Ukaika). BANNERMAN, 1920, Rev. Z. A., VII, p. 293 (Poko; mouth of Congo R.).—*Pogoniulus erythronotos* SCLATER, 1924, 'Syst. Av. Æth.,' pt. 1, p. 282. BANNERMAN, 1933, 'Birds Trop. W. Afr.,' III, p. 390, Fig. 116.—*Pogonoilulus erythronotus* SCHOUTEDEN, 1924, Rev. Z. A., XII, p. 415 (Bikoro); 1936, Ann. Mus. Congo, Zool., I, f. 2, p. 99 (Buta).—*Pogoniulus erythronotus* SCHOUTEDEN, 1926, Rev. Z. A., XIII, p. 194 (Temvo).

SPECIMENS.—Coquilhatville, ♂, Dec. 15. Bafwabaka, ♂, July 26. Medje, 7 ♂, Apr. 4, June 1, July 9, 13, Sept. 14, 28, Oct. 17; 2 ♀, Sept. 21, 22; ♂ juv., Oct. 3. Nala, ♂, July 3.

ADULT MALE.—Iris dark brown, bill black, feet dark bluish gray.

DISTRIBUTION.—From the Casamance River through the forests of Upper and Lower Guinea to the Portuguese Congo, and eastward to the southern Uelle district and the slopes of Ruwenzori. Father Callewaert has sent us a half-dozen specimens from the Luluabourg in the Kasai district, and Doctor Schwetz obtained one for the Congo Museum at Kasanga, near the middle Kwango River.

Although distinctly a bird of the forest districts, the red-rumped tinker-bird, we found, is more common near the borders of the Ituri forest, as at Medje, than in its center near Avakubi. It extends northward in the Uelle district to within a day's march of Niangara. Often it is heard calling from the higher trees, hidden in the foliage, and takes wing if one stands too long below looking for it.

Its notes are characteristic, a slow succession of "coks," following each other at two-thirds or three-quarters of a second, without any periodic break. They may continue regularly for several minutes, and are often loud enough to be heard 400 yards. Thus they are louder and slower than the corresponding call of *P. chrysoconus*. Another call of *erythronotos* is hoarser, "kahkk, kahkk, kahkk—" given at about the same intervals as the preceding, but never continuing for long.

As a rule this red-rumped species is not found in mountain forests, but on the west slope of Ruwenzori, near the Butahu River, it is of regular occurrence. We secured two in immature plumage at 7400 and 7900 feet, besides seeing two more, one of them at 7000 feet.

Reproduction takes place in the rainy season, for at Medje and Nala we took breeding males in July and September, and young in September

and October. In the Cameroon, on the other hand, Bates¹ recorded a female, taken in February, with a nest containing two nestlings. The nest was in a soft-wood stump.

Fruit forms the greater part of the diet, for we found small berries in all of the five stomachs examined, varied only by an insect and two small spiders.

***Buccanodon duchaillui duchaillui* (Cassin)**

Barbatula duchaillui CASSIN, 1856, Proc. Acad. Nat. Sci. Phila. (1855), p. 324 (type locality: Moonda R., Gaboon). DUBOIS, 1905, Ann. Mus. Congo, Zool., I, f. 1, p. 35 (Banalia).—*Barbatula duchaillui* OUSTALET, 1893, Naturaliste, (2) VII, p. 60 (no exact locality).—*Buccanodon duchaillui* REICHENOW, 1902, 'Vög. Afr.', II, p. 142 ("Ubangi R."). SASSI, 1912, Ann. Naturh. Hofmus. Wien, XXVI, p. 384 (Moera; Mawambi; Ukaika; Mawambi—Irumu). SCHOUTEDEN, 1918, Rev. Z. A., V, p. 242; 1936, Ann. Mus. Congo, Zool., I, f. 2, p. 98 (Djamba; Buta; Nava R.; Bondo Mabe). GYLDENSTOLPE, 1924, K. Svenska Vet. Akad. Handl., (3) I, No. 3, p. 240 (Kartushi; Bopu). W. L. SCLATER, 1924, 'Syst. Av. Æth.', pt. 1, p. 279 (in part. Uelle distr.). W. DEW. MILLER, 1924, Bull. A. M. N. H., L, p. 323. CHAPIN, 1927, Bull. A. M. N. H., LIII, p. 478. STONE, 1936, Proc. Acad. Nat. Sci. Phila., LXXXVIII, p. 563 (Saidi in Ituri).—*Buccanodon duchaillui ugandæ* REICHENOW, 1911, 'Wiss. Ergeb. D. Z.-Afr. Exp.', III, p. 278 (W. base of Ruwenzori).—*Buccanodon duchaillui duchaillui* BANNERMAN, 1933, 'Birds Trop. W. Afr.', III, p. 384 (Angu; Poko).

SPECIMENS.—Avakubi, ♀, Aug. 26. Gamangui, ♂, Feb. 14; 2 ♀, Feb. 1, 14; Medje, 2 ♀, July, Sept. 26; 3 ♂ juv., Apr. 1, Aug. 30; 2 ♀ juv., Aug. 30, Sept. 2. Rungu, ♂, June 27. Niangara, ♂, Dec. 2; ♀, Nov. 30.

ADULTS.—Iris dark brown, bill black; feet dark gray.

DISTRIBUTION OF THE SPECIES.—From Sierra Leone through the Gold Coast to the Cameroon and the Lower Congo, eastward to the Uelle district, Semliki Valley, Uganda, Kavirondo, and doubtless the whole of the Upper Congo forest.

Reichenow's *ugandæ* is not a valid race, as yellow spots are not always wanting on the upper back of Uganda birds. Specimens from Kakamega in the Kavirondo district have wings varying from 79–85 mm., though elsewhere to the west they measure 74–82 mm. *B. d. duchaillui* occupies the whole area outlined above except the region northwest of Stanley Pool and perhaps the Mayombe forest. There the crown-patch is lighter red, and *B. d. gabriellæ* appears to be a valid race.

Buccanodon duchaillui is allied to *Pogoniulus*, but has a larger hind toe and nude oil-gland. The three other species included in *Buccanodon*

¹ 1911, Ibis, p. 507.

by Selater do not seem to me congeneric with *duchaillui*, the type of the genus.

In the Upper Congo DuChaillu's barbet is a fairly common bird in the whole region of heavy forest, but is more often heard than seen. Only seldom does it come out into the larger trees in clearings to feed on small wild figs. Its call is easily recognized, a soft rolling whirr or purr ("b-r-r-r-r—"), lasting one and one-half or two seconds. This curious note was also given by a brood of nestlings brought to us by natives. Beginning with a couple of distinct low notes, as of discontent, it ran into a sort of musical purr. At the same time the head was extended, beak downwards, and the neck swelled decidedly, the skin showing at its sides. A young female gave it, as well as the young males.

In addition to the published records, the Hamburg Museum has a male specimen from Koloka, Uelle district, collected by Schubotz; and Dr. Schouteden brought one from the Rutshuru River. I have seen and heard this barbet a number of times at Lukolela, but it seems to extend little into gallery forests either north or south of the forest. It scarcely crosses the Uelle River, and is not yet recorded from the Kasai district.

The nesting season is a long one, for breeding females were taken in the Ituri in early February, August, and September, and one of the nestlings also in April. Fruit is the main source of nourishment, and was contained in five stomachs, which otherwise showed only a single small snail shell.

***Buccanodon duchaillui gabriellæ* Bannerman**

Buccanodon duchaillui gabriellæ BANNERMAN, 1924, B. B. O. C., XLIV, p. 100 (type locality: Pangala, Fr. Congo); 1933, 'Birds Trop. W. Afr.,' III, p. 385. W. L. SCLATER, 1930, 'Syst. Av. Æth.,' App., p. 860.—*Buccanodon duchaillui* W. L. SCLATER, 1924, 'Syst. Av. Æth.,' pt. 1, p. 279 (in part. Lower Congo Valley).

DISTRIBUTION.—Known only from the type locality, 80 miles northwest of Stanley Pool, and perhaps from the Belgian Mayombe. The examples in the British Museum certainly have the red of the crown-patch duller and lighter, tending more toward orange-red, than specimens from any other region. The yellow markings on underparts are also paler. Wings 80–84 mm.

A single male which I collected at Ganda Sundi in the Mayombe has the crown slightly lighter red than *B. d. duchaillui*, and the underparts with paler yellow. Additional specimens are needed from the Mayombe forest, where the species is by no means uncommon.

Stactolæma anchietæ anchietæ (Bocage)

Buccanodon anchietæ BOCAGE, 1869, P. Z. S. Lond., p. 436, Pl. xxix (type locality: Caconda, Angola).—*Buccanodon anchietæ anchietæ* LYNES, 1938, Rev. Z. A., XXXI, p. 71 (L. Mukamba).

DISTRIBUTION OF THE SPECIES.—Angola and southern Congo to the southern end of Lake Tanganyika, the region near Lake Nyasa, and Mashonaland.¹ *S. a. anchietæ* of the Benguella highland and southern Kasai district is thickly spotted with white on hind-crown and temporal region. *S. a. rex*, ranging from the North Bailundu district to the upper Kwango River, has the hind-crown and nape plain blackish. *S. a. katangæ* of the southeastern Congo has the hind-crown faintly spotted with pale yellowish, but not so broad an area of white just behind the eye, and yellowish color on fore-neck more diffuse, less restricted to centers of feathers. *S. a. sowerbyi* Sharpe of Angoniland and Mashonaland has chin white instead of yellow, fore-neck blackish, and white-tipped feathers on lower underparts. *S. a. stresemanni* (Grote)² of the southern end of Lake Tanganyika is like *sowerbyi*, but region before and below the eye is yellow, not white. *S. a. whytii* (Shelley), to the east and southeast of Lake Nyasa, is blacker about head, only speckled with white on forehead, and white on chin and malar region.

The typical race of the yellow-headed barbet extends into the southern Kasai district, and we have an adult female collected by Father Callewaert near Katabwa, some 40 miles south-southwest of Luluabourg. Unfortunately it has suffered from wetting. Admiral Lynes has also secured this barbet at Lake Mukamba, some 50 miles east-northeast of Luluabourg.

Stactolæma anchietæ katangæ (Vincent)

Buccanodon anchietæ katangæ VINCENT, 1934, B. B. O. C., LIV, pp. 176, 177 (type locality: Kaluli R., Katanga).—*Stactolæma anchietæ* NEAVE, 1910, Ibis, p. 120 (S. Kaluli R.; Lualaba R.). SCHOUTEDEN, 1930, Rev. Z. A., XVIII, p. 284.—*Buccanodon anchietæ anchietæ* W. L. SCLATER, 1924, 'Syst. Av. Æth.,' pt. 1, p. 278 (Lualaba Valley).—*Buccanodon anchietæ* DE RIEMAECKER, 1927, Rev. Z. A., XIV, p. 274 (Elisabethville).

DISTRIBUTION.—From the eastern Lulua district through the Upper Katanga to Serenje in Northern Rhodesia. The Congo Museum has nine specimens, which came from Kizimba near Kinda, Kanzenze, Kanzenia, Elisabethville, and Nieuwdorp.

Nothing seems to have been written of the habits of this barbet in

¹ The supposed record of *S. anchietæ* from Bumba by Dubois (1905) was based on an adult specimen of *Gymnobucco bonapartei* which is still in the Congo Museum.

² 1934, O. Mb., p. 86 (Kitungulu, Urungu).

the Congo. It is surely a bird of savanna woods, not conspicuous, but not rare.

[*Stactolæma anchietæ rex* (Neumann)]

Buccanodon anchietæ rex NEUMANN, 1908, B. B. O. C., XXI, p. 47 (type locality: Duque de Bragança, Angola).—*Buccanodon anchietæ* REICHENOW, 1902, 'Vög. Afr.', II, p. 141 (Kwango R.).

From northern Angola this subspecies may extend into the Kwango district, but so far I have seen no Congo specimen.

KEY TO THE SPECIES OF *GYMNOBUCCO*

- 1.—Whole crown well feathered, thick tufts of bristly feathers just behind nostrils
..... *G. bonapartei*.
Fore-part of crown virtually bare, with sparse hair-like feathers..... 2.
- 2.—Bristly feathers absent just behind nostrils; or if present, they are few, not forming a thick tuft..... *G. calvus*.
Well-developed bristly tufts of feathers just behind nostrils..... 3.
- 3.—Bill dark brown or blackish..... *G. sladeni*.
Bill light rufous-brown..... *G. peli*.

Gymnobucco bonapartei bonapartei Hartlaub

Gymnobucco bonapartei HARTLAUB, 1854, J. f. O., p. 410 (type locality: Gaboon). REICHENOW, 1902, 'Vög. Afr.', II, p. 139 (Kwango; "Ubangi"). DUBOIS, 1905, Ann. Mus. Congo, Zool., I, f. 1, p. 35 (Uelle). BANNERMAN, 1920, Rev. Z. A., VII, p. 294 (Poko; Avakubi; Medje).—*Heliobucco bonapartei* OUSTALET, 1893, Naturaliste, (2) VII, p. 60. SALVADORI, 1909, Ann. Mus. Civ. Stor. Nat. Genova, (3) IV, p. 320 (Buta-Dungu).—*Stactolæma anchietæ* DUBOIS, 1905, Ann. Mus. Congo, Zool., I, f. 1, p. 35 (Bumba).—*Heliobucco bonapartei bonapartei* SCHOUTEDEN, 1923, Rev. Z. A., XI, pp. 328, 395 (Luebo; Makumbi; Ngombe in Kasai; Kwamouth); 1925, idem, XIII, p. 11 (Kunungu; Mongende). CHAPIN, 1929, J. f. O., Festschrift E. Hartert, pp. 181, 182 (Stanley Falls; Avakubi; Medje).—*Heliobucco cinereiceps intermedius* SCHOUTEDEN, 1923, Rev. Z. A., XI, p. 328 (Luebo).—*Gymnobucco bonapartei bonapartei* W. L. SCLATER, 1924, 'Syst. Av. Æth.', pt. 1, p. 277. BANNERMAN, 1933, 'Birds Trop. W. Afr.', III, p. 383 (in part. Congo R.; Poko; Avakubi). BOUET, 1934, Ois. R. F. O., (N. S.) IV, p. 635. STONE, 1936, Proc. Acad. Nat. Sci. Phila., LXXXVIII, p. 563 (Saidi).—*Gymnobucco bonapartei cinereiceps* SCHOUTEDEN, 1936, Ann. Mus. Congo, Zool., I, f. 2, p. 98 (in part. Kotili; Djamba; Buta; Panga; Medje).

SPECIMENS.—Stanleyville, 2 ♂, ♀, Nov. 1; ♀ juv., Aug. 16. Munyé Katoto, near Bafwaboli, ♀, Sept. 10. Bafwasende, ♂, Sept. 23. Avakubi, ♂, Oct. 26; ♀, Dec. 7. Ngayu, ♀, Dec. 25. Medje, 10 ♂, Jan. 16, 19, Sept. 14; 8 ♀, Jan. 13, 16, 19, Sept. 14; 2 ♂ juv., Mar. 18, Apr. 3; 4 ♀ juv., Jan. 19, 22, Apr. 3, Sept. 14.

ADULTS.—In the vicinity of Stanleyville both sexes have the iris reddish brown to scarlet; skin of cheeks (though not entirely naked) dark brownish pink or dull red brown; bill dusky brown; feet dark gray or dusky brown. At Avakubi the adult

male has iris dark brown, adult female has iris brownish yellow. At Medje adult males have iris rather light brown, that of females being yellow.

DISTRIBUTION OF THE SPECIES.—Cameroon-Gaboon coast, Kwamouth, and Kwango River, east to Mt. Elgon, Nandi district, Rutshuru Valley, and Lulua district in the southeast Congo. Three races are recognizable on size; the small *G. b. bonapartei* in the forest regions from the lower Ituri River westward; the very large *G. b. cinereiceps* Sharpe¹ from Mt. Elgon to Nandi; and *G. b. intermedius* van Someren in the intervening areas from the Upper Uelle district to the eastern edge of the Congo forest and Uganda, as well as in the eastern Lulua district.

The wing in twelve Gaboon examples of *G. b. bonapartei* measures 76–85 mm., while the same measurement in specimens from Medje is 77–84 mm., and from Luluabourg 79–84.5 mm. Wings of *intermedius* measure 88–95 mm. near Niangara, 85–94 in the Mawambi-Beni area, 87–99 in Uganda, and 89 mm. at Kinda in the Lulua district. The wing-length of *cinereiceps* is 96–104 mm., and a few examples of *intermedius* from the eastern Congo approach these dimensions. Two females from Djugu have wings 100 and 101 mm., a female from the western base of Ruwenzori 98 mm.

In the Gaboon, Ansorge noted the eye-color as “blood-red” in both sexes of *bonapartei*, and as brown in some of the males. Eastward to Bafwaboli the sexes are alike in having reddish eyes. Near Avakubi and Medje the iris of *bonapartei* begins to change to the yellowish color seen in *intermedius*; and there is an unusual sexual difference, with brighter color in females. The light yellow color of the iris in both sexes of *intermedius* and *cinereiceps* is confirmed by notes on the labels of specimens collected by Camburn, van Someren, Turner, and Grauer.

G. b. bonapartei extends from the Cameroon River to the Gaboon, east to Poko and the central Ituri forest, and south to Kwamouth, the southern Kasai district, and perhaps the Kwango River. A common bird in all the forest region of the Upper Congo, seen in trees along roads and near villages. It has never been taken in the Mayombe forest or the Lower Congo.

Compared with most of the other barbets of the Congo, this species might almost be called mute. Its ordinary note is weak, something between a chirp and a whistle, but occasionally an unpleasant note is given that reminded me of a lawn-mower or a sewing-machine, prolonged but not loud. As the birds perch on their nesting trees the tufts of feathers stand up at such an angle as to be rather conspicuous. They fly con-

¹ 1891, *Ibis*, p. 122 (Mt. Elgon).

siderable distances in search of fruit, visiting *Ficus* trees or plants of that genus supported on other trees; but they never come down close to the ground, nor do they visit the more remote parts of the forest.

About large dead trees in clearings, where it nests, it is seen in numbers, for several pairs—sometimes twenty or more—usually chisel out their nest-holes in the trunk or large limbs of the same tree. Three or four young are contained in a nest, and a set of four white eggs was secured at Medje. These measured 23.2–23.8 mm. \times 17.3–17.9. In the Cameroon, Bates¹ has found small bats of the genus *Nyctinomus* roosting in holes in the midst of an occupied nesting colony. These colonies are parasitized by honey-guides, for he took a nestling of *Melignotheres controstris* from one of the holes. At Lukolela in December, 1930, I found at least five of these same honey-guides about a nesting tree of *Gymnobucco bonapartei*, and saw one clinging at the entrance to a barbet's nest. At Medje this brown barbet seemed to be breeding most actively during the dry season, from December to March inclusive, but two birds with enlarged gonads were also taken in September.

Notes on the contents of seven stomachs show that insects, including a wasp and a bug, were eaten by three of the birds, fruit (largely small berries) being present in five cases. Small wild figs often attract numbers of these barbets.

***Gymnobucco bonapartei intermedius* van Someren**

Gymnobucco bonapartei intermedius VAN SOMEREN, 1921, B. B. O. C., XLI, p. 105 (type locality: Mpanga Forest, Uganda. Also from Mabira Forest, Ruwenzori, and S. Ankole); 1922, Nov. Zool., XXIX, p. 57. GYLDENSTOLPE, 1924, K. Svenska Vet. Akad. Handl. (3) I, No. 3, p. 239 (Bopu). HARTERT, 1925, Nov. Zool., XXXII, p. 140.—*Heliobucco bonapartii* SHELLEY, 1891, 'Cat. Birds Brit. Mus.,' XIX, p. 36 (Sassa).—*Gymnobucco cinereiceps* REICHENOW, 1902, 'Vög. Afr.,' II, p. 139. O.-GRANT, 1910, Tr. Z. S. Lond., XIX, p. 417 (Mpanga Forest). SASSI, 1912, Ann. Naturh. Hofmus. Wien, XXVI, p. 384 (Moera; Beni; Mawambi; Ukaika). SCHOUTEDEN, 1914, Rev. Z. A., III, p. 264 (Kilo); 1918, idem, V, p. 242 (in part. Kilo; Mawambi; Ukaika).—*Gymnobucco sladeni* SCHOUTEDEN, 1918, Rev. Z. A., V, p. 242 (in part. Kinawa; Kikanga).—*Pogonorhynchus* sp. SCHUBOTZ, 1921, 'Tageb. Emin Pascha,' VI, p. 277 (Bellima).—*Gymnobucco bonapartei bonapartei* BANNERMAN, 1933, 'Birds Trop. W. Afr.,' III, p. 383 (in part. Voro on Uelle R.; Sassa).—*Gymnobucco bonapartei cinereiceps* SCHOUTEDEN, 1936, Ann. Mus. Congo, Zool., I, f. 2, p. 98 (in part. Mauda).

SPECIMENS.—Okondo's village, near Niangara, 3 ♂, Nov. 25, 30; 2 ♀, Nov. 10, 26.

¹ 1905, Ibis, p. 92; 1909, Ibis, pp. 16, 17.

ADULTS.—Iris light yellow in both sexes; bill and feet as in *G. b. bonapartei*.

DISTRIBUTION.—Border regions of the Upper Congo forest from the Bomu River (and possibly farther westward) to the forests of Uganda, the base of Ruwenzori, forest east of the Rutshuru Valley, and thence doubtless through the Manyema to Kinda in the Lulua district.

In habits this larger subspecies is like typical *bonapartei*; but it is more local, because of its partiality for wooded areas in a more or less open country. The four stomachs we examined contained fruit in each instance, and the remains of one insect as well. One of our males on November 30, was a breeding bird, and only the female of November 10 was definitely non-breeding.

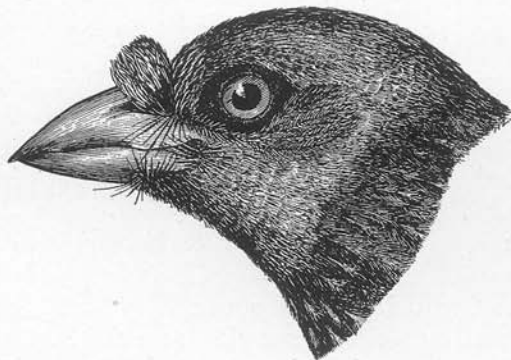


Fig. 31. *Gymnobucco bonapartei intermedius*. $\times 1$.

Gymnobucco peli Hartlaub

Gymnobucco peli HARTLAUB, 1857, 'Orn. Westafr.,' p. 175 (type locality: Dabocrom, Gold Coast). W. L. SCLATER, 1924, 'Syst. Av. Æth.,' pt. 1, p. 277 (lower Congo Valley). SCHOUTEDEN, 1926, Rev. Z. A., XIII, p. 194 (Butu Polo). BANNERMAN, 1933, 'Birds Trop. W. Afr.,' III, p. 382, Fig. 113.

DISTRIBUTION.—Gold Coast to Cameroon, Gaboon, and Mayombe forest. Within our limits it is known only from a single specimen taken by Dr. Schouteden at Butu Polo.

This species differs from *G. calvus* mainly in the possession of tufts of bristly feathers over the nostrils. These tufts are present in both sexes and even in the nestlings of *peli*, although the latter have the head clothed with short feathers. The wing of *peli* measures 81–90 mm. In West Africa both species are not infrequently found in the same localities; and *peli*, like *calvus*, excavates a number of nest-holes in a large

dead tree, often in a clearing. The two species are said sometimes to use the same tree.

Gymnobucco sladeni O.-Grant

Gymnobucco sladeni O.-GRANT, 1907, B. B. O. C., XIX, p. 42 (type locality: Mawambi, eastern Congo forest); 1910, Tr. Z. S. Lond., XIX, p. 416. REICHENOW, 1911, 'Wiss. Ergeb. D. Z.-Afr. Exp.,' III, p. 278. SASSI, 1912, Ann. Naturh. Hofmus. Wien, XXVI, p. 384 (Beni-Mawambi). SCHOUTEDEN, 1918, Rev. Z. A., V, p. 242 (in part. Assumba); 1923, idem, XI, p. 329 (Luebo); 1925, idem, XIII, p. 11 (Kunungu); 1936, Ann. Mus. Congo, Zool., I, f. 2, p. 98 (Djamba; Buta; Poko; Medje). BANNERMAN, 1920, Rev. Z. A., VII, p. 293 (Poko). W. L. SCLATER, 1924, 'Syst. Av. Æth.,' pt. 1, p. 278.—*Gymnobucco adolfi-friederici* REICHENOW, 1908, O. Mb., p. 160 (N. of Beni).—? *Helibucco peli* SALVADORI, 1911, Ann. Mus. Civ. Stor. Nat. Genova, (3) V, p. 445 (Zone of the Gurba-Dungu).—*Gymnobucco cinereiceps* SCHOUTEDEN, 1918, Rev. Z. A., V, p. 242 (in part. Marassawa).—*Gymnobucco peli sladeni* GYLDENSTOLPE, 1924, K. Svenska Vet. Akad. Handl., (3) I, No. 3, p. 239 (Kampi na Mambuti).

DISTRIBUTION.—Upper Congo forest, from Libenge on the Ubangi River and Kunungu near Bolobo, eastward to Poko, the Semliki Valley, the vicinity of Kasongo, and Luebo in the Kasai.

This is a darker bird than *G. calvus* or *G. peli*, very similar in body-color to *G. bonapartei*. The tufts of bristly feathers around the base of the bill are like those of *G. peli*, but the bill is blackish in color.

The specimen collected by Schubotz at Libenge is in the Hamburg Museum. The Congo Museum has a series of twenty-eight skins, including two from Lukolela. Examples from the Semliki Valley look slightly darker and larger than those from other parts of the range, and have wings 85–91 mm. long. The wing-length in the remainder of the series varies from 82–88 mm.

Sladen's barbet is evidently rather common in the vicinity of Buta, but thus far no specimen has been collected in the central districts of the Upper Congo forest. How Lang and I overlooked this bird I am at a loss to explain, save that in appearance and habits it must resemble *G. bonapartei* very closely.

Gymnobucco calvus congicus Chapin

Gymnobucco calvus congicus CHAPIN, 1932, A. M. Nov., No. 570, p. 5 (type locality: Thysville, Cataracts distr., Belgian Congo). BANNERMAN, 1933, 'Birds Trop. W. Afr.,' III, p. 382.—*Gymnobucco calvus* REICHENOW, 1887, J. f. O., p. 299 (Manyanga); 1902, 'Vög. Afr.,' II, p. 137. SHELLEY, 1891, 'Cat. Birds Brit. Mus.,' XIX, p. 34 (Landana). DUBOIS, 1905, 'Ann. Mus. Congo, Zool.,' I, f. 1, p. 35 (Mayombe). SCHOUTEDEN, 1920, Rev. Z. A., VII, p. 190 (Temvo in Mayombe).—*Gymnobucco calvus major* BANNERMAN, 1922, Rev. Z. A., X, p. 105 (Congo mouth); 1933, 'Birds Trop. W. Afr.,' III, p. 381 ("western Belgian Congo").—*Gymnobucco*

calvus calvus SCHOUTEDEN, 1926, Rev. Z. A., XIII, p. 194 (Lukula).—*Gymnobucco calvus vernayi* BOUTON, 1931, Ann. Carnegie Mus., XXI, pp. 44, 46 (in part. Thysville; Ganda Sundi).

SPECIMENS.—Thysville, 2 ♂, Dec. 23.

ADULT MALE.—Iris dark brown, skin of face blackish; bill rather light rufous brown; feet dusky brown.

DISTRIBUTION OF THE SPECIES.—West Africa from Liberia to northern Benguela. *G. c. calvus* ranges from Sierra Leone to Southern Nigeria, and has the wing 85–96 mm. long. *G. c. major* Neumann replaces it in the forested Cameroon and perhaps Gaboon, and is distinguished mainly by its longer wing, 94–105 mm. *G. c. conigicus* of the Mayombe

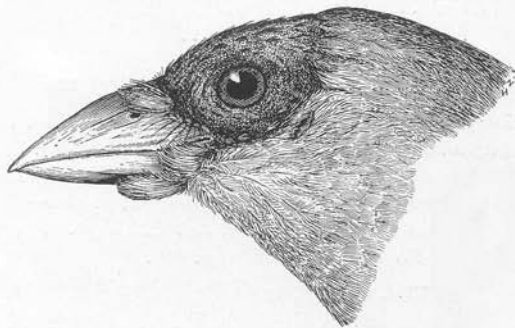


Fig. 32. *Gymnobucco calvus conigicus*. $\times 1$.

forest, gallery forests of the Lower Congo, and of northern Angola, is generally lighter in color, especially on the throat, and has shorter wings, 88.5–96 mm. *G. c. vernayi* Boulton¹ of the Benguela highland is a very different grayish-brown bird, with throat and striping of back and breast nearly whitish. Its wing measures 90–97 mm.

Gymnobucco c. conigicus is a common species in the Mayombe forest, where Dr. Schouteden collected fifteen examples, and I three. Mine were members of a group of about ten near Ganda Sundi, coming to feed in a tree with small green fruits. In the Rothschild Collection there are specimens from Manyanga and Lutete in the Lower Congo, and from Ndala Tando in northern Angola.

Dr. Schwetz has recently collected two more at Thysville, where I found them in December, 1914, in one of the patches of woods not far

¹ 1931, Ann. Carnegie Mus., XXI, p. 44 (Mombolo, 6000 ft.).

from the station. A dozen or more of these brown barbets were sitting on a large dead tree in which they had cut out their nests exactly as *G. bonapartei* does. The two male birds collected were in breeding condition and both had eaten only fruit. Many small starlings (*Pæoptera lugubris*) were perching near by, and apparently they were nesting in holes fashioned by the barbets. The eggs of the barbet are certainly glossy white, and those of the Upper Guinea race are said to measure 23×20 mm. and to be laid usually in sets of three.

KEY TO THE CONGO SPECIES OF *TRICHOLÆMA*

- 1.—Forehead red, throat whitish.....*T. diadematum*.
Forehead not red.....2.
- 2.—Wing over 80 mm. long; back blackish, spotted with yellow.....*T. hirsutum*.
Wing less than 80 mm. long; middle of back unspotted; throat black.....
.....*T. lacrymosum*.

Tricholæma diadematum frontatum (Cabanis)

Pogonorhynchus frontatus CABANIS, 1880, J. f. O., p. 351, Pl. II (type locality: Angola).—*Pogonorhynchus frontatus* ? DE SOUSA, 1886, Jorn. Sci. Lisboa, XI, p. 78 (Tenke); 1886, in Capello and Ivens, 'De Angola a Contra-Costa,' II, p. 444.—*Tricholaema frontatum* REICHENOW, 1902, 'Vög Afr.,' II, p. 136.—*Tricholæma diadematum frontatum* W. L. SCLATER, 1924, 'Syst. Av. Æth.,' pt. 1, p. 277 (Katanga). FRIEDMANN, 1930, Bull. 153, U. S. Nat. Mus., p. 450.

DISTRIBUTION OF THE SPECIES.—The Bahr-el-Jebel near Mongalla, and southern Abyssinia, south through East Africa to Nyasaland and thence to Angola. *T. d. diadematum*, with breast and flanks all but spotless, ranges from southern Abyssinia to the Bahr-el-Jebel, but probably does not quite reach Congo territory. *T. d. mustum* Friedmann, with slightly longer wings, is found between the Turkwell River and Mount Kenya. *T. d. massaicum* (Reichenow), of southern Kenya Colony and central Tanganyika Territory, has round dusky spots on breast and flanks. *T. d. frontatum* has heavy black spots on underparts, and a wash of lemon yellow across the breast.

The last-named race extends from Angola eastward through Northern Rhodesia to Namwewe in Nyasaland. Although Neave and other recent collectors have not found it in the Upper Katanga, one specimen is believed to have been taken by Capello and Ivens at Tenke (or Ntenkwe) near the headwaters of the Lufira River.

[*Tricholæma diadematum diadematum* (Heuglin)]

Laimodon diadematus HEUGLIN, 1856, Sitz.-Ber. Kais. Akad. Wiss. Wien, XIX, p. 299 (nomen nudum).—*Pogonorhynchus diadematus* HEUGLIN, 1861, Ibis, pp. 124,

126, Pl. v (type locality: Steppes of the Kitsch Negroes, i.e. Upper White Nile).—*Tricholæma diadematum* SHELLEY, 1891, 'Cat. Birds Brit. Mus.,' XIX, p. 33 (Lado).

There is a slight possibility that this red-fronted barbet may occur in the vicinity of Mahagi Port, as it has been taken at Redjaf and near Masindi in Uganda.

***Tricholæma lacrymosum lacrymosum* Cabanis**

Tricholæma lacrymosa CABANIS, 1878, J. f. O., p. 205 (type locality: Adi R., i. e. Athi R., Kenya Colony).—*Tricholæma lacrymosum* SHELLEY, 1891, 'Cat. Birds Brit. Mus.,' XIX, p. 31 (Wadelai).—*Tricholæma lacrymosum* SCHUBOTZ, 1921, 'Tageb. Emin Pascha,' VI, p. 100.—*Tricholæma lacrymosum radcliffei* SCHOUTEDEN, 1936, Ann. Mus. Congo, Zool., I, f. 2, p. 98 (Mahagi Port).

DISTRIBUTION OF THE SPECIES.—From Lake Albert, Wadelai, and southern Abyssinia to southern Tanganyika Territory. *T. l. lacrymosum*, with black spots on flanks definitely tear-shaped, extends from Lake Albert to southern Abyssinia, then southward to the coast near Mombasa and the base of Kilimanjaro. Specimens from the northwest shore of Lake Albert have wings only 64–67 mm. long, as compared with 68–72 mm. for others from the region between Mt. Elgon and Baringo.

T. l. radcliffei has the flank-spots rounded, and inhabits the region around Lake Victoria, from Kavirondo to western Tanganyika Territory. *T. l. ruahæ* Neumann has also round flank-spots, but less yellow wash on the underparts. It is restricted to southern Tanganyika Territory.

Tricholæma l. lacrymosum is fairly numerous in the dry savanna near Kasenyi on the western shore of Lake Albert, frequenting the patches of trees and bushes. Two specimens which I took there on August 28 were non-breeding; but at Wadelai Emin found a nest on July 26, a hole in a tree containing four young, nearly full-grown. The call of this barbet, according to Emin, is a pleasant "dūi, dūi,—"repeated from a perch.

In the stomachs of both our specimens were seeds from fruit and bits of ant-like insects. The iris of the male was bright ochreous yellow, that of the female dark brown.

***Tricholæma lacrymosum radcliffei* O.-Grant**

Tricholæma radcliffei O.-GRANT, 1904, B. B. O. C., XV, p. 29 (type locality: Mulema, S. Uganda); 1910, Tr. Z. S. Lond., XIX, p. 416 (Mokia; upper Semliki Valley).—*Tricholæma lacrymosum* REICHENOW, 1902, 'Vög. Afr.,' II, p. 132 (Ukon-dju); 1911, 'Wiss. Ergeb. D. Z.-Afr. Exp.,' III, p. 277. SASSI, 1912, Ann. Naturh. Hofmus. Wien, XXVI, p. 383 (Kasindi).—*Tricholæma lacrymosum radcliffei* W. L. SCLATER, 1924, 'Syst. Av. Æth.,' pt. 1, p. 276.

DISTRIBUTION.—From Kakamega in the Kavirondo district, Kampala in Uganda, and the southern base of Ruwenzori to the southern Guaso Nyiro, Tabora, and the region north of Lake Nyasa. Within our

limits it is known from the savannas near the northern shore of Lake Edward, in the upper Semliki Valley and in the Rutshuru Valley south to the Molindi River. There it lives in the savanna woods, largely composed of acacias, and does not ascend the mountains.

***Tricholæma hirsutum angolense* Neumann**

Tricholæma hirsutum angolense NEUMANN, 1908, B. B. O. C., XXI, p. 47 (type locality: Golungo Alto, N. Angola).—*Tricholæma hirsuta* SHARPE AND BOUVIER, 1878, Bull. Soc. Zool. France, III, p. 78 (Lukula R.). REICHENOW, 1887, J. f. O., pp. 299, 302 (Manyanga; Leopoldville).—*Tricholæma flavipunctatum* REICHENOW, 1902, 'Vög. Afr.', II, p. 131 (in part. Manyanga; Leopoldville). LÖNNBERG, 1907, Arkiv f. Zool., III, No. 21, p. 7 (Kingoyi).—*Tricholæma hirsutum* var. *ansorgei* DUBOIS, 1905, Ann. Mus. Congo, Zool., I, f. 1, p. 35 (in part. Mayombe; Kisanu).—*Tricholæma hirsutum flavipunctatum* SCLATER, 1922, B. B. O. C., XLII, p. 62 (lower Congo Valley); 1924, 'Syst. Av. Æth.', pt. 1, p. 274. BANNERMAN, 1922, Rev. Z. A., X, p. 113; 1924, idem, XII, p. 485 (Fr. Congo). SCHOUTEDEN, 1923, Rev. Z. A., XI, p. 329; 1924, idem, XII, p. 267; 1926, idem, XIII, p. 194 (Moanda; Temvo; Makaia Ntete).—*Tricholæma flavipunctata flavipunctata* BANNERMAN, 1933, 'Birds Trop. W. Afr.', III, p. 377 (Landana-Leopoldville).

DISTRIBUTION OF THE SPECIES.—Forests of western and central Africa, from Liberia to Uganda, northern Kavirondo, and Manyema, south to northern Angola and the southern Kasai district.

T. h. hirsutum (Swainson), from Sierra Leone to Togoland, has the head and throat black, with white superciliary and malar stripes. *T. h. flavipunctatum* Verreaux¹ of the forested Cameroon and Gaboon, lacks these white stripes, the crown being thickly spotted with yellow and throat pale gray streaked with black. In the intervening area, from the Gold Coast to the Niger Delta, birds are found with white stripes on sides of head more or less developed, but otherwise resembling *flavipunctatum*. I regard *T. h. hybridum* Neumann² as the proper name for such examples, even though some from the Gold Coast and the vicinity of Lagos show close resemblance to *chapini* of the northern Congo.

T. h. angolense of the Lower Congo and northern Angola is similar to *flavipunctatum* but much more brownish throughout, including the ground-color of upperparts and spotting of lower underparts.

The white stripes on supercilium and cheek reappear in *T. h. chapini* of the Uelle, Upper Congo, and Kasai, but both sexes have throat gray, streaked with black. The wing in this race measures 83–91 mm. *T. h. ansorgii* of the eastern edge of the Congo forest and the forest patches of Uganda has wings averaging slightly longer, 88–95 mm., and its underparts a little less yellowish green than in most examples of *chapini*.

¹ 1855, J. f. O., p. 103 (Gaboon).

² 1908, B. B. O. C., XXI, p. 47 (Degama, S. Nigeria).

At first sight *flavipunctatum* and *angolense* look specifically distinct from the three other races with white facial stripes, but this is certainly not true. It is a great pity that the type locality of *flavipunctatum* is the Gaboon, just where it begins to intergrade with *angolense*. My two specimens from Ganda Sundi, like five others from the Mayombe and two from Kisantu in the Congo Museum, are much more like the Angolan race than that of southern Cameroon.¹

In the Mayombe forest this is a rather common bird, and its notes are very like those of *chapini* and *ansorgei*. I watched one calling while perched on a bare limb, swelling its neck and puffing up its back as it emitted a series of coos, beginning rather rapidly and later slowing down, to stop abruptly after 12 or 14 notes.

Tricholæma hirsutum chapini Bannerman

Tricholæma hirsutum chapini BANNERMAN, 1924, B. B. O. C., XLIV, p. 101 (type locality: Djabir, Uelle R.); 1924, Rev. Z. A., XII, p. 484 (Uelle distr.). HARTERT, 1925, Nov. Zool., XXXII, p. 143 (Luluabourg). W. L. SCLATER, 1930, 'Syst. Av. Æth.,' App., p. 859. BATES, 1930, 'Handbook Birds W. Afr.,' p. 275; 1931, Ibis., p. 269.—*Tricholæma* EMIN, 1887, Mittheil. Vereins f. Erdkunde, Leipzig, (1886). p. 45 (Monbutt); 1888, 'Emin Pasha Centr. Afr.,' p. 200.—*Tricholæma hirsutum* OUSTALET, 1893, Naturaliste, (2) VII, p. 60.—*Tricholaema flavipunctatum* REICHENOW, 1902, 'Vög. Afr.,' II, p. 131 (in part. Ubangi R.).—*Tricholaema hirsutum* var. *ansorgei* DUBOIS, 1905, Ann. Mus. Congo, Zool., I, f. 1, p. 35 (in part. "L. Dilolo").—*Tricholaema ansorgei* SCHOUTEDEN, 1918, Rev. Z. A., V, p. 242 (in part. Kabambare).—*Tricholæma hirsutum hybridum* SCLATER, 1922, B. B. O. C., XLII, p. 62; 1924, 'Syst. Av. Æth.,' pt. 1, p. 274. BANNERMAN, 1922, Rev. Z. A., X, p. 112 (Djabir; Imburru near Angu; Avakubi; Poko; Likandi R.). SCHOUTEDEN, 1923, Rev. Z. A., XI, p. 329 (Luebo; Kamaiembi).—*Tricholaema flavipunctata chapini* BANNERMAN, 1933, 'Birds Trop. W. Afr.,' III, p. 378.—*Tricholaema flavipunctatum chapini* SCHOUTEDEN, 1936, Ann. Mus. Congo, Zool., I, f. 2, p. 98 (Kotili; Buta; Panga; Mauda; Abimva).

SPECIMENS.—Isangi, at mouth of Lomami R., ♂, Dec. 10. Avakubi, ♂, Jan. 29; 3 ♀, Jan. 29, Apr. 14, Nov. 23; ♂ im., Nov. 23. Medje, 4 ♂, Jan. 17. Mar. 28, May 29, Sept. 5; ♀, Aug. 13; ♂ juv., Sept. 17. Bafwabaka, ♂, Apr. 13. Gaman-gui, ♂, Feb. 4. Niangara, 6 ♂, Nov. 29, 30, Dec. 2, 5, 7; 3 ♀, Jan. 29, Apr. 14, Nov. 23; ♂ im., Nov. 26.

ADULT MALE.—Iris dark red, bill black, feet greenish black.

ADULT FEMALE.—Iris red-brown, bill black, feet dusky.

DISTRIBUTION.—From near Nola in French Equatorial Africa, Molundu in southeast Cameroon, and Lukolela on the Congo, eastward to Mauda and Abimva in the Uelle, the region near Mawambi in the Ituri, and the vicinity of Kabambare. Southward it reaches Katabwa in the

¹ *T. schultzei* Reichenow, 1911, O. Mb., p. 82 (Molundu, E. Cameroon) is supposedly a synonym of *flavipunctatum*.

southern Kasai, and the Congo Museum has one specimen supposedly from Dilolo.

From Molundu, where *flavipunctatum* is said to occur, the Hamburg Museum has also a skin of *chapini*. In the upper Sanaga district, according to Grote,¹ Tessmann secured an intermediate between this race and *flavipunctatum*. The eastern limits of *chapini* are difficult to state, because it differs so little from *T. h. ansorgii*. The wing of *chapini* averages slightly shorter, its throat is usually more narrowly streaked with black, and its underparts generally more yellowish green. The specimens most brightly colored beneath are apt to be females, and in all the races of this species females may be recognized by the deeper yellow spotting of the upperparts. These markings in males are lemon-yellow. The difference is already evident in the juvenal plumage.

From Lukolela to the Ituri and southern Uelle we found *chapini* a common bird in forest and second-growth woods, betraying its presence by cooing notes which are usually repeated for a short spell, instead of continuing more slowly for long periods like those of *Trachylæmus purpuratus*. Of rather solitary habit, it is usually seen perching in the trees, though I have watched one clinging to the under side of a slanting dead branch of a parasol tree (*Musanga*) and hammering away exactly like a woodpecker. Doubtless this performance occurs only during nest-building.

The majority of our specimens, though adult, were non-breeding. A female with enlarged ovary was taken at Medje in August, and a nestling two-thirds grown in September, so it is safe to assert that the species breeds during the rains. Fully fledged but immature birds were taken at Niangara and Avakubi in November, at a season when none seemed to be breeding. Noticeable enlargement of the gonads was, however, observed in two cases in January and February. As in many other species of barbets, the young nestling has on each heel a patch of scales with a rough rasp-like surface, which wears down as the bird grows up.²

Fruit forms the principal sustenance, and was present in every one of the twenty stomachs examined. Remains of insects were found but twice, one of them being a small beetle.

Tricholæma hirsutum ansorgii Shelley

Tricholæma ansorgii SHELLEY, 1895, B. B. O. C., V, p. iii (type locality: Uganda, type in Brit. Mus. from Entebbe).—*Tricholaema ansorgei* REICHENOW, 1902, 'Vög. Afr.,' II, p. 131 (Kinyawanga); 1911, 'Wiss. Ergeb. D. Z.-Afr. Exp.,' III, p. 277

¹ 1925, J. f. O., pp. 80, 81.

² See Gyldenstolpe, 1917, Arkiv f. Zool., XI, No. 12, pp. 1-15.

(Beni). O.-GRANT, 1910, Tr. Z. S. Lond., XIX, p. 415 (Mpanga forest near Fort Portal). SASSI, 1912, Ann. Naturh. Hofmus. Wien, XXVI, p. 383 (Rutshuru Plain; Kasindi-Beni; Beni; Moera; Beni-Mawambi; Mawambi; Ukaika; Mawambi-Irumu; Irumu). SCHOUTEDEN, 1914, Rev. Z. A., III, p. 264 (Kilo); 1918, idem, V, p. 242 (in part. Kinawa; Lesse). LÖNNBERG, 1917, Arkiv f. Zool., X, No. 24, p. 17.—*Tricholaema hirsutum ansorgii* GYLDENSTOLPE, 1924, K. Svenska Vet. Akad. Handl., (3) I, No. 3, p. 238 (Molembe; Kartushi). STONE, 1936, Proc. Acad. Nat. Sci. Phila., LXXXVIII, p. 563 (Ekibondo).



Fig. 33. *Tricholaema hirsutum ansorgii*. $\times 1$.

SPECIMENS.—Dungu, ♂, Feb. 24. Between Faradje and Aba, 2 ♀, Oct. 6, Dec. 2.

DISTRIBUTION.—Forests of North Kavirondo, Uganda, and the eastern Congo, from the northeastern Uelle to Kilo, the Semliki Valley, and the eastern side of the Rutshuru Valley. In the vicinity of Dungu and Faradje, and also near Lake Edward, it lives only in the heavier patches of forest. Its voice and way of life are exactly like those of *chapini*.

KEY TO THE SPECIES OF *LYBIUS* IN OR NEAR THE CONGO

- | | |
|---|---------------------|
| 1.—Head and neck white..... | 2. |
| Head and neck not white, but some red about face..... | 4. |
| 2.—Red markings about face..... | <i>L. chapini</i> . |
| No red about face..... | 3. |

- 3.—Lower breast, belly, and under wing-coverts white; tail dark brown or blackish
 *L. leucogaster*.
 Lower breast and belly blackish brown, though spotted with white; tail blackish
 brown *L. leucocephalus*.
 4.—No bright red on throat, only on forehead and cheeks; body largely black
 *L. rubrifacies*.
 Red on both crown and throat 5.
 5.—Underparts and back black, red of face extending to chest *L. guifsobalito*.
 Underparts partially light yellowish 6.
 6.—Nape black, and a black pectoral band *L. torquatus*.
 Nape not pure black, but spotted with red; no dark pectoral band . . *L. vieilloti*.

Lybius torquatus congicus (Reichenow)

Melanobucco torquatus congicus REICHENOW, 1898, in Werther, 'Mittl. Hochl. D. O.-Afr.', p. 273 (type locality: Malanje, Angola—type in Berlin Mus.).—*Pogonorhynchus torquatus* DUBOIS, 1886, Bull. Mus. Roy. Hist. Nat. Belg., IV, p. 147 (L. Tanganyika). SCHALOW, 1886, J. f. O., pp. 412, 413, 433 (Mpala; E. Marungu; Likulwe R.); 1887, idem, p. 234.—*Pogonorhynchus irroratus* MATSCHIE, 1887, J. f. O., p. 150 (Lufuku; Urua-Likulwe; Mpala; Likulwe).—*Lybius torquatus congicus* REICHENOW, 1902, 'Vög. Afr.', II, p. 126; 1911, 'Wiss. Ergeb. D. Z.-Afr. Exp.', III, p. 277. Neave, 1910, Ibis, p. 119 (Dikulwe R.). W. L. SCLATER, 1924, 'Syst. Av. Æth.', pt. 1, p. 271 ("Congo valley"; Katanga). DE RIEMAECKER, 1927, Rev. Z. A., XIV, p. 274 (Elisabethville). STRESEMANN and GROTE, 1928, Verhandl. VI Internat. Orn.-Kongr. (1926), pp. 373, 374. SCHOUTEDEN, 1930, Rev. Z. A., XVIII, p. 284. BANNERMAN, 1933, 'Birds Trop. W. Afr.', III, p. 372, Fig. 108.—*Barbatula rubrigularis* DUBOIS, 1905, Ann. Mus. Congo, Zool., I, f. 1, pp. 1, 36, Pl. I, fig. 1 (Katanga).—*Lybius torquatus* var. *irrorata* DUBOIS, 1905, Ann. Mus. Congo, Zool., I, f. 1, p. 35 (Tanganyika).—*Lybius congicus* SALVADORI, 1907, Boll. Mus. Zool. Anat. Torino, XXII, No. 570, p. 2 (Lukonzolwa).—*Lybius torquatus* MOURITZ, 1914, Ibis, p. 32 (near Kalonga). PAGET-WILKES, 1926, S. Afr. Journ. Nat. Hist., VI, p. 65 (Ndola).

DISTRIBUTION OF THE SPECIES.—From eastern Cape Province north to Angola, the Ruzizi Valley, and Lamu on the east coast; but not in dry Southwest Africa. *L. t. torquatus* (Dumont) is largely restricted to the region south of the Zambesi Valley, and has the yellow of underparts dull and mixed with dark gray, back dull brown with little black vermiculation; wings 89–98 mm. *L. zombæ* (Shelley) is regarded by Grote as a gray-faced race of this species, living to the east and southeast of Lake Nyasa.¹

L. t. congicus (Reichenow) resembles typical *torquatus*, having wings 87–96 mm., but is more distinctly vermiculated with black on back and lesser wing-coverts, the belly brighter yellow. It occupies the south-

¹ See also Vincent, 1933, B. B. O. C., LIII, pp. 149–151.

eastern Congo and neighboring countries, but is replaced at the northern end of Lake Tanganyika by *L. t. pumilio* Grote, similar in color, with wings only 83–91 mm. long. The smallest form of all is *L. t. irroratus* Cabanis, of the coast of East Africa from Lamu to Ugogo. Its wing measures 78–86 mm.; the vermiculation of the back extends to the greater wing-coverts, and the red feathers of crown and fore-neck have narrower tips.

L. t. congicus is distributed from southwest Tanganyika Territory to Marungu, Katanga, and Malanje, Angola. Specimens from Tembwe on Lake Tanganyika belong to this larger race, and those of the Benguella highland are closer to it than to typical *torquatus*. The species is not known from the Kasai district. The type specimen of *Barbatula rubrigularis* Dubois, in the Congo Museum, is simply a young bird of the present form, with wings and tail not yet fully grown.

The black-collared barbet is a common bird in the savannas of the Katanga and Marungu. "Despite their clumsy exterior," wrote Böhm, "these barbets are gay and lively creatures. One sees them in flocks seeking the fruit-bearing sycamores (*Ficus*), where they whirr quickly hither and thither, beating the short tail; and when two meet they burst out in joyous call which changes suddenly to a triple whistled note."

In Northern Rhodesia, according to Pitman, they nest in September and October. At Moba, northern Marungu, Rockefeller and Murphy collected specimens in breeding condition in February. The nest of the South African race is excavated in dead wood, and its glossy white eggs, laid in sets of four, measure around 25×21.5 mm.

***Lybius torquatus pumilio* Grote**

Lybius torquatus pumilio GROTE, 1927, O. Mb., p. 144 (type locality: Uvira on L. Tanganyika). SCLATER, 1930, 'Syst. Av. Æth.,' App., p. 859.—*Pogonorhynchus torquatus* REICHENOW, 1887, J. f. O., p. 308 (Kasongo).—*Lybius torquatus congicus* REICHENOW, 1902, 'Vög. Afr.,' II, p. 126 (in part. Kasongo).—*Lybius torquatus* var. *congica* DUBOIS, 1905, Ann. Mus. Congo, Zool., I, f. 1, p. 35.—*Lybius irroratus* O.-GRANT, 1908, Ibis, p. 311 (E. of Kasongo).—*Lybius torquatus irroratus* REICHENOW, 1911, 'Wiss. Ergeb. D. Z.-Afr. Exp.' III, p. 277. SASSI, 1912, Ann. Naturh. Hofmus. Wien, XXVI, p. 382 (Uvira; Baraka). SCHOUTEDEN, 1918, Rev. Z. A., V, p. 241 (Manakwa; Milumba; Dogodo R.).

DISTRIBUTION.—Lowlands about the northern end of Lake Tanganyika, including the Ruzizi Valley, and extending westward to the Lualaba River. Specimens in the Congo Museum from Kabalo agree better with *pumilio* than with *congicus*, though the difference between these two

racés is very slight.¹ *L. t. pumilio* is a fairly common bird, living in savannas and never ascending the mountains. Its call is a repetition of loud ringing syllables which to me suggest the words "markable, markable, markable—."

Lybius guifsobalito ugandæ Berger

Lybius tridactylus ugandæ BERGER, 1907, O. Mb., p. 201 (type locality: Nimule, on Bahr-el-Jebel).—*Lybius tridactylus* SCLATER AND M.-PRAED, 1919, Ibis, p. 636 (Yei). SCHUBOTZ, 1921, 'Tageb. Emin Pascha,' VI, p. 99 (Mundu; Nyamsansi; Nsabe).—*Pogonorrhynchus habessinicus* SCHUBOTZ, 1921, 'Tageb. Emin Pascha,' VI, p. 240 (Mundu).—*Lybius guifsobalito* W. L. SCLATER, 1924, 'Syst. Av. Æth.,' pt. I, p. 270 (L. Albert; Upper Uelle). Schouteden, 1936, Ann. Mus. Congo, Zool., I, f. 2, p. 97 (Faradje; Mahagi Port). STONE, 1936, Proc. Acad. Nat. Sci. Phila., LXXXVIII, p. 563 (Kasenyi).—*Lybius guifsobalito ugandæ* FRIEDMANN, 1930, Bull. 153, U. S. Nat. Mus., p. 435.

SPECIMENS.—Faradje, 9 ♂, Jan. 5, Mar. 2, Apr. 26, Sept. 4, Oct. 8, 18, Nov. 15, Dec. 29; 6 ♀, Feb. 8, 16, 25, Apr. 27, Oct. 27, Nov. 14, Dec. 4; ♀ im., Nov. 14. Garamba, ♂, May 11.

ADULTS OF BOTH SEXES.—Iris medium brown, eyelids and bill black, feet blackish.

DISTRIBUTION OF THE SPECIES.—Abyssinia and the Anglo-Egyptian Sudan to Uganda, Lake Albert, and the Upper Uelle district. *L. g. guifsobalito* Hermann, with wings 85–93 mm. long, ranges from southeastern Eritrea and Abyssinia to the Blue Nile district of the Sudan. *L. g. ugandæ*, with wings 77–86 mm. and narrower yellow and whitish edgings on wings, occupies the savannas of the upper White Nile, Uelle district, west shore of Lake Albert, and Uganda to the north shore of Lake Victoria.

In our territory *ugandæ* is limited to the savannas of the northeastern border, but is common about Faradje, and frequent also at Kasenyi on the western shore of Lake Albert. They not only dwell among the scrubby trees of the grasslands, but come to fruit trees planted about the government posts, as at Faradje. Parties of five or six birds are common, uttering discordant notes in chorus. The most characteristic of these is a dry "hic-cup, hic-cup, hic-cup, hic-cup—" introduced by a medley of harsh sounds. This might also be written "cha-cha-cha—cho-ko, cho-ko, cho-ko—." A single nasal "caw" suggestive of our American fish-crow, is also a part of their vocabulary.

The breeding season in the Uelle, I believe, is during the rains; but only a single male bird (March 2) showed any considerable enlarge-

¹ I certainly do not agree with Grant and M.-Praed, 1938, B. B. O. C., LVIII, p. 105, who regard both *congius* and *pumilio* as synonyms of *L. t. torquatus*.

ment of the sexual glands. A full-grown but immature female was taken in November.

Of thirteen stomachs, all but one contained fruit of some kind. The pink pulp of guavas was noted twice, papaya twice, small red peppers twice, and some wild berries twice, the remaining fruit not recognizable. One bird had eaten only an insect; among the others, one had taken a large black ant, and one a large hemipter.

Lybius rubrifacies (Reichenow)

Pogonrhynchus rubrifacies REICHENOW, 1892, J. f. O., pp. 25, 215 (type locality: Kimoani, on southwest side of L. Victoria).—*Lybius rubrifacies* O.-GRANT, 1904, B. B. O. C., XV, p. 29 (Mulema, southern Uganda). SCHOUTEDEN, 1933, Bull. C. Z. C., X, p. 13 (Kamonyi); 1933, Rev. Z. A., XXII, p. 377 (Rugobagoba).

DISTRIBUTION.—Country southwest and west of Lake Victoria, as far as central Ruanda. Known thus far only from the four localities listed above. Kamonyi and Rugobagoba are on the highland not far from Kigali in Ruanda. At these places Douce obtained two adults, not sexed.

L. rubrifacies seems closely allied to *L. guifso-balito*, and the black-and-brown feathers of its chin and upper throat show traces of red at their tips. But the red of its forehead is much less extensive than in *guifso-balito*, its wing-coverts are black without pale edgings, and its tail is longer. Douce's specimens have wings 89, 91 mm., tail 54, 56, culmen to base 22, 24, metatarsus 22, 22.5.

The habits of *rubrifacies* may be expected to resemble those of *guifso-balito*. It is not true, as stated by Friedmann,¹ that the two species are found together.

Lybius vieilloti vieilloti (Leach)

Pogonius vieilloti LEACH, 1815, 'Zool. Misc.', II, p. 104, Pl. xcvi (type locality: Africa, probably Abyssinia?).—*Lybius vieilloti vieilloti* SCHOUTEDEN, 1936, Ann. Mus. Congo, Zool., I, f. 2, p. 97 (Mauda).

SPECIMENS.—Niagara, 4 ♂, May 4, Nov. 22, Dec. 17; ♂ im., Dec. 17.

ADULT MALE.—Iris light brown, becoming whitish on outer rim; bill black; feet very dark greenish brown.

DISTRIBUTION OF THE SPECIES.—Bogosland, Sennar, and Kordofan, southward to the Uelle district and westward to northern Cameroon, Asben, and Senegal. The geographic variation in color is slight, and it cannot be determined whether Leach's type came from Northeast Africa

¹ 1930, Bull. 153, U. S. Nat. Mus., p. 436.

² See O.-Grant, 1902, Ibis, p. 426.

or from Senegal. Neumann¹ and Hartert² have argued that Senegal should be taken as the type locality, but it seems better to accept Ogilvie-Grant's earlier designation of Abyssinia.

Lybius v. vieilloti (Leach) would thus be the race extending from Eritrea to Darfur, the Bahr-el-Ghazal, and the Uelle. It is less thickly marked with red on the breast than *L. v. rubescens* (Temminck), which ranges from Senegal to the savannas near the bend of the Ubangi River.³ North of *rubescens*, from the region of Timbuktu to Lake Chad, lives *L. v. buchanani* Hartert,⁴ which is said to be paler in coloration on its whole upperparts.

In habits Vieillot's barbet is similar to *L. guifsobalito*, and frequents the small trees of the savanna. Some of our specimens were captured there in a nesting hole by natives. We met with the species only near Niangara, and did not find it common. Only the bird taken in May showed some enlargement of the reproductive organs. Stomach contents, noted in two cases, included fruit in both instances, and two large black ants eaten by one of the birds.

In Darfur Admiral Lynes⁵ found that the breeding season extended from April to July. The call of this barbet, he stated, is audible for a considerable distance, and best described as "yodeling," a succession of two flute-like notes widely separated. Two birds, almost certainly male and female, are responsible for it, one giving the low and the other the high note. They sit facing each other on a bough, and at each dissyllable bow to each other.

A nest found in Darfur in early May was excavated in the spongy stem of a small *Adenium* tree, at four feet from the ground. The eggs were three in number, nearly glossless white, and averaged 25 × 21 mm.

[*Lybius vieilloti rubescens* (Temminck)]

Pogonias rubescens TEMMINCK, 1823, 'Planches Coloriées,' livr. 34 (type locality: Senegal).—*Melanobucco vieilloti* OUSTALET, 1893, *Naturaliste*, (2) VII, p. 60.—*Lybius vieilloti* REICHENOW, 1902, 'Vög. Afr.,' II, p. 127 ("Ubangi R.").

This subspecies was to be expected in the savannas of the north-western Ubangi district, and Mr. Berlioz kindly informed me that three specimens were taken by Dybowski on the upper Kemo River in adjacent French territory. But examination of these skins showed them

¹ 1917, J. f. O., Festschr. A. Reichenow, p. 201, footnote; 1927, *Ibis*, p. 503.

² 1921, Nov. Zool., XXVIII, p. 107; 1924, idem, XXXI, p. 23.

³ *L. v. tessmanni* Grote, 1923, O. Mb., p. 110 (Upper Kadei district) is synonymous with *rubescens*.

⁴ 1924, Nov. Zool., XXXI, p. 23 (Tebeig, Asben).

⁵ 1925, *Ibis*, p. 349.

to be very similar to Dr. Schouteden's from Mauda, and I have not been able to compare Uelle birds again with examples from northeastern Africa.

[*Lybius chaplini* Clarke]

Lybius chaplini STEPHENSON CLARKE, 1920, B. B. O. C., XLI, p. 50 (type locality: Kafue R., N. Rhodesia); 1921, Ibis, pp. 617, 620, Pl. vii, fig. 3.

This barbet combines color characters of *L. leucocephalus* and *L. rubrifacies*, having underparts and head white, spattered with red on lores and cheeks, a dark brown back and tail, and yellow edgings on the secondaries. About a dozen specimens have now been collected,¹ all in the vicinity of the lower Kafue Valley. The chances are slight that it reaches the southern Katanga.

Lybius leucocephalus leucocephalus (Defilippi)

Laimodon leucocephalus DEFILIPPI, 1853, Rev. Mag. Zool., Paris, (2) V, p. 291 (type locality: White Nile, betw. 3° and 4° N. Lat.).—*Pogonorhynchus leucocephalus* HARTLAUB, 1882, Abhandl. Naturwiss. Verein Bremen, VIII, p. 209 (Wandi). SCHUBOTZ, 1921, 'Tageb. Emin Pascha,' VI, p. 238.—*Melanobucco leucocephalus* SHELLEY, 1891, 'Cat. Birds Brit. Mus.,' XIX, p. 21 (Kiri, on Bahr-el-Jebel).—*Lybius leucocephalus* DUBOIS, 1905, Ann. Mus. Congo, Zool., I, f. 1, p. 35 (Niam-Niam). SALVADORI, 1911, Ann. Mus. Civ. Stor. Nat. Genova, (3) V, p. 445 (Uelle). SCLATER AND M.-PRAED, 1919, Ibis, p. 635 (Mt. Baginzi; Yei). SCHUBOTZ, 1921, 'Tageb. Emin Pascha,' VI, p. 99 (Makraka; Kaia in Mundu). STRESEMANN AND GROTE, 1928, Verhandl. VI Internat. Orn.-Kongr. (1926), p. 368.—*Pogolorhynchus leucocephalus* EMIN, 1919, in Stuhlmann, 'Tageb. Emin Pascha,' II, p. 425 (Tobbo).—*Lybius leucocephalus leucocephalus* SCHOUTEDEN, 1936, Ann. Mus. Congo, Zool., I, f. 2, p. 98 (Mauda; Mahagi Port).

SPECIMENS.—Niangara, ♀ juv., Apr. 13. Dungu, ♀, Jan. 26. Faradje, 2 ♂, Jan. 27, Sept. 8; 2 ♀, Oct. 12, 23. Aba, ♂, ♀, Dec. 19.

ADULTS.—Iris brown, bill and orbits blackish, feet dusky.

DISTRIBUTION OF THE SPECIES.—From southern Ankole and Kavirondo through Uganda to Mt. Elgon and the Lado district. Thence west through the savannas of the Uelle to the Shari River and Northern Nigeria. *L. l. leucocephalus*, with white of fore-neck extending only to upper breast, occupies the eastern part of the range, while from the Ubangi westward it is replaced by *L. l. adamaux*, with more white on the breast, so that only the abdomen and flanks are brownish black streaked with white. Specimens of *leucogaster* from the Uelle and Mahagi Port have wings 86–95 mm. The wing-length in *adamaux* is said to be 83–91 mm.

¹ Pitman, 1932, Ibis, pp. 304, 308; 1934, 'Rep. Faunal Survey N. Rhodesia,' p. 229. Winterbottom, 1932, Ibis, pp. 722, 723.

Very closely allied to this species are *Lybius albicauda* and *senex* of eastern Africa and *L. leucogaster* of Benguela. They replace each other geographically, but their ranges seem not to meet and so they do not intergrade with *leucocephalus*.

In Uganda the white-headed barbet is rather common; and while it has been found on the west shore of Lake Albert only at Mahagi Port, I have noted one individual near the new post of Kasindi, at the southern base of the Ruwenzori range. Colonel Hackars has since collected one at Kadiakadia in the upper Semliki Valley. In the Uelle it is a bird of the savannas, from Niangara and Nzoro northward, seen also at Garamba. In parties of four or five it haunts the larger trees on dry ground, such as "sausage-trees" (*Kigelia*). The flight is well sustained and rapid, with swiftly beating wings. This barbet has a very unusual voice, giving a series of shrill metallic notes of two syllables, which I used to recall by the words "king-crown." These are repeated energetically from 15 to 20 times, and then die off in a sort of "k-k-k-k—." Occasionally they also produce a dry "ch-ch-ch-ch—" which is not so loud. I once flushed two of the birds from the ground, the only time I have known any barbet to come to the earth. None of the Congo woodpeckers, either, was seen feeding on the ground.

All I can say as to the time of reproduction in the Uelle is that a partly grown nestling was secured through natives in April, and that partial enlargement of the gonads was noted in three birds, in January, September, and October. This argues for a very long breeding season.

Seven out of eight stomachs contained only fruit, in one case the inner pulp of a guava. The remaining bird was the nestling which had been eating some beetles.

***Lybius leucocephalus adamauxæ* Reichenow**

Lybius leucocephalus adamauxæ REICHENOW, 1921, J. f. O., p. 46 (type locality: Tibati Highland, N. Cameroon). BANNERMAN AND BATES, 1924, Ibis, p. 218 (Ubangi R.). GROTE, 1925, J. f. O., p. 80. BANNERMAN, 1933, 'Birds Trop. W. Afr.,' III, p. 373, Fig. 109.—*Melanobucco leucocephalus* OUSTALET, 1893, Naturaliste, (2) VII, p. 60.—*Lybius leucocephalus* REICHENOW, 1902, 'Vög. Afr.,' II, p. 121 ("Ubangi R.").

DISTRIBUTION.—From the Ubangi and Shari rivers westward to northern Cameroon and Haussaland. This subspecies surely occurs in the northern Ubangi district, for Boyd Alexander collected it at a Catholic Mission on the Ubangi River, a little above the mouth of the Kemo. Dybowski's specimen, mentioned by Oustalet, came from the upper Kemo River and not from the Ubangi itself.

[*Lybius leucogaster* (Bocage)]

Pogonorhynchus leucogaster BOCAGE, 1877, Journ. Sci. Lisboa, VI, p. 63 (type locality: Quillengues, Benguella).

Differing from *L. leucocephalus* in its wholly white underparts and under wing-coverts, this white-headed barbet inhabits western Benguella, and is apparently known only from the types. There seems to be a very wide gap between the range of this form and that of *L. albicauda*. Otherwise it might be expected somewhere along the southern border of the Congo.

KEY TO THE SPECIES OF *MELANOBUCCO*

- 1.—Breast deep red, throat and abdomen also red, a white patch on each flank; upperparts largely glossy black, with a white spot on lower back, and a narrow red band on greater wing-coverts. *M. bidentatus*
 Breast white, with a wash of pink posteriorly; throat white; no median spot of white on lower back, nor any red band on wings; forehead with a red patch *M. minor*.

Melanobucco minor minor (Cuvier)

Pogonias minor CUVIER, 1817, 'Règne Animal,' I, p. 428 (type locality: Afrique et aux Indes).¹—*Pogonorhynchus æogaster* JOHNSTON, 1884, 'River Congo,' p. 37, Fig. (Kissange).—*Pogonorhynchus æogaster* JOHNSTON, 1884, 'River Congo,' p. 366 (Lower Congo).—*Pogonorhynchus eogaster* REICHENOW, 1887, J. f. O., p. 299 (Manyanga).—*Melanobucco levaillanti* SHELLEY, 1891, 'Cat. Birds Brit. Mus.,' XIX, p. 20 (Landana). OUSTALET, 1893, Naturaliste, (2) VII, p. 60.—*Lybius levaillanti* REICHENOW, 1902, 'Vög. Afr.,' II, p. 120 (in part. Manyanga; "Ubangi R."). DUBOIS, 1905, Ann. Mus. Congo, Zool., I, f. 1, p. 35 (Lower Congo).—*Lybius levaillanti levaillanti* SCHOUTEDEN, 1923, Rev. Z. A., XI, pp. 329, 395 (Matadi). W. L. SCLATER, 1924, 'Syst. Av. Æth.,' pt. 1, p. 272. BANNERMAN, 1933, 'Birds Trop. W. Afr.,' III, p. 375, Fig. 110 (in part).

SPECIMENS.—Boma, ♂, Jan. 3; 2 ♀, Jan. 3, 7; ♂ juv., Jan. 3.

ADULTS.—Iris light yellowish brown or buff, orbit flesh-color; bill whitish; feet pink, with gray claws.

DISTRIBUTION OF THE SPECIES.—Landana, Lower Congo, and Angola, east to the Katanga, Marungu, and the country north of Lake Nyasa. *M. m. minor*, with sides and back of head grayish brown, and back uniform blackish brown, ranges from Benguella north to the Lower Congo and the coast near Landana. *M. m. intercedens* differs in having the sides of the head white, the nape blackish brown, and the back with a whitish stripe on each side. It occupies the country between the Lower Congo and the lower Kasai River. *M. m. macclounii* also has white sides

¹ *Bucco levaillantii* Vieillot, 1816, is antedated by *Bucco levaillantii* Gmelin, 1806, which was proposed for an Asiatic barbet. I am obliged to Dr. Herbert Friedmann for this information.

of head, white stripes on back, but upperparts blacker, including hind-crown and hind-neck. This race ranges from the Kwango River eastward to the north end of Lake Nyasa.

There is no great difference in wing-length between these subspecies. In three adults of *minor* from Boma it is 84–87 mm., and in four others of the same race from the Benguella highland 88–95 mm. Six examples of *intercedens* from Kwamouth have wings 87–92 mm., and a large series of *macclounii* from the southeastern Congo 84–93 mm.

In Congo territory *L. m. minor* is restricted to the area between the cataracts and the coast. Dybowski's specimen was not obtained on the Ubangi, but was labeled as coming from "Congo." It is no longer in existence. About Boma the typical race of the pink-bellied barbet is not uncommon in bushes and small trees of the savanna. It has a long "clicking" note, much like that of *M. bidentatus*, which lives in the same district. All the adults (in January) were non-breeding birds, but the nesting season had just closed, to judge from the young example. This bird lacks all trace of the red frontal patch, and is generally lighter above than adults.

Nothing but fruit was found in their stomachs. In one case it was identified as the outer covering of a palm nut.

Melanobucco minor intercedens (Neumann)

Lybius levaillanti intercedens NEUMANN, 1908, O. Mb., p. 27 (type locality: Manyanga, lower Congo R.). SCHOUTEDEN, 1923, Rev. Z. A., XI, pp. 329, 395 (Kabambaie ?; Kwamouth).

DISTRIBUTION.—From Manyanga in the Cataracts district east to Kwamouth and possibly the Kasai district, and south to the interior of northern Angola. Bohndorff collected an adult pair at Manyanga, whereas a third adult from the same place was referred by Neumann to *M. m. minor*. At Pungo Andongo in northern Angola typical *minor* occurs, though elsewhere in that region Schütt is stated to have taken *intercedens*. Dr. Schouteden believed he saw *intercedens* at Kabambaie in the central Kasai district, but the race occurring near Luluabourg is *macclounii*.

Melanobucco minor macclounii Shelley

Melanobucco macclounii SHELLEY, 1899, B. B. O. C., VIII, p. xxxv (type locality: Nyasaland; type in British Museum from Luchinde).—*Pogonorrhynchus eogaster* SCHALOW, 1886, J. f. O., p. 423 (L. Itambe). MATSCHIE, 1887, J. f. O., p. 150.—*Lybius levaillanti* REICHENOW, 1902, 'Vög. Afr.' II, p. 120 (in part. L. Itambe).—*Lybius macclouni* NEAVE, 1907, Mem. Proc. Manchester Lit. Phil. Soc., LI, No. 10, p. 48 (Mkushi-Ndola); 1910, Ibis, p. 119 (Kambove; Dikulwe R.). SCHOUTEDEN,

1918, Rev. Z. A., V, p. 241 (Mawagongo). REICHENOW, 1923, Mitt. Naturh. Mus. Hamburg, XL, p. 63 (Lupungu).—*Lybius levaillanti macclouni* SCHOUTEDEN, 1923, Rev. Z. A., XI, p. 329 (Kinda). DE RIEMAECKER, 1927, Rev. Z. A., XIV, p. 274 (Elisabethville).—*Lybius levaillanti macclounii* W. L. SCLATER, 1924, 'Syst. Av. Æth.,' pt. 1, p. 272.—*Melanobucco levaillanti macclouni* SCHOUTEDEN, 1930, Rev. Z. A., XVIII, p. 284.—*Lybius levaillanti levaillanti* BANNERMAN, 1933, 'Birds Trop. W. Afr.,' III, p. 375 (in part. Katanga).

DISTRIBUTION.—The country north of Lake Nyasa, westward through Northern Rhodesia to the Katanga, Marungu, the southern Manyema and Kasai districts, and the Kwango River. Dr. Schwetz brought back a single specimen, plainly *macclounii*, from the Wilhelm Falls on the Kwango, Father Callewaert sent us four from Katabua in the Kasai, and G. F. de Witte obtained two from the Congo Museum at Dilolo. Count de Baillet-Latour collected a series near Kinda and Lake Musolo, and de Witte others at Kanzenze, Kansenia, and the vicinity of Tenke. Both De Riemaeker and Schouteden have found this barbet near Elisabethville. In Marungu, Rockefeller and Murphy took three, and in the Manyema, Pilette secured a single specimen at Mawagongo. In the Upper Katanga, Neave found it common everywhere: "It usually occurs in pairs and is nearly always found in the bush on the banks of streams. It is very tame and rather inquisitive."

***Melanobucco bidentatus friedmanni* (Bannerman)**

Pogonornis bidentatus friedmanni BANNERMAN, 1933, B. B. O. C., LIII, p. 124 (type locality: Ndala Tando, N. Angola); 1933, 'Birds Trop. W. Afr.,' III, p. 369.—*Pogonorhynchus bidentatus* REICHENOW, 1887, J. f. O., p. 299 (Manyanga).—*Melanobucco bidentatus* OUSTALET, 1893, Naturaliste, (2) VII, p. 60 ("Ubangi").—*Lybius bidentatus* REICHENOW, 1902, 'Vög. Afr.,' II, p. 119 (Isangila). OUSTALET, 1904, Bull. Mus. Paris, p. 432 (Krebedje). DUBOIS, 1905, Ann. Mus. Congo, Zool., I, f. 1, p. 35 (Lower Congo). LÖNNBERG, 1907, Arkiv f. Zool., III, No. 21, p. 7 (Kingoyi).

DISTRIBUTION OF THE SPECIES.—Portuguese Guinea east to the Cameroon, Bahr-el-Ghazal, and southern Abyssinia, south to Angola, the northern end of Lake Tanganyika, Uganda, and South Kavirondo.

M. b. bidentatus (Shaw) has a relatively deep red border on its greater wing-coverts, and rather short wings, 92–102 mm. It occupies West Africa from Portuguese Guinea to Southern Nigeria. *M. b. friedmanni* is very similar in color with the same deep red border on wing-coverts, but wings averaging longer, 100–108 mm. This race is found along the northern edge of the forest belt from the vicinity of Mt. Cameroon to the great bend of the Ubangi, and also from the Gaboon south to northern Angola, approximately to the Kwanza River. *M. b. æquatorialis* is distinguished from the foregoing by the lighter, more rose-colored

band on the greater wing-coverts, and its wing measures 97–109 mm. It occupies Uganda and adjacent countries west to the Uelle district. Two adult females collected by Dybowski on the upper Kemo River have red wing-bars wide, as in *friedmanni*, but of much the same rosy tint as in *æquatorialis*. *M. b. æthiops* Neumann is barely separable from *æquatorialis*, the coloration being the same, and the wing 95–103 mm. Its bill may be slightly smaller. The range of *æthiops* includes southern Abyssinia and adjacent regions of the Sudan. The females of this barbet have small black spots on the red feathers just in front of the white flank-patches; these spots are absent in males.

Within our limits *M. b. friedmanni* is found mainly in the Lower Congo, where it is not very common. I regard it as a relatively recent invader from the savannas north of the equator, now occupying territory once inhabited only by *M. minor*. Near Boma I found a small party of *friedmanni* in a wooded stream-bed, but was unable to secure a specimen. Dr. Schwetz obtained an example there, and another at Thysville.

A nest described by Bates¹ from the southern Cameroon was an excavation a foot and a half deep in a tall dead stump, its opening about six feet above the ground. The four nestlings had been fed on insects, while the adults eat mainly fruit.

Melanobucco bidentatus æquatorialis Shelley

Melanobucco æquatorialis SHELLEY, 1889, Ibis, p. 476 (type locality: Hparo, i.e., Umparu near Wadelai); 1891, 'Cat. Birds Brit. Mus.,' XIX, p. 19 (Semio). OUSTALET, 1893, Naturaliste, (2) VII, p. 60 (Hparo; Niam-Niam). SALVADORI, 1911, Ann. Mus. Civ. Stor. Nat. Genova, (3) V, p. 445 (Uelle).—*Pogoniorhynchus bidentatus* HARTLAUB, 1881, Abhandl. Naturwiss. Verein Bremen, VII, p. 85 (Magungo).—*Pogonias bidentatus* HARTLAUB, 1881, Abhandl. Naturwiss. Verein Bremen, VII, p. 112.—*Pogoniorhynchus bidentatus* SHARPE, 1884, Journ. Linn. Soc. Lond., Zool., XVII, p. 432 (Semio). SCHWEINFURTH AND RATZEL, 1888, 'Emin-Pascha,' German Ed., p. 145. EMIN, 1888, 'Emin Pasha Centr. Afr.,' p. 146; 1919, in Stuhlmann, 'Tageb. Emin Pascha,' II, p. 495 (Tomaya). SHELLEY, 1888, P. Z. S. Lond., p. 41 (Umparu). SCHUBOTZ, 1921, 'Tageb. Emin Pascha,' VI, p. 240 (Mundu).—*Lybius æquatorialis* SHARPE, 1902, Ibis, p. 113 (Ruwenzori, 5600 ft.). REICHENOW, 1902, 'Vög. Afr.,' II, p. 119 (Nyangabo); 1911, 'Wiss. Ergeb. D. Z.-Afr. Exp.,' III, p. 276 (Kirk Falls, lower Semliki R.). O.-GRANT, 1910, Tr. Z. S. Lond., XIX, p. 415 (Mubuku Valley, 5000 ft.; Mokia; lower Semliki Valley). SCHOUTEDEN, 1914, Rev. Z. A., III, p. 264 (Kilo); 1918, idem, V, p. 241 (Beni; Bonzo; Boga; Kibati; Talia R. and Semliki). SCHUBOTZ, 1921, 'Tageb. Emin Pascha,' VI, p. 98 (Mundu; Makraka; Niam-Niam; Mangbetu country; Fanjimoro; Tunguru).—*Lybius bidentatus æquatorialis* SASSI, 1912, Ann. Naturh. Hofmus. Wien, XXVI, p. 382 (Usumbura; Rutshuru Plain).

¹ 1911, Ibis, p. 505.

LÖNNBERG, 1917, Arkiv f. Zool., X, No. 24, p. 17 (Rutshuru). SCLATER AND M.-PRAED, 1919, Ibis, p. 635 (Meridi; Mt. Baginzi; Yambio). BANNERMAN, 1922, Rev. Z. A., X, p. 102. GYLDENSTOLPE, 1924, K. Svenska Vet. Akad. Handl., (3) I, No. 3, p. 237 (Masidongo). FRIEDMANN, 1930, Bull. 153, U. S. Nat. Mus., p. 441 (Faradje; W. shore L. Edward; Ruanda). SCHOUTEDEN, 1932, Rev. Z. A., XXII, p. 124 (Ngoma; Lulenga); 1933, idem, XXII, p. 377 (Kisenyi); 1936, Ann. Mus. Congo, Zool., I, f. 2, p. 98 (Buta; Buta-API; Poko; Mauda; Dramba; Djalasinda; Mahagi Port).—*Lybius bidentatus xhiops* HARTERT, 1925, Nov. Zool., XXXII, p. 138 (Mt. Baginzi and vicinity).—*Pogonornis bidentatus aequatorialis* BANNERMAN, 1933, 'Birds Trop. W. Afr.,' III, p. 368.

SPECIMENS.—Niagara, 8 ♂, Nov. 15, 19, 24, 25, 28, Dec. 4; 8 ♀, Nov. 15, 17, 19, 20, 24, 30, Dec. 6; 5 ♂ juv., Nov. 7, 11, 26, 29; ♀ juv., Nov. 12. Faradje, 4 ♂, Mar. 19, Oct. 9, 13, Dec. 9; 8 ♀, Jan. 6, Mar. 1, 19, July 8, Aug. 21, Sept. 7, Oct. 9, Dec. 9.

ADULTS.—Iris dark brown with outer rim whitish, orbit yellow; bill whitish; feet dark brown.

YOUNG.—Iris dark brownish gray; bill and orbit light gray; feet brownish white, claws dusky.

DISTRIBUTION.—Kavirondo district, Mt. Elgon, and Uganda, westward across the Uelle district and Bahr-el-Ghazal to the Shari River. Southward also to Bukoba, and along the eastern margin of the Congo forest and about Lake Kivu to Usumbura at the north end of Lake Tanganyika. Seen only seldom above 5000 feet. Lacking in all the heavy forest of the Ituri, and even just along its northern edge.

We did not encounter this conspicuous bird until near Niagara. It is fond of groves of trees near native villages, and the Mangbetu boys trapped many specimens for us, using single palm-nuts as bait. About the post of Faradje, too, it was numerous, pecking large holes in any ripe papaya that remained on the trees, along with the colies. The barbets eat the seeds of the papaya as well. Small red peppers are also devoured by them, though one bite in this fruit would make my mouth burn for a quarter of an hour. The voice of this barbet is a prolonged clicking or grinding sound, comparable with that of the wood-hoopoes of the genus *Pheniculus*.

Breeding takes place over a large period of the year. Dr. Schouteden obtained a brood of three nestlings at Dramba, April 18. We took a female ready to lay as early as March 19 at Faradje, noted others with some enlargement of the ovary in August and September, and had nestlings brought by natives near Niagara in November.

Nests are excavated in dead limbs rather high in trees, and Emin noted that fragments of eggshell were pure white. Sets must number three or four, but no one has measured the eggs. The nestlings exhibit

the horny rasp-like heel-pads which are characteristic of all young barbets. The juvenal plumage is largely blackish, with white patches on lower back and flanks, but often only a little dull red along the mid-line of the breast and abdomen, although other individuals have a little red on the ear-coverts.

Sixteen out of nineteen stomachs contained fruit, which was noted in four cases as red peppers, twice as palm-nut pulp, and once wild figs. Nine birds had partaken of insects. In two cases these were recognized as beetles, and once as a young hemipter.

***Pogonorhynchus rolleti* (Defilippi)**

Pogonias rolleti DEFILIPPI, 1853, Rev. Mag. Zool., (2) V, p. 290 (type locality: Upper White Nile).—*Erythrobucco rolleti* SHELLEY, 1891, 'Cat. Birds Brit. Mus.,' XIX, p. 17 (Kiri on Bahr-el-Jebel; Faradjok).—*Pogonorhynchus rolleti* REICHENOW, 1902, 'Vög. Afr.,' II, p. 117 (Wandi). SCLATER AND M.-PRAED, 1919, Ibis, p. 634 (Mt. Baginzi).

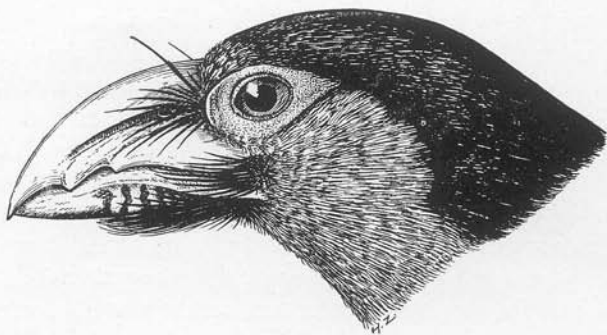


Fig. 34. *Pogonorhynchus rolleti*. $\times 1$.

DISTRIBUTION.—Upper White Nile near Redjaf, and the Bahr-el-Ghazal, north to Darfur and west to the valley of the Shari River. Two specimens now in the Congo Museum were collected by Dr. C. Christy at Mt. Baginzi, on the Congo-Sudan border near Yakuluku; and Emin also secured it at Wandj, only 45 miles northeast of Garamba.

Lynes¹ reported that in Darfur it frequents the thickest-foliaged trees, feeding on figs and other fruit. In flight its wings whirl, but the only vocal sound he heard it make was a harsh scraping note. Breeding took place in July, and the two nests found were borings in live hardwood tree-trunks about fifteen feet from the ground.

¹ 1925, Ibis, p. 347.

FAMILY Indicatoridæ. HONEY-GUIDES

KEY TO THE AFRICAN GENERA OF INDICATORIDÆ

- 1.—Rectrices only 10 in number; bill small and pointed; plumage somewhat softer than in other genera, wing not longer than 80 mm. *PRODOTISCUS*, p. 535.
Rectrices 12 2.
- 2.—Tail of exceptional shape, three outermost pairs of rectrices narrowed and much reduced in length, next pair still distinctly shortened, two middle pairs pointed and curved outward at tips; under tail-coverts nearly or quite equal in length to median rectrices *MELICHNEUTES*, p. 553.
Rectrices of normal form, outer ones often shortened so that tail is rounded; under tail-coverts not more than one-half as long as tail 3.
- 3.—Wing more than 95 mm. long; bill moderately stout, but pointed
 *INDICATOR*, p. 545.
Wing usually less than 95 mm., seldom attaining 98 mm.; chest never spotted 4.
- 4.—Bill short and stout, with blunt tip *MELIGNOTHES*, p. 539.
Bill far slenderer and more pointed *MELIGNOMON*, p. 537.

KEY TO THE SPECIES OF *PRODOTISCUS*

- Back and outer surface of wings always olive-green or washed with green; outermost tail-feathers always wholly white *P. insignis*.
Whole upperparts brown without a trace of green; outermost tail-feathers frequently with dusky tips *P. regulus*.

Prodotiscus insignis insignis (Cassin)

Heterodas insignis CASSIN, 1856, Proc. Acad. Nat. Sci. Phila., p. 157 (type locality: Moonda R., Gaboon).—*Prodotiscus insignis* SHELLEY, 1891, 'Cat. Birds Brit. Mus.,' XIX, p. 12 (Bellima). REICHENOW, 1902, 'Vög. Afr.,' II, p. 115. SASSI, 1912, Ann. Naturh. Hofmus. Wien, XXVI, p. 382 (Moera).—*Prodotiscus emini* BANNERMAN, 1921, Ibis, p. 87.—*Prodotiscus insignis emini* BANNERMAN, 1923, Ibis, p. 724.—*Prodotiscus insignis insignis* W. L. SCLATER, 1924, 'Syst. Av. Æth.,' pt. 1, p. 291. BANNERMAN, 1933, 'Birds Trop. W. Afr.,' III, p. 420, Fig. 126. SCHOUTEDEN, 1936, Ann. Mus. Congo, Zool., I, f. 2, p. 100.—*Prodotiscus insignis insignis* SCHOUTEDEN, 1926, Rev. Z. A., XIII, p. 195 (Kai Bumba; Temvo).

SPECIMEN.—Avakubi, ♀, Sept. 3.

ADULT FEMALE.—Iris dark brown; bill black, with a little pale greenish yellow at corners of mouth; feet dark gray.

DISTRIBUTION OF THE SPECIES.—Sierra Leone to Togoland and whole Lower Guinea forest; also locally from southern Abyssinia to Kenya Colony, the base of Kilimanjaro, Nyasaland, Southern Rhodesia, and Mossamedes. The Upper Guinea race is *P. i. flavodorsalis* Bannerman.¹ *P. i. insignis* extends from southern Cameroon, Gaboon, and the Lower Congo eastward to the Uelle, Ituri, and Semliki Valley, perhaps also to

¹ 1923, B. B. O. C., XLIII, p. 161 (Béoumi, Ivory Coast).

Wadelai and North Kavirondo. *P. i. ellenbecki* Erlanger,¹ from southern Abyssinia to Kenya Colony, is larger, with wings 69–73 mm., as opposed to 62–68 mm. in typical *insignis*. It is also lighter and grayer on the breast, with whitish under tail-coverts; but the lower back is greenish in all races of this species. *P. i. reichenowi* Madarász² is doubtfully distinct from *ellenbecki*, with which it agrees in size. At most it is only slightly darker on crown and back, with duller green edgings on secondaries. This form is found about Kilimanjaro and in Usambara. *P. i. zambesiæ* has still longer wings, 71–75 mm., and is lighter in color throughout than *P. i. insignis*, crown gray with little or no green wash. Its underparts are a little paler than those of *ellenbecki*. We now know that it ranges from Lake Tanganyika, the Katanga, and Benguela south to Southern Rhodesia.

Prodotiscus i. insignis is distinctly a bird of the forest subregion, but little or nothing is known of its ways of life. Our first specimen was shot by my native hunter, Nekuma, in a tree overlooking a rice field. Its stomach contained some soft matter which may have been the remains of caterpillars.

On October 24, 1926, I collected another example, a male, about 28 miles north of the new post of Beni. It was in a large forest tree at the edge of a clearing, flying actively about and showing its white outer tail-feathers. When perched it resembled a small flycatcher. In the hand, too, *Prodotiscus* is very different-looking from a typical honey-guide, having much softer plumage and a bill of very different shape.

Prodotiscus insignis zambesiæ Shelley

Prodotiscus zambesiæ SHELLEY, 1894, Ibis, p. 8 (type locality: Zomba, southern Nyasaland).

DISTRIBUTION.—From Tembwe on Lake Tanganyika and the Upper Katanga, south to Mt. Namuli in Mozambique, the Sabi Valley in Southern Rhodesia, and westward to southern Angola. At Tembwe Dr. Schouteden collected a female in February, 1926, and the Museum of Comparative Zoölogy has another female from Elisabethville. In Angola Boulton obtained an example at Quipungo, while the Rothschild Collection contains one bird from Cabeça de Ladrões. Vincent³ found it on Mt. Namuli in Mozambique and Mt. Cholo in southern Nyasaland. He heard it make a subdued squeaky chatter, and noted that while perching it bobs its head ceaselessly up and down.

¹ 1901, O. Mb., p. 182 (Daroli, Arussi country).

² 1904, Ann. Mus. Nat. Hung., II, p. 206 (Moshi, Kilimanjaro).

³ 1935, Ibis, pp. 14–16.

In Southern Rhodesia Mr. D. Townley has seen *zambesiæ* on five different occasions at Rumani near Salisbury and in the Sabi Valley, and secured three specimens. The birds frequent heavy woods along streams and were not heard to call. One example was hawking insects after the manner of a flycatcher. A male taken in February had gonads enlarged, and in early October another bird of this species was seen entering a nest-hole of *Parus niger*, as if to lay.

Townley found remains of insects in their stomachs, noted once as small beetles, but no trace of wax or bees. In Usambara Moreau¹ reported that examination of four stomachs of *P. i. ellenbecki* showed nothing but scale-insects (*Coccidæ*) and their waxy exudation.

***Prodotiscus regulus regulus* Sundevall**

Prodotiscus regulus SUNDEVALL, 1850, Öfvers. K. Vet. Akad. Förh., VII, p. 109 (type locality: Mohopani near Palachwe, Bechuanaland).

DISTRIBUTION OF THE SPECIES.—Natal north to Angola, savannas of the southeastern Congo, East Africa, Abyssinia, Sennar, and westward to Bozum in French Equatorial Africa. *P. r. peasei* O.-Grant of Abyssinia is apparently not a valid race, and of *P. r. camerunensis* Reichenow only the type is known. Very probably the species does not vary geographically.

The only examples known from the Congo were taken by Dr. Schouteden at Tembwe on the west shore of Lake Tanganyika and Kabalo on the Lualaba River. They have wings 76.5 and 80 mm. long, and both have well-marked blackish tips on outer rectrices. This species is certainly to be expected in the Upper Katanga.

While Dr. Friedmann reported finding beeswax in this bird's stomach, other observers have reported that it hunts insects other than bees and behaves very much like a flycatcher. A. L. Butler noted that it came to feed at the flowers of a *Sterculia* tree. During the breeding season, according to Vincent,² this *Prodotiscus* utters a loud rasping "zeet - zeet" in flight; but its usual note is a chatter similar to that of *P. i. zambesiæ*.

It is suspected of parasitism in breeding, and Vincent³ told of seeing an immature bird accompanying a pair of sparrows (*Gymnoris superciliaris*) on two successive days.

***Melignomon zenkeri* Reichenow**

Melignomon zenkeri REICHENOW, 1898, O. Mb., p. 22 (type locality: Yaunde Cameroon). SCHOUTEDEN, 1936, Ann. Mus. Congo, Zool., I, f. 2, p. 100 (Kotili).—*Prodotiscus insignis* SCHOUTEDEN, 1918, Rev. Z. A., V, p. 241 (Beni).

¹ 1932, Ibis, pp. 666, 667.

² 1930, Bateleur, II, pp. 40, 41.

³ 1935, Ibis, pp. 15, 16.

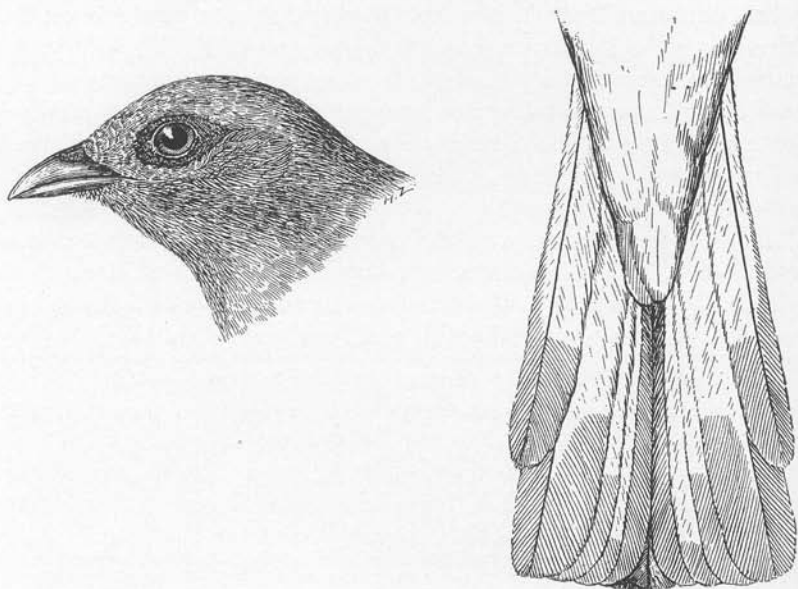


Fig. 35. Head of *Melignomon zenkeri*. $\times 11/2$.

Fig. 36. Tail of *Melignomon zenkeri*, from beneath. $\times 11/2$.

DISTRIBUTION.—From Yaunde in southern Cameroon eastward to the Semliki Valley. Everywhere rare, and known in the Cameroon only from Yaunde and Bitye. The first Congo specimen was collected by Borgerhoff at Beni, and in 1925 Dr. Schouteden obtained a second at Kotili on the Itimbiri River.

Though the texture of the plumage resembles that of *Melignothres*, the bill of this bird is very slender, approaching the form seen in *Prodotiscus*. The nostrils of *Melignomon* are however narrow and slit-like, not open and rounded as in *Prodotiscus*. The breast of *M. zenkeri* has a distinctive dull yellow wash. In 'Die Vögel,' II, 1914, pp. 60, 61, Professor Reichenow gave a very misleading description of the tails in *Melignomon* and *Melichneutes*. The first-named is stated to have *two* outer pairs of rectrices successively shortened, whereas but one pair is reduced and distinctly narrowed. His figure of the tail of *Melichneutes* is even more inaccurate, and does not at all resemble the tail of the type specimen of *M. sommerfeldi*.

The two Congo specimens of *Melignomon zenkeri*, without sex, have wings 80 and 86 mm., tails 50 and 59 mm. The larger bird is from Beni.

Measurements of five Cameroon specimens by Bannerman are: wing 73–83 mm., tail 46–52.

Nothing is known of the habits of *M. zenkeri*, but they are likely to resemble those of *Melignothos*. No doubt it is a bird of heavy forest. Bates noted that the stomach of his first specimen contained a mass of fine flakes of wax, mixed with some tiny black particles.

KEY TO THE CONGO SPECIES OF *MELIGNOTHOS*

- 1.—Wing usually less than 80 mm. long; a whitish stripe from lores to nostril; usually with a dark malar stripe. *M. exilis*.
Wing 80 mm. or longer. 2.
- 2.—Back and wings more heavily streaked and margined with yellow; forehead and throat darker gray, often with indistinct blackish markings; dark malar stripe present. *M. conirostris*.
Less yellow streaking above; whole bird grayer and lighter; malar stripe often indistinct. *M. minor*.

Melignothos exilis exilis Cassin

Melignothos exilis CASSIN, 1856, Proc. Acad. Nat. Sci. Phila., p. 157 (type locality: Moonda R., Gaboon).—*Indicator exilis* SHARPE, 1878, P. Z. S. Lond., p. 794 (Landana). SHELLEY, 1891, 'Cat. Birds Brit. Mus.,' XIX, p. 11. REICHENOW, 1902, 'Vög. Afr.,' II, p. 113 (Chinchoxo); 1911, 'Wiss. Ergeb. D. Z.-Afr. Exp.,' III, p. 276. O.-GRANT, 1910, Tr. Z. S. Lond., XIX, p. 415 (Irumu). SASSI, 1912, Ann. Naturh. Hofmus. Wien, XXVI, p. 382 (N. W. of L. Tanganyika; Moera; Ukaika).—*Indicator exilis exilis* C. GRANT, 1915, Ibis, p. 434 (Ruwenzori). BANNERMAN, 1922, Rev. Z. A., X, p. 100; 1933, 'Birds Trop. W. Afr.,' III, p. 415. GYLDENSTOLPE, 1924, K. Svenska Vet. Akad. Handl., (3) I, No. 3, p. 246 (Kartushi). SCHOUTEDEN, 1924, Rev. Z. A., XII, p. 415 (Eala). W. L. SCLATER, 1924, 'Syst. Av. Æth.,' pt. 1, p. 289.

SPECIMENS.—Avakubi, ♂, Sept. 3; ♀, Jan. 23.

ADULTS.—Iris rather dark brown, eyelids dark gray; bill brownish black, with base of mandible light gray; feet rather dark grayish green.

DISTRIBUTION OF THE SPECIES.—Portuguese Guinea east to Southern Nigeria, Fernando Po, Cameroon, Bahr-el-Ghazal, Kenya Colony, and perhaps Usambara; south to the vicinity of Lake Tanganyika, the Kasai district, and northern Angola. *M. e. exilis*, with wings 63–74 mm., ranges from northern Angola and Luluabourg in the Kasai district to the forests of Cameroon and Southern Nigeria, and eastward to the Ituri River, the western base of Ruwenzori, and the highland forest northwest of Lake Tanganyika.

From Upper Guinea three races have been described, with wings varying between 69 and 80 mm. The first to be named was *M. e. willcocksii* (Alexander) from Prahsu, Gold Coast; but *M. e. ansorgei* (Grant) of Portuguese Guinea seems the most distinct, because of its paler grayish

coloration and long wing, 80 mm. in the male type. *M. e. leona* (Grant) is known from only one specimen taken near Freetown. Another pale form, perhaps a race of the present species, is *M. hutsoni* (Bannerman) from the Benue Province of Northern Nigeria. *M. e. poensis* (Alexander) of Fernando Po is grayer on crown and breast than typical *exilis*, and has the wing 66–79 mm.

A rather long-winged race, colored like typical *exilis*, but with wings 73–82 mm. long, is *M. e. pygmæus* (Reichenow), ranging from Bukoba on Lake Victoria to western Kenya Colony and the Bahr-el-Ghazal Province. *M. e. meliphilus* Oberholser, from the vicinity of Kilimanjaro and Usambara in East Africa, may well be a pale representative of this species; and *M. appelator* (Vincent)¹ must be a very close ally.

Melignotheres e. exilis is not uncommon in the heavy forests of the Upper and Lower Congo, and has been found in adjacent gallery forests. It is a lowland bird, but ventures occasionally into the mountain forests; and on the western slope of Ruwenzori we collected a male at 6900 feet. Its wing measured 73 mm.

In the forest region of the Ituri I often inquired of the natives whether they knew anything of honey-guides' habits, but always received negative answers. I am convinced that none of the forest honey-guides leads mankind to the stores of bees, even though the pygmies are said to be so expert at collecting honey. In addition to the ordinary honey-bees, there are other kinds in the Ituri, darker and smaller, which are said never to sting; and natives will even eat the honey of a still more minute black bee.

At Avakubi I saw a party of three *Melignotheres exilis* hopping about the boughs of some tall trees not far from a village. Their flight was undulating, the white on the outer tail-feathers showing conspicuously. Several times I heard them give a short, dry, trilling note. Our second specimen was taken by a hunter, in a tall tree left standing on a farm.

The stomachs of both our specimens contained beeswax, as well as a few insect-remains and a seed. To test the wax I melted it on a heated knife and allowed it to harden again. I cannot explain how this species procures its honey-comb; but since it asks no aid of man I suspect it of having some other mammalian ally.

[*Melignotheres exilis pygmæus* (Reichenow)]

Indicator pygmæus REICHENOW, 1892, J. f. O., pp. 24, 132 (type locality: Bukoba, Victoria Nyanza).—*Indicator exilis pygmæus* SCLATER AND M.-PRAED, 1919, Ibis, p. 640 (Tembura).

¹ 1933, B. B. O. C., LIII, p. 130 (Zobue, Kirk Mts., Port E. Afr.).

This subspecies is believed to extend from the country just west of Lake Victoria to the Mabira forest in Uganda, the western border of Kenya Colony, and the Bahr-el-Ghazal Province. We have examples with wings 75, 76, and 82 mm. from Sotik and Kakamega in Kenya Colony. Even a specimen from northern Cameroon, with wing 77 mm., might be referred to the present form. Sassi (1912) mentioned a male of *exilis* from the highland northwest of Lake Tanganyika as having the wing 79 mm. long, but three other specimens known from the same locality have wings only 71–73 mm., so I do not think the range of *pygmæus* extends to that region. On the other hand, it is possible that representatives of this race may yet be found in Ruanda or on the northern border of the Uelle district.

The oldest name for the subspecies may be *pachyrhynchus* Heuglin,¹ but this type has disappeared. The measurements given in the description were very close to those of *pygmæus*, the wing said to measure 78.7 mm., tail 50.6.

Melignothes minor minor (Stephens)

Indicator minor STEPHENS, 1815, in Shaw, 'Gen'l. Zool.' IX, p. 140 (type locality: Cape of Good Hope). DUBOIS, 1886, Bull. Mus. Roy. Hist. Nat. Belg., IV, p. 147 (L. Tanganyika). SCHALOW, 1886, J. f. O., p. 422 ("Lualaba" [= Luvua R.]). O.-GRANT, 1910, Tr. Z. S. Lond., XIX, p. 414 (Mubuku Valley, 5500 ft.). SASSI, 1912, Ann. Naturh. Hofmus. Wien, XXVI, p. 381 (Bukoba province).—*Melignothes minor minor* SCHOUTEDEN, 1930, Rev. Z. A., XVIII, p. 284 (Kafubu R. near Elisabethville).

DISTRIBUTION OF THE SPECIES.—Cape Province to northern Angola, the southeastern Congo, East Africa, Abyssinia and Somaliland; and westward across the Sudan and northern Cameroon to Senegal. Not in the heavy forests of West Africa, unless *M. conirostris* is to be regarded as conspecific.

Melignothes m. minor seems to range from the Cape north to the eastern base of Ruwenzori, the Manyema district, and Angola. Its wing varies from 86 to 97 mm., in males usually exceeding 88.² *M. m. damarensis* Roberts from Damaraland has the head grayer, breast more whitish, and wings a little shorter. *M. m. teitensis* (Neumann) is apparently confined to the coastlands of eastern Africa, and has wings 79–91 mm. *M. m. diadematus* (Rüppell) of Abyssinia and adjacent countries is darker brownish gray on crown and breast, with wings

¹ 1864, J. f. O., p. 266 (Bongo, Bahr-el Ghazal).

² Roberts distinguishes specimens from countries north of Natal as *M. m. albigularis*.

85–97 mm. Other races have been described from Northeast Africa, but their validity is not established.¹

From the Semliki Valley and Bahr-el-Jebel west to northern Cameroon there is a race with more yellowish margins on back and wings, *M. m. riggenbachi*, with wings 85–95 mm. *M. m. alexanderi* (Grant), from the Gold Coast hinterland to Darfur, may be slightly lighter in color than *riggenbachi*. The representative of the species in Senegambia is *M. m. senegalensis* (Neumann), with upperparts like *teitensis*, but very pale beneath; wing about 85 mm. in males.

In the Belgian Congo, birds which I refer only tentatively to *M. m. minor* are found in the Katanga, Marungu, and north to Kabalo on the Lualaba. This same form probably extends to the country west of Lake Victoria and the eastern base of Ruwenzori.

Near Elisabethville Schouteden took three examples, with wings 97 mm. in a male, and 90 for each of two females. He also obtained a male at Kabalo with wing 94 mm. Three specimens from Moba and Lake Suse in Marungu, collected by Rockefeller and Murphy, are lighter gray on crown, and less yellowish green on outer margins of secondaries than examples of *teitensis* from southeast Kenya Colony. The wings of these Marungu birds measure 88–90 mm. A male with wing 89 mm. was collected by the British Museum Expedition on the eastern slope of Ruwenzori, but others from the western base of the same range are more richly colored, and are referred to *M. m. riggenbachi*.

The lesser honey-guide haunts patches of large trees or scrubby woods in savanna districts. During about eight months of the year it calls persistently from a high perch, giving a series of toneless notes introduced by a drawling double note: “pe-ew, pew, ’pew, ’pew’—.” The “pew” may be repeated as many as twenty-five times without pause.²

I have little confidence in statements that *Melignothes minor* shares the well-known guiding instinct of *Indicator indicator*. In the case of Sir John Kirk’s account of the honey-guide³ which he gave under the name “*Indicator minor*” I am firmly convinced that his observations really apply to *Indicator indicator*, and that they were placed under the name of the only species of the family he happened to have collected. The same explanation may apply to the remarks by Marshall⁴ and by Lord Lovat⁵ as to this species guiding men to bee-hives.

¹ See especially Oberholser, 1905, Proc. U. S. Nat. Mus., XXVIII, pp. 868–874; Zedlitz, 1915, J. f. O., pp. 11–14; C. Grant, 1915, Ibis, pp. 432–434; Friedmann, 1930, Bull. 153, U. S. Nat. Mus., pp. 471, 472; and Grant and M.-Praed, 1938, B. B. O. C., LVIII, pp. 118, 119, 141, 144.

² Moreau, 1937, Ibis, pp. 173, 174.

³ 1864, Ibis, p. 327.

⁴ 1900, Ibis, p. 251.

⁵ 1900, Ibis, p. 306.

R. H. Ivy, well versed in South African birds, gave testimony to the opposite effect: "I have often watched this bird (*M. minor*) killing bees at a hive, but have never known it lead anyone to a nest of wild bees."¹ The same ornithologist tells of shooting a female of *minor*, with an egg protruding from the vent, as it tried to enter the nest of a barbet, *Lybius torquatus*, at Blue Krantz, Cape Province, in the month of October. Haagner and Ivy² figured an egg taken from a nest of the same barbet, and A. D. Millar is credited with finding one egg of the lesser honeyguide with four of this barbet's. *Pogoniulus pusillus*, *Dendropicos fuscescens*, and a stripe-breasted swallow have also been reported as victims of *Melignothos minor*. The white eggs of *M. minor* from South Africa are said to measure 20.3–22.3 mm. \times 15.5–17.5.

***Melignothos minor riggenbachi* (Zedlitz)**

Indicator minor riggenbachi ZEDLITZ, 1915, J. f. O., p. 12 (type locality: Tibati, northern Cameroon. Also from Ukondju, N. of L. Edward). W. L. SCLATER, 1924, 'Syst. Av. Æth.', pt. 1, p. 289 (Aba). BANNERMAN, 1933, 'Birds Trop. W. Afr.', III, p. 413. SCHOUTEDEN, 1936, Ann. Mus. Congo, Zool., I, f. 2, p. 100 (Mahagi Port).—*Indicator minor* REICHENOW, 1902, 'Vög. Afr.', II, p. 110 (Ukondju); 1911, 'Wiss. Ergeb. D. Z.-Afr. Exp.', III, p. 275 (Karevia). EMIN, 1919, in Stuhlmann, 'Tageb. Emin Pascha,' II, p. 424 (Tobbo). SCHUBOTZ, 1921, 'Tageb. Emin Pascha,' VI, p. 237.

SPECIMEN.—Aba, ♀, July 17.

ADULT FEMALE.—Iris dark brown, orbit dark gray; bill blackish, with base of mandible gray; feet greenish.

DISTRIBUTION.—From northern Cameroon and the Shari basin to the northern Uelle and Lado districts. Perhaps also along the eastern edge of the Ituri forest, south to the base of Ruwenzori. Here the plumage is unusually dark, and specimens seem almost intermediate between *riggenbachi* and *conirostris*.

Our female from Aba came from the rocky hill called "Libugu" that marks the frontier on the road from Aba to Yei. With another of its kind it was hopping silently about the boughs of some trees on the lower slope of the hill. This specimen has been compared with the type of *riggenbachi* in the Berlin Museum, and despite a slightly shorter wing (85 mm.), agrees closely in coloration, including the extent of black on the outer rectrices. It also resembles closely a female collected by Boyd Alexander at Bunda, on the Shari River. At Mahagi Port Dr. Schoute-

¹ 1901, Ibis, p. 21. In 1937 Mr. D. Townley wrote me however that he had observed "guiding" by *M. minor* twice, and by *I. variegatus* just once, during a period of twelve years in Southern Rhodesia.

² 1907, Journ. S. Afr. Orn. Union, III, p. 103, Pl. iv.

den secured a male of *riggenbachi* with wing 91 mm., and two females with wings 85 and 87 mm.

Reichenow stated that Emin's specimen from Karevia showed some resemblance to *conirostris* in the color of the back; and Count Zedlitz referred it to *riggenbachi*, while remarking that it was unusually dark below. Karevia is at the west base of Ruwenzori, near the Butahu River. Higher up in the valley of the Butahu, at 6800 feet, we secured a male of *conirostris*. Near the new post of Beni, some 30 miles to the northwest of Karevia, we also collected two specimens which seem nearly intermediate in color between *conirostris* and *riggenbachi*. Here they will be referred to *riggenbachi*, the adult male having the wing 89 mm., the young female 80.5 mm. This undoubtedly lends support to the view that *minor* and *conirostris* belong to one species.

The male from Beni was secured at the border of the lowland forest; and its stomach was well filled with bits of beeswax, mingled with fragments of insect-shells—probably not from bees. The young female taken near Beni was in a small patch of woods about a spring, surrounded by grassland. In its stomach were pulp and a few seeds from fruit, and many pieces of small insects. None of these birds called or attempted to attract our attention in any way.

A white egg taken from the oviduct by Dr. Schouteden at Mahagi Port on May 18 measures 21.5×16.8 mm.

Melignothus conirostris conirostris Cassin

Melignothus conirostris CASSIN, 1858, Proc. Acad. Nat. Sci. Phila., p. 156, Pl. II (type locality: Moonda R., Gaboon).—*Indicator conirostris conirostris* BANNERMAN, 1933, 'Birds Trop. W. Afr.,' III, p. 413, Fig. 123 (Ruwenzori). SCHOUTEDEN, 1936, Ann. Mus. Congo, Zool., I, f. 2, p. 100 (Buta).

DISTRIBUTION OF THE SPECIES.—Forests of the Gold Coast Colony, Cameroon, Gaboon, Upper Congo, Ruwenzori, Mt. Elgon, and Kakamega in North Kavirondo. *M. c. ussheri* (Sharpe)¹ is usually regarded as the Upper Guinea representative. Its crown and nape are dark olive green, like the back; wings 91–93 mm. *M. c. conirostris* differs by its grayer head, only the nape with a greenish tinge, and by its grayer underparts; wings usually 79–96 mm. This race is widely distributed in the Lower Guinea forest, from Mt. Cameroon and the Gaboon eastward to Ruwenzori. I have never met with it in the Ituri forest, but the Congo Museum has an immature example from Buta, and I have collected two adults at Lukolela on the middle Congo. Outside the solid forest area

¹ 1902, B. B. O. C., XII, p. 80 (Fantee).

conirostris has been found by Bates at Tibati in the Cameroon highland, by Granvik on Mt. Elgon, and by Caldwell at Kakamega, Kenya Colony.

The thick-billed honey-guide inhabits mountain forests as well as the lowlands. We have a male from Kalongi, 6800 feet, on the west slope of Ruwenzori, which agrees well in color with Cameroon specimens, and has the wing 93 mm. Even more surprising are Granvik's records of *conirostris* from Mt. Elgon,¹ where he obtained a female with wing 90 mm. at 7000 feet, and later a male with wing 102 mm. The American Museum has three specimens from Kakamega which I cannot distinguish from *conirostris*. They were obtained from Captain Keith Caldwell. Two examples labeled as males have wings 92 and 93 mm.; the third, sexed as a female, has the wing 92 mm. Dr. van Someren² mentioned long-winged specimens of "*teitensis*" from Kakamega, and it would not be surprising if they were *conirostris*.

At Lukolela on December 12, 1930, I visited a large dead tree occupied by a nesting colony of *Gymnobucco bonapartei*. Several of these honey-guides were in the vicinity, and one even flew up and clung to the lower edge of a barbet doorway. Of the two specimens of *M. conirostris* collected at that time one was a male with gonads slightly enlarged, the other a female with a soft egg in the oviduct. The stomachs of both contained beeswax and bits of insects. Nine weeks later the barbets were still busy at their nests, and one honey-guide was seen in a nearby tree.

I have examined the young honey-guide of this species secured by Bates from a nest of *Gymnobucco bonapartei* at Bitye, Cameroon, on April 1.³ It is better feathered below than on its upperparts, though the wings are nearly half grown. There is no reduction of inner primaries as in so many young woodpeckers. Neither could I find a trace of an egg-tooth or any hooks on the beak. The heel-pad is conspicuous, and bears rasp-like scales much as in a young barbet. Another nestling believed to be of this species was found by Bates as the sole occupant of a nest-hole of *Pogoniulus leucolaima*.⁴ I should rather expect *M. exilis* to lay its egg in such a small nest.

KEY TO THE CONGO SPECIES OF *INDICATOR*

- 1.—Chest uniformly colored, light yellowish, whitish, or light gray; often with a black patch or spots on throat.....*I. indicator*.
Chest with light spots on a darker (grayish or olive) ground, or spotted or streaked with dusky.....2.

¹ 1923, J. f. O., Sonderheft, p. 85; 1934, Rev. Z. A., XXV, p. 50.

² 1922, Nov. Zool., XXIX, pp. 53, 54.

³ 1909, Ibis, p. 16.

⁴ 1911, Ibis, p. 503.

- 2.—Crown and back both rich olive in adults, olive-brown in young; spots on upper breast are rounded, yellowish, on an olive ground.....*I. maculatus*.
 Back olive, but crown often more grayish; forehead feathers dusky and edged laterally with whitish; spotting on upper breast and chest less yellowish and less sharply marked, so that the feathers often appear more streaked or spotted in the middle with gray or blackish.....*I. variegatus*.

Indicator variegatus variegatus Lesson

Indicator variegatus LESSON, 1831, 'Traité d'Orn.,' p. 155 (Africa; restricted type locality: Knysna, Cape Prov.). NEAVE, 1907, Mem. Proc. Manchester Lit. Phil. Soc., LI, No. 10, p. 48 (near Msofu R., Alala Plateau). SASSI, 1912, Ann. Naturh. Hofmus. Wien, XXVI, p. 381 (Kasindi; Kasindi-Beni).—*Indicator variegatus variegatus* FRIEDMANN, 1930, Bull. 153, U. S. Nat. Mus., p. 469 ("L. Kivu"; Katanga).

DISTRIBUTION OF THE SPECIES.—Eastern and southern Africa, from southern Abyssinia through Kenya Colony, Uganda, the southeastern Congo, and Angola to the Cape Province. From southern Somaliland to Usambara there is a small race, *I. v. jubaensis* Neumann,¹ with wings 97–105 mm. long; elsewhere the wings measure 103–114 mm. Long known in the Congo only from the vicinity of Kasindi and Beni, the typical race has now been found in the Katanga at Lukafu by G. F. de Witte. John T. Zimmer also tells me that he collected a specimen at Katapena south of Lake Upemba; and Rockefeller and Murphy brought back two females from Kinia and Kampia in southern Marungu.

Indicator variegatus is so like a faded counterpart of *I. maculatus* that it is not surprising that they were regarded as representative races by Zedlitz.² The gap between them, in coloration, seems wide enough to be specific; and their choice of habitat is very different.

The variegated honey-guide is usually found in patches of scrubby woods in savanna districts, and while largely a lowland bird it has been found up to 11,000 feet on Mt. Elgon. It is said to have a chattering call like that of *I. indicator* and also a monotonous frog-like croaking or churring, uttered as it perches on some large tree.

In South Africa *variegatus* has been said to lead men to beehives. R. H. Ivy³ told of being guided thus six times, but perhaps always by the same bird. Although he saw two adult and three immature birds, only one adult would lead him.

A very young bird referred to this species by Haagner⁴ was found in the nest of *Gymnoris supercilialis* on November 12 in the Albany

¹ 1908, B. B. O. C., XXI, p. 97 (Jonte, near Kismayu).

² 1915, J. f. O., pp. 9, 10.

³ 1901, Ibis, p. 21.

⁴ 1907, Journ. S. Afr. Orn. Union, III, p. 3, Pl. 1.

Division, Cape Province. Probably not more than ten days old, it was still largely naked, and the extremity of the beak was furnished with a pair of strong, sharp hooks, one on the maxilla and one on the mandible. They measured 1.8 mm. in total length, and overlapped so as to take a sure hold—perhaps on the young of the fosterers, which were missing. "These hooks are semi-transparent," wrote Haagner, "and appear to be an exaggeration of the shell-breaking scale," or egg-tooth, of other birds. They had an appearance of being welded to the tips of the mandibles.

In Uganda Dr. van Someren¹ reported eggs and a nestling taken from nests of *Mesopicos goertæ* and *Pogoniulus leucolaima*. Moreau² in Usambara noted one young of this honey-guide being fed by *Dendropicos fuscescens*, and another by *Mesopicos griseocephalus*, side by side with a fledgling of the woodpecker.

Indicator maculatus stictithorax Reichenow

Indicator stictithorax REICHENOW, 1877, J. f. O., p. 110 (type locality: Cameroon).—*Indicator maculatus* BOCAGE, 1880, Journ. Sci. Lisboa, VIII, No. 29, p. 54 (Loemba R., Loango Coast).—*Indicator theresæ* ALEXANDER, 1908, B. B. O. C., XXI, p. 90 (Gudima, Iri R.).—*Indicator strictithorax* SASSI, 1912, Ann. Naturh. Hofmus. Wien, XXVI, p. 381 (Beni; Ukaika).—*Indicator fææ theresæ* SCLATER, 1922, B. B. O. C., XLII, p. 61.—*Judicator strictithorax* SASSI, 1924, Ann. Naturh. Mus. Wien, XXXVIII, p. 76.—*Indicator stictithorax theresæ* GYLDENSTOLPE, 1924, K. Svenska Vet. Akad. Handl., (3) I, No. 3, p. 245 (Simbo).—*Indicator fææ theresæ* W. L. SCLATER, 1924, 'Syst. Av. Æth.,' pt. 1, p. 288. BANNERMAN, 1933, 'Birds Trop. W. Afr.,' III, p. 411.

SPECIMENS.—Gamangui, ♂, Feb. 19; ♀, Feb. 8.

ADULTS.—Iris dark brown, eyelids dusky olive; bill blackish, base of mandible slightly pinkish (♂) or greenish brown (♀); feet dark green.

DISTRIBUTION OF THE SPECIES.—From the Gambia through Liberia to the forested Cameroon, Gaboon, and Upper Congo. *I. m. maculatus* Gray occupies Upper Guinea; and *I. m. stictithorax* ranges from southern Cameroon (including Mt. Cameroon) and Gaboon³ eastward through the heavy forests of Lower Guinea to the upper Kibali River and the eastern edge of the Ituri forest near the Semliki. The southern limit is not known, but probably coincides with the edge of the unbroken forest.

Besides comparing one of our Gamangui specimens with the type of *stictithorax* in Berlin, I have gone over the British Museum series with a

¹ 1916, Ibis, p. 234.

² 1932, Ibis, p. 665.

³ The Philadelphia Academy has a specimen from the Ogowé River.

view to understanding the status of *maculatus*, *feæ*, and *theresæ*. I cannot see how Alexander's type of *theresæ* differs from *stictithorax*; and if in Upper Guinea we try to distinguish *deæ* from *maculatus* I fear we shall be separating young and adult of the same bird. The only difference is that some birds ("maculatus") are more spotted on crown and cheeks, and the spots on their breasts stand out more clearly because of the duskier ground color. Their rectrices are more pointed, and the whole plumage has an appearance of immaturity. In Lower Guinea the same differences may be noted among the birds collected by Bates at Efulen and Bitye. I feel satisfied that the difference is not specific, and that *feæ* is a synonym of *maculatus*, as *theresæ* is of *stictithorax*.

The adult of the Upper Guinea bird, *I. m. maculatus*, differs from *I. m. stictithorax* in being a little darker on the crown, with cheeks and malar region unstreaked, dark olive. It has less yellow on the abdomen, and the light breast-spots do not stand out quite so clearly. The length of wing and tail is about the same.

Both our specimens from Gamangui were trapped by our native helpers, close to the ground in the heavy forest, the snares being baited with fragments of termite nests. The stomachs of both contained remains of insects, and one had some sand in addition. Neither was in breeding condition. The wing of the male measures 104 mm., that of the female 101. Before being skinned they emitted a peculiar musty odor, which adhered to their compact plumage after the skins were made up. Several of the other species of honey-guides share this characteristic odor.

On October 10, 1926, we collected another female in non-breeding condition in the heavy forest near the new post of Beni. It perched in the trees without calling or attempting to attract attention, and its stomach contained beeswax mixed with broken bits of insects. This example has the wing 99 mm. long, and its underparts more brightly washed with yellow than those from Gamangui. It shows no approach to *variegatus*, although that species has been obtained no farther away than the upper Semliki Valley.

Bates in the Cameroon shot four specimens near Efulen as they sat quietly in tree-tops near camp, in a forest clearing. "The stomach-contents of the birds were mainly particles of wax, mixed with bits of insects, and had a smell of honey; but sometimes there were only bits of insects."¹

¹ 1909, *Ibis*, p. 16.

Indicator indicator (Sparman)

Cuculus indicator SPARRMAN, 1777, Phil. Tr. Roy. Soc. Lond., LXVII, p. 43, Pl. 1 (type locality: Great Fish R., near Somerset East, Cape Prov.).—*Indicator major* DUBOIS, 1886, Bull. Mus. Roy. Hist. Nat. Belg., IV, p. 147 (L. Tanganyika). HARTLAUB, 1887, Zool. Jahrb., II, p. 311 (Djanda). SHELLEY, 1901, Ibis, p. 166 (E. shore of L. Moero). MOURITZ, 1914, Ibis, p. 28 (Katanga-Rhodesia border). SCHUBOTZ, 1921, 'Tageb. Emin Pascha,' VI, p. 96 (Niam-Niam).—? *Indicator major* SCHALOW, 1886, J. f. O., p. 424 (L. Itambe).—*Indicator sparrmanni* REICHENOW, 1887, J. f. O., p. 309 (Kibondo). OUSTALET, 1893, Naturaliste, VII, p. 61 (Bangui). DYBOWSKI, 1893, 'La Route du Tchad,' p. 322 (Upper Kemo R.). SCHUBOTZ, 1921, 'Tageb. Emin Pascha,' VI, p. 244 (Dongu).—*Indicator indicator* REICHENOW, 1902, 'Vög. Afr.,' II, p. 104. NEAVE, 1910, Ibis, p. 118 (Dikulwe R.; Lualaba R.). SASSI, 1912, Ann. Naturh. Hofmus. Wien, XXVI, p. 381 (Rutshuru Plain; Kasindi). MOURITZ, 1914, Ibis, p. 28. Schouteden, 1918, Rev. Z. A., V, p. 241 (Dogodo); 1927, Bull. C. Z. C., IV, p. 85; 1936, Ann. Mus. Congo, Zool., I, f. 2, p. 100 (Mauda; Faradje; Mahagi Port). SCLATER AND M.-PRAED, 1919, Ibis, p. 639 (Mt. Baginzi; Yei). SCHUBOTZ, 1921, 'Tageb. Emin Pascha,' VI, p. 96 (Tunguru; Nyamsansi). CHAPIN, 1924, Nat. Hist., p. 329 (Faradje). FRIEDMANN, 1930, Bull. 153, U. S. Nat. Mus., p. 466.—*Indicator maior* REICHENOW, 1902, 'Vög. Afr.,' II, p. 106 (Tomaya); 1911, 'Wiss. Ergeb. D. Z.-Afr. Exp.,' III, p. 275 (Rugege forest).—*Indicator sparrmanni* EMIN, 1919, in Stuhlmann, 'Tageb. Emin Pascha,' II, p. 424 (Tobbo).—*Indicator sparrmanni* SCHUBOTZ, 1921, 'Tageb. Emin Pascha,' VI, p. 237.

SPECIMENS.—Dungu, ♂, June 30; ♀ im., July 1. Nzoro, ♂ im., Apr. 9. Faradje, 8 ♂, Feb. 24, Mar. 4, 5, 6, Aug. 29, Oct. 23, Nov. 6; 3 ♀, Jan. 20, Sept. 21; ♂ im., Oct. 27; 2 ♀ im., May 1, Sept. 8. Aba, ♂, July 13; ♂ im., July 17. Garamba R., ♂, Aug. 30.

ADULT MALE.—Iris dark brown, orbit dusky; bill pale pink; feet dark gray, claws blackish.

ADULT FEMALE.—Iris grayish brown, orbit dark gray; bill dirty brownish with a tinge of pink; feet dark gray, slightly bluish in places, claws blackish.

DISTRIBUTION.—Throughout the Ethiopian Region, from Senegal, Darfur, and Eritrea to the Cape, with the exception of the West African lowland forests and the Eastern mountain forests.¹ Not migratory in the Congo, and known from all the savanna districts except the Lower Congo and the open plateau of the Kivu. Close to the margin of the lowland forest it is apt to be rare or wanting, and we have only two specimens from the Kasai, taken in the vicinity of Luluabourg. The Congo Museum has, however, a nestling from Lusambo. I have seen it at Kasenyi on Lake Albert and in the Rutshuru Plain, but never on the wooded mountains of the eastern border. In Marungu Rockefeller and Murphy took specimens up to 5600 feet, and Reichenow has recorded one example from the Rugege forest. The Congo Museum has others

¹ All recent investigators agree that there are no geographic races. It is not even true, as Neumann claimed, that old birds from Angola always have dark bills.

from Tembwe on Lake Tanganyika, Kiambi on the Luvua, and Kinda in the Lulua district.

In the Upper Uelle district we encountered it rather commonly throughout the savannas, and sometimes in small patches of woods near streams. A party of four is the largest I have seen. It is famous among the natives for its betrayal of beehives, and I was told that Azande chiefs would formerly have cut off the ear of any man who dared kill one of the "Turubwa." The Mangbetu call the honey-guide "Natombé." The services rendered by it to mankind have been known to Europeans ever since the publication of the travels of Father Jerome Lobo, who went to Abyssinia in 1629.

Lang and I both had many chances to observe the extraordinary behavior of this honey-guide. Its note, when it wishes to point out a bee colony, is a loud, excited, chattering noise which sound like "cutta cutta cutta cutta—" repeated very rapidly and over long periods as the bird moves ahead from tree to tree with fluttering flight. When a native wishes to profit by the attentions of a honey-guide, he gives an occasional whistle, and walks after it.

The following is an account of one of my own experiences: In a small wooded swamp near the post of Faradje, one afternoon in November, we came upon a male bird, who at once started his chattering, and flew off to some distance, returning shortly as though to assure himself that we were in earnest. Replying with low whistles, we were led out onto higher ground, through the tall grass and scrub. Now our feathered guide would fly noisily ahead some fifty yards till out of sight, perching on top of a bush, and repeating the performance as soon as we came up. Presently another male bird joined him. We had gone about 600 yards when both birds stopped in a tree too small to harbor bees in its trunk. Yet by their short aimless flights and continual return to the tree, they showed us that this was the spot, and would allow us to walk up within 10 or 15 feet. The buzzing of passing bees was now traced to a small hole in the ground close by.

We prepared to make a fire, and our birds retired noiselessly for the time. A little later I saw them again, sitting with puffed-out breasts and open bills, uttering a low "chwee-r-r," which I had not heard before. They seemed to be quarreling, and one soon chased his rival off at top speed. With the aid of some burning grass, two of my black helpers soon had the hive unearthed, paying a penalty of only six stings. The comb contained no honey, only pollen and bee larvæ; the cavity in the ground had been excavated by termites. A shower came up, so

we placed some of the comb in the forks of a tree and departed. An hour and a half later, we found that the birds had returned to peck at the comb; and the following morning I watched both birds, one after the other, come silently to seize a piece of the comb and fly off with it. This is the reward, beyond a doubt, for which the birds have worked, even though it may be wrong to credit them with the intelligence to foresee it.

It is anything but unusual for honey-guides to secure honeycomb to eat. In six of the eight stomachs we examined of *Indicator indicator* there was beeswax, and most of these birds had not led us to hives. Only four of the birds had been eating insects other than bee larvæ: a few small unidentified insects in one case, a single beetle in the second, and termites in the two others. On one occasion I saw a honey-guide, in company with some weavers, a drongo, and a woodpecker, catching termites in the air. Its oesophagus and stomach were found to contain no less than 80 winged individuals of a medium-sized species.

Most of the other African species of Indicatoridæ, with the exception of *Prodotiscus*, also manage to eat honeycomb. Wax is so often found in their stomachs that I believe it must resist digestion for some time, probably breaking up eventually in fine particles and passing down the intestine. *I. indicator* is the only species which I have known to seek the assistance of man; but in South Africa *I. variegatus* is said likewise to do so. It has often been said that the honey badger (*Mellivora*) is guided like man by these birds; and I should be loath to abandon the idea that many species of Indicatoridæ get help in attacking hives from squirrels, monkeys, or other mammals.¹ They are so poorly adapted, themselves, for securing what we know is their usual food. Should this instinct prove common to the whole group, it would furnish most valuable material for the study of avian behavior.

I have known a honey-guide to accompany a hunting party on the road for a full half hour, trying to attract the men in some other direction by its frantic calls. Not only the males act as guides to honey. Adult females give the same chattering call, and proffer their services in the same manner; but I have not seen young birds do so.

In East Africa the blacks often relate that there is a chance of being led by the honey-guide to a lion or leopard. This would seem to be mere accident, but Blayney Percival² vouches for one case in his own experience.

¹ See also Seitz, 1923, *Aus Natur und Museum*, Frankfurt a. M., LIII, p. 22.

² 1924, 'A Game Ranger's Note Book,' pp. 48-50.

In October, 1912, I heard an unusual call from an adult male *Indicator indicator*, perching in a clump of trees at noon. These sounds, which may correspond to the longer calls of some barbets, and represent a sort of song, were delivered with upraised beak, opening at each note. Starting with a rather shrill "ree," they soon changed to a double "ree-chee," the second half rolling slightly, and were repeated about ten times. At a hundred yards distance they sounded dry and tuneless, but close by had a more pleasant ring. After each performance the bird rested three or four minutes, often preening his feathers. I heard him repeat about six times; and immediately after he flew off he was mimicked by *Cos-sypha niveicapilla* in a nearby thicket.¹

The breeding habits of the honey-guides resemble those of the parasitic cuckoos. In South Africa *Indicator indicator* has been found to lay its white egg in the nests of *Phæniculus purpureus*, *Pogoniulus pusillus*, *Lybius torquatus*, *Campethera "nubica"*, *Dendropicos fuscescens*, *Monticola explorator*, *Hirundo cucullata*, *Hirundo albigularis*, *Dryoscopus cubla*, *Parus niger*, *Spreo bicolor*, *Passer melanurus*, and a drongo. Much information on the subject will be found in notes by Messrs. Haagner and Ivy, in the *Ibis*, 1901, pp. 20, 21; *Journ. S. Afr. Orn. Union*, 1907, III, pp. 1-5, 103; *idem*, 1911, VII, p. 79. Both names used by these authors, *sparrmani* and *major*, are simply synonyms of *indicator*.² The olive-backed juvenal plumage, with yellowish throat, is surprisingly different from that of adults. A black throat distinguishes the adult male.

The egg of *I. indicator* is described as of regular "oval" shape, plain creamy white with a mere tinge of lavender-buff, 24.5-25 mm. × 18-19.5. It seems "that all the honey-guides break the eggs of the foster parent to make room for their own, wherever possible." The nestling of the present species³ has curved hooks on the tips of both upper and lower mandibles, which are sometimes retained until it is fully fledged and ready to fly. It has been supposed that the hooks could be used to eject other young birds from the nest, if necessary. None of the fosterers of this species in tropical Africa are known, except that in Kenya Colony Dr. van Someren⁴ reported finding one egg in the nest of *Pogoniulus bilineatus*. Larger barbets and woodpeckers are likely to prove the usual victims.

From dissections of our series taken in the Uelle district it is ap-

¹ This call was also described by Swynnerton, 1908, *Ibis*, p. 411. He wrote it "tee-tree!"

² Credit for recognizing *Indicator major* Stephens as the young of *I. indicator* goes to Boyd Alexander (1908, B. B. O. C., XXI, p. 91).

³ Haagner, 1911, *Journ. S. Afr. Orn. Union*, VII, p. 79.

⁴ 1916, *Ibis*, p. 238.

parent that breeding is carried on there from January to April, whereas no bird ready to breed was found during the remainder of the year. From Luluabourg in the Kasai district we have a young bird with wings and tail not fully grown, taken by Father Callewaert on August 29. It strengthens my belief that in the Congo *Indicator indicator* is a dry-season breeder.¹ This young bird has no longer any trace of hooks on the beak, but does show the heel-pad with tubercles (not so well developed as in young barbets), described by Gyldenstolpe.²

Melichneutes robustus (Bates)

Melignomon robustus BATES, 1909, B. B. O. C., XXV, p. 26 (type locality: Bitye, Cameroon).—*Cerioleptes zenurus* CHAPIN, 1915, Bull. A. M. N. H., XXXIV, p. 512, Fig. 1 (type locality: Avakubi).—*Melichneutes robustus* CHAPIN, 1924, Nat. Hist., pp. 332 (map), 334, Fig. W. L. SCLATER, 1924, 'Syst. Av. Æth.', pt. I, p. 291. BANNERMAN, 1933, 'Birds Trop. W. Afr.', III, p. 418, Fig. 125. SCHOUTEDEN, 1936, Ann. Mus. Congo, Zool., I, f. 2, p. 100 (Medje).—*Melichneustes robustus* BATES, 1930, 'Handbook Birds W. Afr.', p. 270.

SPECIMEN.—Avakubi, ♂, Apr. 17.

ADULT MALE.—Iris bright brown, eyelids grayish brown; bill dusky brown; feet dull grayish green.

DISTRIBUTION.—Lowland forests of the Cameroon, eastward across the Congo to the Upper Ituri, where it must be expected to reach the Semliki Valley. Dumé, whence came von Sommerfeld's specimen, is 110 miles northeast of Bitye.

Bates's type-specimen had the tail-feathers so badly worn and broken that their remarkable form was hardly apparent. Reichenow's type of *sommerfeldi* was a young bird, with the dusky breast of the juvenal plumage; and while its tail resembles that of the adult to a considerable degree, still he failed to describe or figure it adequately.³ This is how I came to apply a third name to the species.

The unusual difference between adult and young is well illustrated by an example scarcely ready to leave the nest, collected at Medje in the Ituri district by Dr. Christy, and now in the Congo Museum. Its crown and cheeks are sooty, wings dusky with olive-green edgings, back and rump more greenish than crown. The underparts are dark grayish olive, washed over with blackish; abdomen and tail-coverts (save the longest) lighter and greener. The tail-feathers, though only half-grown, are colored much as in the adult, and the middle ones curve outward slightly.

¹ See Erlanger, 1905, J. f. O., p. 467.

² 1917, Arkiv f. Zool., XI, No. 12, p. 7.

³ Reichenow, 1910, O. Mb., p. 160; 1914, 'Die Vögel,' II, p. 61.

The beak, which interested me greatly because of the hooks it is said to carry in the young of *Indicator*, is largely blackish, with a small white egg-tooth at the tip of the maxilla. This shows no sign of having been a hook, and the mandible bears no egg-tooth at all. In the wing the growing inner primaries show no sign of the reduction so common in young woodpeckers. The heel-pad is well developed, with pointed conic scales, as in young barbets.

This bird furnishes the final proof that *sommerfeldi* is the young of *robustus*. Bates's type, in fact, shows a few scattered blackish feathers

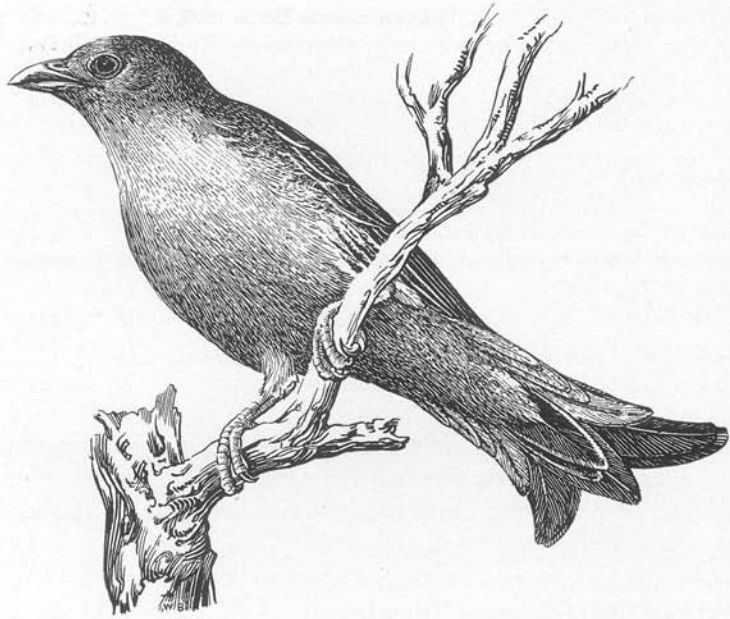


Fig. 37. *Melichneutes robustus*. $\times 2/3$, approximately.

from the juvenal plumage on the middle of the breast. There are no marked differences between the sexes. A second female secured by Mr. Bates at Bitye has a lyrate tail like that of our male, but the long dark under tail-coverts do not reach within 9 mm. of the tip of the median rectrices.

My measurements of the three known specimens which are approximately adult are: wing, ♂, 95 mm., ♀, 96, 94; tail, ♂, 56, ♀, 51, 53; exposed culmen, ♂, 13.5, ♀ 12.5. In general the form of bill and nostrils is similar to that of *Indicator indicator*, but slightly stouter.

The lyre-tailed honey-guide is perhaps a common bird of the forest tree-tops, but very difficult to observe. Walking along a forest path near Avakubi, I was puzzled by a strange harsh note from the top of a tree, and following it up perceived a dull-colored bird with a tail that condemned it at once to death. But there happened to be a second individual, which flew away, and as my helper, Nekuma, started in pursuit we heard a curious note, over which we had long speculated. It seemed to be coming toward us, and suddenly ceased. Looking in that direction, we found our bird perched in a tall tree. It flew back to the tree where its companion had been shot, gave the shorter note we had first heard, somewhat like the chatter of *Indicator indicator* but slower, and then escaped before we could secure it.

The note which apparently was made on the wing interested us particularly, because I had heard it in the Ituri forest nearly four years before, and many times during 1913 and 1914, at Medje, Pawa, and Avakubi. It is very loud, audible seemingly for a quarter of a mile, and might be written "nyeté! nyeté! nyeté! nyeté!—" It is usually repeated a dozen or more times, starting faintly, but swelling in volume, with a peculiar resonant metallic quality, then falling slightly and stopping. Or perhaps it will be continued, rising again and falling in the same way, until sometimes it has been reiterated thirty times. We used to hear this call in the Ituri throughout a large part of the year, except in the months of May and June. It is well known to the natives, and they are unanimous in the opinion that it is made by a small bird in flight, called by the Azande of the wooded Bomakandi district, for example, "Nyěté." Some say it is a woodpecker, but none seems really to know. After following the noise unsuccessfully, I too had come to the conclusion that the maker was flying high in the air, above the forest trees. Now that I feel so sure it must be the lyre-tailed honey-guide, the peculiar structure of its tail makes me wonder whether the narrowed rectrices have not something to do with the note, as they do in snipe.

On November 7, 1926, I again heard this unmistakable note in the forest of the Semliki Valley, near Mushinene. All efforts to see the maker were vain, it seemed to be high over the tree-tops. One of my black companions said that the bird was known as "Anzèba" among the Wambuba, a tribe living in the vicinity. At Lukolela, where I spent eight months in 1930 and 1931, I never heard the sound, although my native helpers when questioned said that they were familiar with it.

It may take many more years to discover the breeding habits of this bird. Dr. Christy's specimen was probably secured by natives, thinks

Lang, who was with him at Medje at the time. There is a great likelihood that it came from a nest of *Gymnobucco*.

The stomach of our adult bird was filled with beeswax, mixed with small bits of insects, showing that it shares the tastes of its better-known relatives. Bates likewise found flakes of wax in the stomach of his first specimen.¹ I do not hesitate to predict that the habits of this bird, when better known, will be of extreme interest.

FAMILY Jyngidæ. WRYNECKS

KEY TO THE CONGO SPECIES OF JYNX

Throat and cheeks barred, but without rufous *J. torquilla*.
Chest bright rufous *J. ruficollis*.

Jynx torquilla torquilla Linnæus

Jynx torquilla LINNÆUS, 1758, 'Syst. Nat.,' 10th Ed., p. 112 (Europe; restricted type locality: Sweden). DYBOWSKI, 1893, 'La Route du Tchad,' p. 319 (region of Bangui).—*Iynx torquilla* OUSTALET, 1893, Naturaliste, VII, p. 61. REICHENOW, 1902, 'Vög. Afr.,' II, p. 163 (Ubangi R.). SCHOUTEDEN, 1929, Bull. C. Z. C., V, p. 76 (S. of Doruma).—*Jynx torquilla torquilla* HARTERT, 1912, 'Vög. pal. Fauna,' II, p. 938, Fig. 162. W. L. SCLATER, 1924, 'Syst. Av. Æth.,' pt. 1, p. 304. GROTE, 1930, Mitt. Zool. Mus. Berlin, XVI, p. 60. BANNERMAN, 1933, 'Birds Trop. W. Afr.,' III, p. 462, Fig. 143.—*Iynx torquilla torquilla* SCLATER AND M.-PRAED, 1919, Ibis, p. 634 (Yei).—*Iynx torquilla* SCHOUTEDEN, 1936, Ann. Mus. Congo, Zool., I, f. 2, p. 102 (Mauda).

DISTRIBUTION OF THE SPECIES.—From southern England to eastern Siberia, Japan, and China. Five or six races are recognized, one of them breeding in northern Algeria. The typical race nests in Europe and western Asia, migrating south in winter to India and the Ethiopian Region, where it has been met with as far south as the Gold Coast, Cameroon, northern Uganda, and Somaliland.

Dr. Christy collected a specimen at Yei, close to the Congo-Lado border, in November. Dybowski's specimen, which Reichenow attributed to the Ubangi River, was reported by Oustalet without giving any exact locality; but Dybowski himself mentioned it as occurring near Bangui. Dr. Schouteden obtained an example south of Doruma in the Uelle district, so the European wryneck may be looked for, during the northern winter, all along the northern border of the Belgian Congo.

Jynx ruficollis ruficollis Wagler

Jynx ruficollis WAGLER, 1830, 'Natürliches Syst. Amphib. Säug. Vög.,' p. 118 (type locality: Kaffirland).—*Yunx pectoralis* SHARPE AND BOUVIER, 1878, Bull. Soc. Zool. France, III, p. 73 (Portuguese Congo). DUBOIS, 1905, Ann. Mus. Congo,

¹ 1911, Ibis, p. 505.

Zool., I, f. 1, p. 35 (Kisantu).—*Iynx pectoralis* REICHENOW, 1887, J. f. O., p. 299 (Manyanga); 1902, 'Vög. Afr.', II, p. 164 (in part. Manyanga). OUSTALET, 1893, Naturaliste, (2) VII, p. 61 (in part. Leketi).—*Iynx ruficollis* HARGITT, 1890, 'Cat. Birds Brit. Mus.', XVIII, p. 565 (Landana). MOURITZ, 1914, Ibis, p. 37 (Moushosi R.). SCHOUTEDEN, 1929, Bull. C. Z. C., V, p. 76 (Kibati).—*Iynx ruficollis ruficollis* SCHOUTEDEN, 1918, Rev. Z. A., V, p. 243 (Goma).—*Iynx ruficollis ruficollis* HESSE, 1912, Mitt. Zool. Mus. Berlin, VI, p. 145. W. L. SCLATER, 1924, 'Syst. Av. Æth.', pt. 1, p. 304. FRIEDMANN, 1930, Bull. 153, U. S. Nat. Mus., p. 494. BOWEN, 1933, Ecology, XIV, p. 261, Fig. 7B (map). BANNERMAN, 1933, 'Birds Trop. W. Afr.', III, p. 464.—*Iynx* SCHOUTEDEN, 1932, Bull. C. Z. C., IX, p. 9 (Dilolo).—*Iynx ruficollis* SCHOUTEDEN, 1932, Rev. Z. A., XXII, p. 123.

DISTRIBUTION OF THE SPECIES.—From eastern Cape Province north to the Loango Coast, Lake Kivu, East Africa, and Wogara in Abyssinia; also the Bahr-el-Jebel, Ubangi district, and savannas of Cameroon. Not in heavy forest of Congo or Cameroon.

J. r. ruficollis, the South African race, ranges north to Landana, the Alima River, the Katanga, and the bases of the Kivu Volcanoes. *J. r. cosensi* Grant¹ of East Africa, north to Mt. Elgon, differs from the typical form only by a slightly longer wing (94–101 mm.). The wings of the South African birds measure 90–95 mm., those of six skins from the Kivu district 91–95 mm. The range of typical *ruficollis* seems therefore to extend to the Kivu district, and perhaps to Lake Victoria. A bird from Dilolo however is longer-winged, 99 mm.

J. r. æquatorialis Rüppell of Abyssinia is distinguished by the greater extension of the rufous chest-color on the breast. In *J. r. pulchricollis* Hartlaub, on the other hand, the rufous is wholly restricted to chest and fore-neck, the throat being barred with black and white. This form ranges from the region of the Bahr-el-Jebel and Lake Albert west to Bozum in French Equatorial Africa, being replaced in Cameroon by *I. r. thorbeckei* Reichenow, with throat similarly barred, but rufous gorget less elongate, and underparts more buffy.

Within our territory *Jynx r. ruficollis* appears to be not very common in the Lower Congo, and as yet unknown in the savannas of the Kasai. One example in the Paris Museum was obtained by de Brazza at Leketi on the Alima River, French Congo. In the Katanga it is probably more common than the single published record would indicate, and de Witte secured a specimen at Dilolo.

In the highlands of the Kivu district *ruficollis* is not uncommon. In addition to the specimens collected by Pilette and Schouteden I have taken a female six miles north of Kibati (6600 ft.) on July 1, and a male

1915, B. B. O. C., XXXV, p. 102 (Amala R., E. Africa).

in British Ruanda near Lake Bunyoni on April 8. Although neither individual was in breeding condition, it does not seem likely that they were migrants from the south. G. F. de Witte also obtained specimens at Munagana and Lake Bulero. This race may even reach the southern extremity of Ruwenzori.

Despite its relation to the woodpeckers, this wryneck does not resemble them superficially in life. At first view it always seemed to me a nondescript brown bird with a flight like a passerine bird's, which might be seen perching on a bough of a tree, or flying up unexpectedly from some bare patch of ground. Not until I put the field glass on it would its identity become clear. As with the European species, the dark stripe running down the back of the neck was then conspicuous.

Ants and their pupæ seem to provide the bulk of their food. They have extensile tongues with long hyoids and very large salivary glands; but the hard tip of the tongue is without barbs.

The nest, as described from Natal, is an excavation in a tree-trunk, some 10 feet above the ground, containing four eggs. These are white, well glossed, elongate-oval, and measure 20.5-24 mm. \times 17-17.3. Nesting dates in Natal are in August and October.

Jynx ruficollis pulchricollis Hartlaub

Iynx pulchricollis HARTLAUB, 1884, Ibis, p. 28, Pl. III (type locality: Babira, near Bahr-el-Jebel); 1891, Abh. Naturw. Ver. Bremen, XII, p. 33 ("Mragoro" = Buguera). REICHENOW, 1902, 'Vög. Afr.,' II, p. 163.—*Iynx pectoralis* OUSTALET, 1893, Naturaliste, (2) VII, p. 61 (in part. Upper Kemo R.). REICHENOW, 1902, 'Vög. Afr.,' II, p. 164 (in part. "Ubangi R.").—*Iynx ruficollis pulchricollis* HARTERT, 1925, Nov. Zool., XXXII, p. 144.—*Jynx ruficollis pulchricollis* BOWEN, 1932, Ibis, p. 600 (Ibba, S. Bahr-el-Ghazal).

DISTRIBUTION.—From Babira, east of the Bahr-el-Jebel, southward to Buguera, west of Lake Albert, and westward to the upper Kemo River and Bozum in French Equatorial Africa.¹ The record from Buguera is authentic, for Dr. Stresemann writes me that there are two specimens, male and female, in the Berlin collection, which were collected by Emin at Buguera on March 7 and 13, 1889. This locality appears to be close to the Bogoro of our day, a village on a grassy plateau overlooking Lake Albert, and a likely spot for such a bird. A young wryneck obtained by Stuhlmann in Ihangiro, west of Lake Victoria, is *ruficollis*, not *pulchricollis*.² Dr. Stresemann assures me that the rusty color of its throat extends right up to the chin.

I believe that *pulchricollis* is found also in the savannas of the Ubangi

¹ Berlioz, 1934, Bull. Mus. Paris, (2) VI, pp. 230, 231.

² See Hesse, 1912, Mitt. Zool. Mus. Berlin, VI, p. 145.

district, for Dybowski's specimen from the upper Kemo River was thus identified by Berlioz, and in the Hamburg Museum I saw a wryneck collected by the Second Mecklenburg Expedition at Duma in Belgian territory. This skin had been labeled as *pulchricollis* by Professor Reichenow. It seems a little strange that this wryneck has not yet been observed in the savannas of the Uelle, but it does occur in the southern Bahr-el-Ghazal province.

While I never found it on the Lendu Plateau, I did see a rufous-chested wryneck in the open acacia woods of the Lubilia Valley, just north of Lake Edward, on January 30, 1927. It made its escape, so whether it was *pulchricollis* or *ruficollis* must remain an open question.

Emin noted that the note of the male of *pulchricollis* was a repeated "dii-i," which was answered by his mate. In rising from the ground they uttered a sharp "zick." Nesting probably takes place in the dry season.

[*Jynx ruficollis thorbeckei* Reichenow]

Jynx thorbeckei REICHENOW, 1912, O. Mb., p. 126 (type locality: Dschang, Cameroon).

Inhabits the savannas of the Cameroon, from Yaunde north to Bamenda, Tibati, and Ngaundere. Unless it should prove that this race, and not *pulchricollis*, is the one occurring in the Ubangi district, it cannot be expected anywhere within our limits.

FAMILY *Picumnidae*. PICULETS

Verreauxia africana (Verreaux)

Sasia africana J. AND E. VERREAUX, 1855, Rev. Mag. Zool., Paris, p. 217 (type locality: Gaboon).—*Verreauxia africana* CHAPIN, 1921, A. M. Nov., No. 17, p. 16 (Stanleyville; Avakubi). SCHOUTEDEN, 1923, Rev. Z. A., XI, p. 329 (Basongo; Kabambaie); 1936, Ann. Mus. Congo, Zool., I, f. 2, p. 102 (Kotili). W. L. SCLATER, 1924, 'Syst. Av. Æth.', pt. 1, p. 304. BANNERMAN, 1933, 'Birds Trop. W. Afr.', III, p. 460, Fig. 142.

SPECIMENS.—Stanleyville, ♂, Nov. 8. Avakubi, 3 ♂, Mar. 12, Oct. 31, Nov. 30; 3 ♀, Jan. 24, Feb. 18, Nov. 30; ♀ im., Nov. 23; 2 ♂ im., Jan. 11, Oct. 31.

ADULTS.—Naked skin of face and chin bright purplish red; iris bright crimson; bill dark gray; feet light purplish red, claws grayish pink.

IMMATURE.—Skin of face purplish red, iris light brown; feet dirty pink.

DISTRIBUTION.—Southern Cameroon, Gaboon, and the whole Congo forest east to the Upper Ituri and south to Kabambaie and Luluabourg in the Kasai district. The Frankfort Museum has a specimen secured by Schubotz at Angu on the Uelle River. Although Bannerman re-

ported this piculet as nesting at Lokodja, Nigeria, I still am skeptical of Shuel's sight identification. The measurements of the egg he collected seem too large.¹

My first examination of *Verreauxia* in the flesh impressed me, as it did Verreaux, with a certain external resemblance to *Pogoniulus*, espe-



Fig. 38. *Verreauxia africana*. $\times 3/4$.

cially in the light lines on the side of the head and the bristles at the base of the bill. The tongue however is barbed (about six barbs on each side) and extensible, with well-developed salivary glands; but the "horns" of the hyoid are not very long, their tips reaching only to a point above the posterior edges of the eyeballs. The upper walls of the brain-case

¹ See Jourdain and Shuel, 1935, *Ibis*, p. 644.

are not entirely composed of a single strong layer of bone, as in the true woodpeckers, but are invaded posteriorly by the diploë, so while the frontal region remains almost transparent, the parietal region has little rods of bone connecting the two layers, and producing a speckled appearance. This feature of the skull is barbet-like. As W. DeW. Miller¹ has shown, the rectrices of *Verreauxia* are only eight in number.

In their first plumage the young have a heavy wash of cinnamon on the whole underparts; and the young males show at an early age a rufous frontal patch which distinguishes them from the females, and becomes more prominent with the adult plumage.

Though so distinctly a bird of the forest districts, the African piculet prefers old tangled second-growth woods to the more open virgin forest. There the tiny birds are found in twos or threes living more or less in woodpecker fashion, often within two or three yards of the ground, hopping and flitting silently from bush to bush, and clinging also to the smooth upright stalks of phryniums. The transverse ridges on the under sides of their toes must be of use in maintaining a hold on such slippery plants; and in the Oriental piculets of the genus *Sasia* they are even better developed, recalling in *S. ochracea* the pads beneath geckos's toes.

Sometimes I found *Verreauxia* in the company of forest bird-parties; but the specimen from Stanleyville was taken as it climbed on a small tree in a patch of tall grass. They differ widely from the small woodpeckers of the region in eating no ants, but mainly wood-boring beetle-larvæ. Nine of the ten stomachs examined contained such soft larvæ, up to ten in number. The one remaining bird, still immature, had eaten a small beetle and other insects. I have seen a piculet hammering vigorously on a small tree, and Bates² relates that their food is usually pecked from the heart of a stalk of a common marantaceous plant, *Trachyphrynium*. Bates also found the nest, in the dry end of a small stump, with a round entrance-hole only 20 mm. in diameter. The two small white eggs, being incubated by the male, measured 14 × 12 and 13.5 × 11.5 mm.

None of our specimens of *Verreauxia* was in breeding condition—from late October to March—and from the occurrence of fully fledged young birds at that time, I concluded that the breeding period in the Ituri falls in the middle of the rainy season, and ends toward September

¹ 1924, Bull. A. M. N. H., L, pp. 320, 321.

² 1909, Ibis, p. 19; 1930, 'Handbook Birds W. Afr.,' p. 283.

or October. Bates is said to have found in the Cameroon that the dry season was preferred for nesting.

FAMILY PICIDÆ. WOODPECKERS

KEY TO THE CONGO GENERA OF PICIDÆ

- 1.—Ridge or ledge of the maxilla, running forward from above nostril, is nearer the culmen than to the tomium. *CAMPETHERA*, p. 562.
This ridge nearer the tomium than to the culmen. 2.
- 2.—Size smaller, wing not exceeding 95 mm. 3.
Size larger, wing over 95 mm. 5.
- 3.—Coloration gray-brown and whitish, with red nape in male, but no olive or yellowish tints on any part of body. *YUNGIPICUS*, p. 586.
With at least a slight olive or yellowish coloration. 4.
- 4.—Tail exceeding 55 mm., exposed culmen more than 21 mm. long.
 *POLIPICUS*, p. 587.
Tail less than 55 mm., exposed culmen less than 21 mm. *DENDROPICUS*, p. 578.
- 5.—Wing proportionately long, twice as long as tail. *THRIPIAS*, p. 595.
Wing distinctly less than twice as long as tail. *MESOPICUS*, p. 589.

KEY TO THE CONGO SPECIES OF *CAMPETHERA*

- 1.—Breast with light spots (though on the flanks they may become bars) on an olive-green or olive-brown ground. 2.
Breast with dark spots, streaks, or cross-barring, on a light ground-color. . . . 3.
- 2.—Wing more than 95 mm., a conspicuous rufous patch on ear-coverts. . . . *C. caroli*.
Wing less than 95 mm., cheeks and ear-coverts whitish, thickly streaked with dusky olivaceous. *C. nivosa*.
- 3.—Underparts, or at least breast, with dark barring. 4.
Breast not barred, but streaked or spotted, though spots may sometimes be few and small. 5.
- 4.—Barring on chest dusky greenish, on fore-neck more blackish, the barring extending to the throat; bill longer, exposed culmen at least 21 mm. . . . *C. tæniolæma*.
Barring on breast blacker and coarser, going over into spots on the throat; exposed culmen not reaching 20 mm. *C. permista*.
- 5.—Chest with dark longitudinal streaks. *C. abingoni*.
Chest with round spots. 6.
- 6.—Exposed culmen less than 17 mm. long; wing often less than 100 mm.; male without any red malar stripe. *C. cailliautii*.
Exposed culmen longer than 19 mm.; wing 100 mm. or longer; males have a red malar stripe. 7.
- 7.—Throat, ear-coverts, and feathering just below eye pale yellow or whitish, unspotted (male); or throat and ear-coverts rufous brown or blackish, malar region yellowish white with small black spots (female); wing exceeding 115 mm. *C. bennettii*.
Ear-coverts whitish or pale yellowish with blackish streaks (in both sexes); throat never brown or blackish, wing usually less than 115 mm. 8.
- 8.—Dark spots on chest very small, none exceeding 2 mm. in diameter.
 *C. punctuligera*.

Dark spots on chest larger, some of them exceeding 2 mm. and often reaching 3 mm. in diameter. *C. nubica*.

***Campethera nubica nubica* (Boddaert)**

Picus nubicus BODDAERT, 1783, 'Tabl. Planches Enluminées,' p. 41 (type locality: Nubia). EMIN, 1922, in Stuhlmann, 'Tageb. Emin Pascha,' III, p. 374 (Mswa).—*Dendromus nubicus* O.-GRANT, 1910, Tr. Z. S. Lond., XIX, p. 411 (Mubuku Valley, 5000 ft.; Mokia; Semliki Valley). SASSI, 1912, Ann. Naturh. Hofmus. Wien, XXVI, p. 387 (Rutshuru Plain; Kasindi-Beni). SCHOUTEDEN, 1918, Rev. Z. A., V, p. 243 (old Mission St. Gustave; Talia and Semliki rivers; Mai-na-Kwenda; Bulaimu; Masidongo).—*Dendromus nubicus neumanni* REICHENOW, 1911, 'Wiss. Ergeb. D. Z.-Afr. Exp.,' III, p. 281 (Beni). LÖNNBERG, 1917, Arkiv f. Zool., X, No. 24, p. 17 (Kasindi; Rutshuru).—*Campethera nubica nubica* GYLDENSTOLPE, 1924, K. Svenska Vet. Akad. Handl., (3) I, No. 3, p. 231. FRIEDMANN, 1930, Bull. 153, U. S. Nat. Mus., p. 475 ("Ruanda"). SCHOUTEDEN, 1935, Rev. Z. A., XXVII, p. 401; 1936, Ann. Mus. Congo, Zool., I, f. 2, p. 101 (Mahagi Port).—*Chrysopicos nubica* W. DEW. MILLER, 1924, Bull. A. M. N. H., L, p. 324.

DISTRIBUTION OF THE SPECIES.—Darfur and northern Abyssinia, south through East Africa and the savannas of the eastern Congo border to the Boror district of Portuguese East Africa. In the Congo it occurs only in the savannas of the eastern border, from Lake Albert to Rutshuru. Böhm's sight records of *nubica* in Marungu must refer to *C. bennettii*.

Campethera n. nubica, the form which reaches these Congo areas, ranges from the Sudan and Abyssinia to Uganda, the northern Kivu district, and northern Tanganyika Territory. There is still some dispute as to the validity of *C. n. neumanni* (Reichenow) from the highlands of Kenya Colony, which may be more heavily spotted beneath. *C. n. pallida* (Sharpe), from Gallaland and Somaliland south to Morogoro in Tanganyika Territory, is lightly spotted below and has more whitish barring above. *C. n. scriptoricauda* (Reichenow) occupies the coastal area of eastern Africa from Kenya Colony south to Nyasaland and Portuguese East Africa. It is distinguished by the black spotting on throat as well as chest, tail-quills tipped with black, and lower mandible yellowish.¹

In the eastern Congo *C. n. nubica* inhabits the savannas in the floor of the Albertine Rift, not only the drier parts with open acacias, but even spots in the Semliki Valley where there is a dense growth of elephant grass. I have seen it at Kasenyi on Lake Albert, at the southwest base of Ruwenzori, near Kasindi, and on the Rutshuru Plain. It does not ascend the slopes of Ruwenzori, above 5000 feet.

¹ See W. L. Slater, 1925, B. B. O. C., XLVI, p. 14. Dr. van Someren (1922, Nov. Zool., XXIX, p. 63; 1932, idem, XXXVII, p. 282) regards *scriptoricauda* as a distinct species.

Its food consists almost entirely of ants, caught on the trunks and limbs of trees; and both in behavior and voice it is closely similar to *C. punctuligera balia*. Its shrill metallic note sounds to me like a reiteration of "kring-kring-kring—," increasing in rapidity and then dying out. The iris of *nubica* is light rosy red, as it is in *balia*.

A nest, found at Nganzi's in the Semliki Valley on February 5, was excavated in an old rotten stump of an *Erythrina* tree, about 7 feet from the ground. The male was incubating, whereas it was the female that we found in a nest in the Kidong Valley, Kenya Colony, on June 6. In the latter case a natural cavity in the trunk of an ant-acacia served as the nest, only the entrance having been enlarged by the birds. Two white eggs are normally laid, measuring about 25×18.5 mm.

***Campethera punctuligera balia* (Heuglin)**

Picus balius HEUGLIN, 1871, 'Orn. Nordost-Afr.,' I, p. 810 (type locality: Djur and Bongo rivers, Bahr-el-Ghazal).—*Campothera balia* SHARPE, 1884, Journ. Linn. Soc. Lond., Zool., XVII, p. 431 (Semio). HARGITT, 1890, 'Cat. Birds Brit. Mus.,' XVIII, p. 98.—? *Campothera punctata* OUSTALET, 1893, Naturaliste (2) VII, p. 60.—*Picus badius* REICHENOW, 1896, O. Mb., p. 130 (Niam-Niam).—? *Dendromus punctatus* REICHENOW, 1902, 'Vög. Afr.,' II, p. 181 ("Ubangi").—*Dendromus balius* REICHENOW, 1902, 'Vög. Afr.,' II, p. 182.—*Dendromus hargitti* REICHENOW, 1903, 'Vög. Afr.,' II, p. 718.—*Campethera punctata balia* SCLATER AND M.-PRAED, 1919, Ibis, p. 629 (Mt. Baginzi).—*Chrysopicos punctatus balius* CHAPIN, 1921, Auk, p. 542 (Faradje).—*Campethera punctuligera punctuligera* BANNERMAN, 1922, Rev. Z. A., X, p. 99 (in part. N. Belgian Congo).—*Campethera balia* BEQUAERT, 1922, Bull. A. M. N. H., XLV, p. 311.—*Campethera punctuligera balia* W. L. SCLATER, 1924, 'Syst. Av. Æth.,' pt. 1, p. 296. BANNERMAN AND BATES, 1924, Ibis, p. 222 (Uelle R.). BANNERMAN, 1933, 'Birds Trop. W. Afr.,' III, p. 438. SCHOUTEDEN, 1936, Ann. Mus. Congo, Zool., I, f. 2, p. 101 (Mauda).

SPECIMENS.—Niagara, ♂ juv., ♀ juv., Jan. 1. Dungu, ♂, June 3. Faradje, 6 ♂, Feb. 23, 27, Apr. 2, May 12, Oct. 18, 25; 3 ♀, Oct. 14, 25, Nov. 13; 4 ♀ juv., Feb. 27, Apr. 2.

ADULT MALE.—Iris light rose-red; maxilla black, mandible dark bluish gray with black tip; feet dark greenish gray.

ADULT FEMALE.—Iris pink to light purplish red.

NESTLING.—Iris dark brownish gray; bill dark gray, with egg-tooth and gape-swells white; feet light blue-gray.

DISTRIBUTION OF THE SPECIES.—From Senegal to Northern Nigeria, the Bahr-el-Ghazal, and the eastern Uelle district. *C. p. punctuligera* (Wagler) ranges from Senegal east to the Gold Coast hinterland, Northern Nigeria, and the Niger Delta. *C. p. batesi* Bannerman, with much more heavily spotted throat and chest, is supposed to occupy northern Cameroon (Ngaundere and Bozum). *C. p. balia* is distributed from

the country south of Lake Chad and the great bend of the Ubangi eastward to the Bahr-el-Ghazal and the Upper Uelle district. It is less heavily spotted below than *batesi*, but more so than typical *punctuligera*, from which it differs especially in the shape of the white markings of the fore-crown in the female. In *balia* these are round, in *punctuligera* elongated almost to streaks. The female specimen collected by Dybowski in the "Pays des Ouaddahs" near the Ubangi River has the white crown spots slightly elongated, and thus seems to be intermediate between these two races. One aberrant male of *balia* from Faradje has no spots on throat or breast, only at sides of chest, and the black post-ocular line is barely indicated.

The *punctuligera* group is so closely allied to the *nubica* group that they are almost certain to be treated as races of one species by the adherents of the Formenkreis-theory. Their ranges indeed seem to be complementary. *C. notata* (Lichtenstein) of South Africa is rather closely allied, whereas *C. bennettii* (Smith) shows a striking difference in the coloration of the cheeks and throat of the female.

In the Upper Uelle we found *balia* rather common among the trees that dot the grassland, in pairs or family parties not exceeding four. The call, apparently given by males only, is a shrill metallic "kweeyer," repeated again and again, which sounded to me as though it ought rather to come from a kestrel. Lang often said it reminded him of the voice of the European wryneck.

We did not find the nest ourselves, but had six young brought to us by natives, from January to April. Broods were of two or three. Together with dissections of adults, this evidence shows there is a definite breeding season from early November to early April.

Small ants furnish the greater part of the food, and were present (with larvæ twice included) in 7 of the 8 adult stomachs we examined, sometimes filling them. In two cases we found small termites (not winged). In the stomachs of two nestlings there was a mixture of termites and ants. These ants must have been taken on tree-trunks, for never in the Congo did I see a woodpecker visit the ground. Yet this species is the one most likely of all to feed there occasionally.

[*Campethera punctuligera batesi* Bannerman]

Campothera batesi BANNERMAN, 1923, B. B. O. C., XLIII, p. 143 (type locality: 35 miles N. of Ngaundere, Cameroon).—*Campethera punctuligera batesi* GROTE, 1925, J. f. O., p. 78 (Bozum, Fr. Eq. Afr.).

A doubtful race, mentioned here only because of the possibility of

its occurrence near the Ubangi River. Apparently but two specimens are known, one from the vicinity of Ngaundere, the other from Bozum.

***Campethera bennettii uniamwesica* (Neumann)**

Dendromus bennettii uniamwesicus NEUMANN, 1908, O. Mb., p. 27 (type locality: Kakoma, Tanganyika Terr.). SASSI, 1912, Ann. Naturh. Hofmus. Wien, XXVI, p. 387 (Urundi).—*Picus nubicus* SCHALOW, 1886, J. f. O., p. 426 (Lugoma R.; Lufua R.).—*Campothera nubicus* MATSCHIE, 1887, J. f. O., p. 150.—*Dendromus nubicus* REICHENOW, 1902, 'Vög. Afr.,' II, p. 178 (in part. Lugoma R.; Lufua R.).—*Dendromus bennettii* NEAVE, 1907, Mem. Proc. Manchester Lit. Phil. Soc., LI, No. 10, p. 50 (Road to Ndola); 1910, Ibis, p. 121 (Kambove; Dikulwe R.).—*Campothera bennettii* MOURITZ, 1914, Ibis, p. 33 (Kalonga).—*Campethera bennettii uniamwesicus* W. L. SCLATER, 1924, 'Syst. Av. Æth.,' pt. 1, p. 294.—*Campethera bennettii* DE RIE-MAECKER, 1927, Rev. Z. A., XIV, p. 274 (Elisabethville-Etoile du Congo).—*Campe-thera bennettii uniamwesica* SCHOUTEDEN, 1930, Rev. Z. A., XVIII, p. 284 (Elisabethville).

DISTRIBUTION OF THE SPECIES.—Zululand and the Transvaal to northern Angola, Katanga, Urundi, and the southern shore of Lake Victoria. *C. b. bennettii* (Smith) ranges from Zululand to Southern Rhodesia; and it is replaced in Damaraland and southern Angola by *C. b. capricorni* Strickland, with chest much more finely spotted, and throat and ear-coverts of female black instead of brown. *C. b. uniamwesica* differs from the typical race in being less distinctly barred, as a rule, on back and rectrices. Throat and ear-coverts of the female are lighter chestnut-brown. Its range extends from the vicinity of Lake Victoria across the southeastern Congo to Northern Rhodesia and northern Angola.

Pilette collected it at Mawagongo west of Baraka, Schouteden at Kabalo. In Marungu Rockefeller and Murphy secured three specimens at Kasoko, Kinia, and Selembe, all between 3600 and 4100 feet. They noted the iris of two males as maroon and pink, of a female as dark brown. The sight records of *C. nubica* by Böhm in Marungu must really refer to *C. bennettii*. Other examples in the Congo Museum are from Kiambi, Lukafu, Nieuwdorp, Kapiiri, and Lake Musolo. In the Katanga this woodpecker seems to be fairly common, and Admiral Lynes finds that his specimens from that district are intermediate between *uniamwesica* and *bennettii*. In the Kasai district the species has not been observed.

According to Austin Roberts it gives "loud, deep, bell-like notes" such as one would never expect from a woodpecker.

The Marungu birds were in non-breeding condition in March and April, while in the southeastern Katanga late in October, Mouritz found

a nest attributed to this species, with two nestlings. It was a hole in a tree only five feet from the ground.

***Campethera abingoni annectens* (Neumann)**

Dendromus abingoni annectens NEUMANN, 1908, B. B. O. C., XXI, p. 95 (type locality: Sambo, Benguella). SASSI, 1912, Ann. Naturh. Hofmus. Wien, XXVI, p. 387 (Baraka). HESSE, 1912, Mitt. Zool. Mus. Berlin, VI, p. 258. SCHOUTEDEN, 1918, Rev. Z. A., V, p. 244 (Manakwa).—*Campethera chrysurus* DUBOIS, 1886, Bull. Mus. Roy. Hist. Nat. Belg., IV, p. 147 (L. Tanganyika).—*Campothera calliaudi* REICHENOW, 1887, J. f. O., p. 302 (Leopoldville).—*Dendromus chrysurus* REICHENOW, 1902, 'Vög. Afr.,' II, p. 173 (in part. Leopoldville; Kwango R.).—*Campethera chrysura* DUBOIS, 1905, Ann. Mus. Congo, Zool., I, f. 1, p. 35 (Mpala).—*Dendromus smithi* NEAVE, 1910, Ibis, p. 121 (Chambezi R.; N. of L. Bangweolo).—*Chrysopicos abingoni annectens* SCHOUTEDEN, 1924, Rev. Z. A., XII, p. 268 (Kidada).—*Campethera abingoni annectens* W. L. SCLATER, 1924, 'Syst. Av. Æth.,' pt. 1, p. 296 (Katanga). SCHOUTEDEN, 1930, Rev. Z. A., XVIII, p. 284 (Kafubu R. near Elisabethville). BANNERMAN, 1933, 'Birds Trop. W. Afr.,' III, p. 440.—*Campethera smithi* DE RIEMAECKER, 1927, Rev. Z. A., XIV, p. 274 (Munama R.).

DISTRIBUTION OF THE SPECIES.—From Natal and Damaraland north to the Juba River, the Bahr-el-Ghazal, and westward to Senegal; but not in the forested areas of western and central Africa.

Eight races are probably to be recognized, of which two occur in savanna districts of the Congo. *C. a. abingoni* (Smith) ranges from Natal and eastern Rhodesia to southern Nyasaland. It has a yellowish-white throat with little or no spotting. *C. a. smithi* (Malherbe) of the Transvaal and Bechuanaland has the blackest throat of all the forms. *C. a. anderssoni* (Roberts)¹ of Southwest Africa is stated to have the throat more spotted or striped with white on a black ground. *C. a. annectens* likewise has the middle of throat blackish, spotted with whitish, the chest heavily streaked with black. Wings 111–127 mm., exposed culmen 26–28. It extends from Benguella to the grasslands of the Gaboon, and eastward to Lake Nyasa and the Kivu district. *C. a. suahelica* (Reichenow) occupies northern Tanganyika Territory, *C. a. mombassica* (Fischer and Reichenow) the eastern coast from Mombasa to the Juba River. *C. a. kavirondensis* van Someren² is known only from southern Kavirondo to the Amala River, while *C. a. chrysura* ranges from the Lado district and Bahr-el-Ghazal to Senegal. The last named race is short-billed, exposed culmen 21–24 mm., its wing 105–113 mm., and throat with relatively little black.

Campethera a. annectens is not a very common woodpecker in the southern Congo, and is not yet known from the Kasai district. It has

¹ 1936, Ann. Transvaal Mus., XVIII, p. 255 (Windhuck).

² 1926, B. B. O. C., XLVII, p. 70 (Lolgorien, S. Kavirondo).

been found near Stanley Pool and the cataracts, and the Congo Museum has specimens from Funda Biabo, Kapiri, Nieuwdorp, and Tembwe, in addition to the published records. I have collected one at Luvungi in the Ruzizi Valley. Dr. van Someren¹ called attention to the small size of specimens from the vicinity of Baraka, but those of northern Angola and the district of the Congo cataracts are no larger, wings only 111 and 112 mm. In the region of the Katanga the wings are appreciably larger, 116–121 mm., even 127 in a single female. Hesse (1912) gave the wing-length of males from Angola as 116–121 mm.

In habits this woodpecker resembles *C. nubica*, frequenting the trees of the lowland savannas, and feeding largely on ants. Neave noted that the iris of males was pale claret or amethyst pink, but in my specimen I found it brown, lighter on the inner edge. A nest found by Belcher on October 29 in southern Nyasaland held two eggs, 26.5×19 mm., as well as one of a honey-guide.

***Campethera abingoni chrysura* (Swainson)**

Dendromus chrysurus SWAINSON, 1837, 'Birds W. Afr.,' II, p. 158 (type locality: W. Africa, i.e., Senegambia). REICHENOW, 1902, 'Vög. Afr.,' II, p. 173 (in part. Wandî).—*Campethera abingoni chrysurus* SCLATER AND M.-PRAED, 1919, Ibis, p. 630 (Meridi). SCHOUTEDEN, 1936, Ann. Mus. Congo, Zool., I, f. 2., p. 101 (Mauda). *Campethera abingoni chrysura* BEQUAERT, 1922, Bull. A. M. N. H., XLV, p. 311 (N. E. Belg. Congo).

SPECIMEN.—Faradje, ♀, Feb. 2.

ADULT FEMALE.—Iris pale reddish brown; bill dusky greenish, black at tip; feet dull green.

DISTRIBUTION.—Senegal and the Gambia, east to the Shari River, the Bahr-el-Ghazal, and the Upper Uelle. *Campethera a. chrysura* is a rare bird in the Uelle, for I saw not more than two examples in two and a half years. They were found in the dry, open bush. Dr. Schouteden likewise obtained only one female. Just beyond our limits Emin has collected this woodpecker at Wandî, and Dr. Christy at Meridi. Its food preferences must be similar to those of *C. punctuligera*, for our bird's stomach contained small ants and their larvæ.

C. a. tessmanni (Reichenow), based on a single example from Bozum in French Equatorial Africa, is probably not valid.²

***Campethera tæniolæma tæniolæma* Reichenow and Neumann**

Campothera tæniolæma REICHENOW AND NEUMANN, 1895, O. Mb., p. 73 (type locality: Eldama Ravine, Kenya Colony).—*Dendromus tæniolæma* O.-GRANT,

¹ 1922, Nov. Zool., XXIX, p. 63.

² Grote, 1923, J. f. O., p. 78.

1910, Tr. Z. S. Lond., XIX, p. 410 (Mpanga forest near Fort Portal). SASSI, 1912, Ann. Naturh. Hofmus. Wien, XXVI, p. 388 (in part. Mountains E. of Rutshuru Plain). SCHOUTEDEN, 1918, Rev. Z. A., V, p. 243 (in part. Loashi).—*Campothera tæniolæma barakæ* VAN SOMEREN, 1922, Nov. Zool., XXIX, p. 65 (in part. L. Kivuto Mpanga forest).—*Campethera tæniolæma tæniolæma* W. L. SCLATER, 1924, 'Syst. Av. Æth.,' pt. 1, p. 294 ("Mt. Mikenno").

DISTRIBUTION OF THE SPECIES.—From Mt. Kenya and the Kikuyu highlands west to Mt. Elgon and the Lendu Plateau, south to Toro, the Kivu district, and the highland northwest of Lake Tanganyika.¹

C. t. tæniolæma, of the forested highlands in Kenya Colony west of the Rift Valley, is more coarsely barred on throat and chest than *C. t. hausburgi* Sharpe² of the Aberdares and mountains to the eastward. The material in the American Museum shows this distinctly. The typical race has been said to extend to Toro and the Kivu Volcanoes, while a separate race, *C. t. barakæ*, is supposedly restricted to the mountains northwest of Tanganyika. The validity of *barakæ* is not yet proved, and the distinctions given it in the original description do not seem to hold good.

At Djugu, 5400 feet, west of Lake Albert, we collected an adult male on August 16, 1926. For some obscure reason the species has never been found on the slopes of Ruwenzori, though occurring in the Mpanga forest just to the east. I also obtained a male at 5300 feet on the mountains east of the Rutshuru Plain, but saw none on the Kivu Volcanoes. Mr. G. Babault showed me a male from the forest near the Mokoto lakes.

This green woodpecker is restricted to heavy forests above 4900 feet, where it leads a quiet and solitary life, feeding on ants and their pupæ. Its iris is deep crimson.

***Campethera tæniolæma barakæ* van Someren**

Campothera tæniolæma barakæ VAN SOMEREN, 1920, B. B. O. C., XL, p. 96 (type locality: Baraka, N. W. of L. Tanganyika).—*Dendromus taeniolaema* SASSI, 1912, Ann. Naturh. Hofmus. Wien, XXVI, p. 388 (in part. N. W. of L. Tanganyika). SCHOUTEDEN, 1918, Rev. Z. A., V, p. 243 (in part. Sibitwa forest).—*Campothera taeniolaema barakæ* VAN SOMEREN, 1922, Nov. Zool., XXIX, p. 65 (in part. N. W. of L. Tanganyika).—*Campethera tæniolæma barakæ* W. L. SCLATER, 1924, 'Syst. Av. Æth.,' pt. 1, p. 294. HARTERT, 1925, Nov. Zool., XXXII, p. 148 (N. W. of Baraka, 2000 m.). FRIEDMANN, 1930, Bull. 153, U. S. Nat. Mus., p. 474.

A male specimen collected by Grauer in the highlands northwest of Baraka is colored very like two males from the Lendu Plateau and the mountains east of the Rutshuru Plain. The eastern Congo birds may

¹ *C. tullbergi* Sjöstedt of the Cameroonian highlands is an allied species.

² 1900, B. B. O. C., X, No. LXVIII, p. xxxvi; 1900, Ibis, p. 370 (Mt. Kenya).

all be slightly yellower beneath than four specimens from Molo in Kenya Colony. I can see no difference in the barring, despite the remarks by Dr. Hartert (1925).

If *barakæ* is separable, it may include all the birds of the eastern Congo highlands. For the present I shall refer to it only the records from the country near Baraka. There it dwells in mountain forests, never low down along the lake shore.

***Campethera cailliautii nyansæ* (Neumann)**

Dendromus malherbei nyansæ NEUMANN, 1900, J. f. O., p. 204 (type locality: Mwanza, S. of L. Victoria). HESSE, 1912, Mitt. Zool. Mus. Berlin, VI, p. 255.—*Dendromus malherbi* SASSI, 1912, Ann. Naturh. Hofmus. Wien, XXVI, p. 387 (Kisaka; Rutshuru Plain).—*Campothera cailliautii nyansæ* VAN SOMEREN, 1922, Nov. Zool. XXIX, p. 64 (in part. Uganda, S. W. to L. Kivu).—*Campethera cailliautii nyansæ* HARTERT, 1925, Nov. Zool., XXXII, p. 149 (L. Urigi in Karagwe). SCHOUTEDEN, 1938, 'Expl. P. N. A. Mission de Witte,' f. 9, p. 84 (Rutshuru).

DISTRIBUTION OF THE SPECIES.—From Southeast Rhodesia and Beira north to Malindi on the east coast, southern Uganda, the Kivu district, and southeastern Congo.

The type locality of *C. c. cailliautii* (Malherbe) was restricted by Claude Grant¹ to Mombasa, and its range extends along the coastal region of East Africa from Malindi south to Zanzibar. Its wing measures 88–99 mm. *C. c. loveridgei* Hartert² of Tanganyika Territory is supposedly more greenish above and below, with round breast-spots larger.

C. c. nyansæ (Neumann), with longer wings (101–106 mm.), is probably streaked on the throat only when young. Dr. Hartert (1925) restricted its range to the region around the southern and western shores of Lake Victoria. To this form, it would seem, we must refer Grauer's specimen from the Rutshuru Plain and Ghesquière's from Rutshuru.

C. c. fülleborni (Neumann), with wings 95–106 mm., is supposed to have median rectrices tipped with blackish, the black breast-spots larger, or merging more or less into bars, at least on the flanks.³ Its range is from the vicinity of Beira to Northwest Rhodesia, the southeastern Congo, and the northern end of Lake Tanganyika.

The subspecies *nyansæ* is evidently a very rare bird in the Kivu district, restricted to the lowlands near Rutshuru and those near the Kagera River.

¹ 1915, Ibis, p. 454.

² 1920, B. B. O. C., XL, p. 139 (Morogoro).

³ These are the color-characters as given by several authors, but Dr. Hesse (1912) pointed out that they were not very reliable. My own examination of the Berlin material in 1937 makes me doubt the validity of *fülleborni*. It may not be separable from *nyansæ*.

***Campethera cailliautii fülleborni* (Neumann)**

Dendromus malherbei fülleborni NEUMANN, 1900, J. f. O., p. 204 (type locality: Langenburg, N. E. shore L. Nyasa). HESSE, 1912, Mitt. Zool. Mus. Berlin, VI, pp. 253, 256.—*Dendromus fülleborni* NEAVE, 1907, Mem. Proc. Manchester Lit. Phil. Soc., LI, No. 10, p. 49 (near Kapopo, N. W. Rhodesia); 1910, Ibis, p. 121 (upper Lufira R.).—*Campothera cailliautii nyansæ* VAN SOMEREN, 1922, Nov. Zool., XXIX, p. 64 (in part. Tanganyika; N. E. Rhodesia).—*Campethera cailliantii nyansæ* W. L. SCLATER, 1924, 'Syst. Av. Æth.', pt. 1, p. 295 (in part. Katanga).—*Campethera cailliautii fülleborni* HARTERT, 1925, Nov. Zool., XXXII, p. 149 (N. W. shore of Tanganyika; Baraka; 340 km. W. of Baraka).—*Campethera malherbei* DE RIEMAECKER, 1927, Rev. Z. A., XIV, p. 274 (Elisabethville).

DISTRIBUTION.—Supposedly from the coast of Mozambique to Northwest Rhodesia, the Katanga, southern Lulua district, savannas of the Manyema, and the north end of Lake Tanganyika. Sclater referred the birds of the Katanga to *nyansæ*, but Hartert was positive that they are *fülleborni*.

J. T. Zimmer collected a male at Katapena, and the Congo Museum has specimens from Elisabethville, Kapiri, Lake Musolo, and Dilolo Mission. There are two more from Elisabethville in De Riemaecker's collection. Wings of four males, 99–103 mm., of four females 100–106. The size of the spots on breast varies, but they are usually rather large, 2.3 to 3 mm. in diameter. The median rectrices of these examples are not blackish at tips. At Tervueren there is also a male from Baraka, with wing 98 mm. and spots on breast not very large.

Little or nothing is recorded of the habits of this woodpecker. It is evidently an inhabitant of lowland savannas with many trees, and doubtless behaves like *C. permista* of the western forest area. Böhm compared its voice to that of the lesser spotted woodpecker of Europe.

***Campethera permista permista* (Reichenow)**

Picus (Campethera) permistus REICHENOW, 1876, J. f. O., p. 97 (type locality: Gaboon).—*Campothera permista* HARGITT, 1883, Ibis, p. 478 (Congo); 1890, 'Cat. Birds Brit. Mus.,' XVIII, p. 106. SHARPE, 1884, Journ. Linn. Soc. Lond., Zoöl., XVII, p. 431 (Ndoruma); 1890, in Jameson, 'Story of Rear Column,' pp. 405, 408 (Yambuya). REICHENOW, 1887, J. f. O., p. 302 (Leopoldville). SHELLEY, 1890, Ibis, p. 168 (Aruwimi R.). OUSTALET, 1893, Naturaliste, (2) VII, p. 60 ("Congo"). SJÖSTEDT, 1894, O. Mb., pp. 34, 35, 170 (Niam-Niam). O.-GRANT, 1908, Ibis, p. 309 (Ponthierville).—*Campothera maculosa* SHELLEY, 1888, P. Z. S., Lond., p. 41 (Tingasi). HARGITT, 1890, 'Cat. Birds Brit. Mus.,' XVIII, p. 104 (Ndoruma; Tingasi).—*Dendromus permistus* REICHENOW, 1902, 'Vög. Afr.,' II, p. 170 (Semio; Ubangi R.); 1911, 'Wiss. Ergeb. D. Z.-Afr. Exp.,' III, p. 281 (Sakarumbi near Beni). LÖNNBERG, 1907, Arkiv f. Zool., III, No. 21, p. 8 (Kingoyi). SASSI, 1912, Ann. Naturh. Hofmus. Wien, XXVI, p. 388 (Beni; Moera; Mawambi; Ukaika; Mawambi-Irumu). SCHOUTEDEN, 1914, Rev. Z. A., III, p. 264 (Kilo); 1918,

idem, V, p. 243. LÖNNBERG, 1917, Arkiv f. Zool., X, No. 24, p. 17.—*Picus (Dendromus) maculosus* OUSTALET, 1904, Bull. Mus. Paris, p. 433 (Ubangi).—*Dendromus permistus permistus* NEUMANN, 1904, J. f. O., p. 393. HESSE, 1912, Mitt. Zool. Mus. Berlin, VI, p. 249. BANNERMAN, 1922, Rev. Z. A., X, pp. 89, 90.—*Campethera permista* DUBOIS, 1905, Ann. Mus. Congo, Zool., I, f. 1, p. 35 (Kisantu; Cataracts; Lower Congo). CHAPIN, 1921, Auk, p. 542 (Medje). BEQUAERT, 1922, Bull. A. M. N. H., XLV, p. 311. SCHOUTEDEN, 1924, Rev. Z. A., XII, p. 268; 1925, idem, XIII, p. 12 (Kunungu); 1926, idem, XIII, p. 195 (Tshela). W. DEW. MILLER, 1924, Bull. A. M. N. H., L, p. 324.—*Dendropicus permixtus* SALVADORI, 1911, Ann. Mus. Civ. Stor. Nat. Genova, (3) V, p. 446 (Uelle).—*Mesopicos ellioti* SCHOUTEDEN, 1918, Rev. Z. A., V, p. 244 (Moera).—*Campethera permista angolensis* SCHOUTEDEN, 1923, Rev. Z. A., XI, p. 329 (Luebo; Belenge).—*Campethera permista permista* GYLDENSTOLPE, 1924, K. Svenska Vet. Akad. Handl., (3) I, No. 3, p. 233 (Malisawa). W. L. SCLATER, 1924, 'Syst. Av. Æth.,' pt. 1, p. 293. BANNERMAN, 1933, 'Birds Trop. W. Afr.,' III, p. 428, Fig. 128. SCHOUTEDEN, 1936, Ann. Mus. Congo, Zool., I, f. 2, p. 100 (Panga; Buta; Rungu; Mauda).

SPECIMENS.—Boma, ♂, Jan. 15. Batama, ♀, Sept. 16. Gamangui, ♀, Feb. 18. Medje, 4 ♂, Mar. 5, 29, May 12, 28; 5 ♀, Jan. 20, May 12, 17, 28, June 10; ♂ juv., May 17. Avakubi, ♂, June 15; ♀, June 15. Niangara, ♂, Apr. 23; ♀ Nov. 10. Faradje, ♂, Oct. 23.

ADULTS.—Iris dark brown; maxilla blackish, mandible dark greenish gray, feet grayish green.

DISTRIBUTION OF THE SPECIES.—Gold Coast to the northeastern Congo and south to northern Angola; also the Omo River region in southern Abyssinia, but not known from Uganda.

C. p. permista extends from the Cameroon River southward to Ndala Tando in Angola and eastward across the whole Lower Guinea forest to the Semliki Valley. It extends far out in gallery forests both to the north and to the south. *C. p. togoensis* (Neumann),¹ with narrower dark bars on under surface, is found from Lagos west to the Gold Coast. *C. p. kaffensis* (Neumann) is purer green above than typical *permista*, and more sparsely, more broadly barred beneath, with rather long wings. It is confined to southwestern Abyssinia.

Northern Angola was believed by Neumann to have a special race, *angolensis*, intermediate in color between *permista* and *kaffensis*, but with still longer wings, 104–107 mm. I fail to see any difference in color for Angolan specimens. Adults from the Mayombe and the Ituri forests have wings 94.5–100.5 mm., while one adult male from Ndala Tando has the wing only 98 mm., and another from Kasanga near the Kwango River 98. All around the borders of the forest region I find a slight increase in average wing-length. In specimens from the Kasai this measurement is 98–105 mm., from the Semliki Valley 96–101, from

¹ 1904, J. f. O., p. 393 (Misahöhe, Togoland).

Buta in the Lower Uelle, 92-103. Our three adults from Niangara and Faradje in the Upper Uelle have wings 99-101.5 mm. Accordingly, I do not recognize *angolensis*.

The Picidæ form by no means a conspicuous part of the Congo avifauna, and I traveled afoot for ten days along the forest road east of Stanleyville before seeing my first woodpecker, a *Campethera permista*. This is one of the ordinary woodpeckers over all the forest area of the Congo, but found in second growth and forest galleries, not in large tracts of primary growth. It has a deeply undulating flight, and is not a sociable bird. The note is a sort of whine.

Its breeding appears to be carried on largely during the rains. A male bird with two naked young and an addled egg (taken from the nest) was brought to us at Medje on March 28; a nestling on May 17, and a breeding female—not its parent—the same day. Birds taken in November, January, and February had gonads in resting stage, whereas those in June and October showed slight enlargement. At Batama, closer to the equator, a breeding female was taken in September.

The young male from Medje, in juvenal plumage, has the forehead and anterior half of crown blackish, with minute spots of buff. On the posterior part of the crown the blackish feathers become tipped with red; and the whole nape is red, but little duller than in adults. The black spots on throat and malar region are not so small and round as in adults; the barring of the breast is less regular, and more obscured by the yellowish feather-tips. Back and wings bright green, of a less yellowish cast than in adults.

A more confirmed ant-eater than this woodpecker would be hard to find. Small dark-colored ants, occasionally mixed with their pupæ, were the sole food discovered in 14 stomachs, many of which were entirely filled. In one case I noted that the "crop" was also distended with them.

***Campethera caroli caroli* (Malherbe)**

Chloropicus caroli MALHERBE, 1852, Rev. Mag. Zool., (2) IV, p. 550 (type locality: Gaboon).—*Campothera caroli* REICHENOW, 1887, J. f. O., p. 306 (Stanleyville). HARGITT, 1890, 'Cat. Birds Brit. Mus.,' XVIII, p. 107 (Sassa). OUSTALET, 1893, Naturaliste, VII, p. 60 (Ubangi region). SALVADORI, 1909, Ann. Mus. Civ. Stor. Nat. Genova, (3) IV, p. 321 (Buta-Dungu).—*Dendromus caroli* REICHENOW, 1902, 'Vög. Afr.,' II, p. 168 (Kwango R.); 1911, 'Wiss. Ergeb. D. Z.-Afr. Exp.,' III, p. 281 (N. W. of Beni). LÖNNBERG, 1907, Arkiv f. Zool., III, No. 21, p. 8 (Mukimbungu). O.-GRANT, 1910, Tr. Z. S. Lond., XIX, p. 410 (Mawambi). SASSI, 1912, Ann. Naturh. Hofmus. Wien, XXVI, p. 388 (Beni; Moera; Beni-Mawambi;

Ukaika; Mawambi-Irumu). HESSE, 1912, Mitt. Zool. Mus. Berlin, VI, pp. 247, 248. SCHOUTEDEN, 1914, Rev. Z. A., III, p. 264 (Kilo); 1918, idem, V, p. 243 (Kabambaré).—*Picus (Dendromus) caroli* OUSTALET, 1904, Bull. Mus. Paris, p. 432 (Beso; Ouadda).—*Campethera caroli* DUBOIS, 1905, Ann. Mus. Congo, Zool., I, f. 1, p. 35 (Kibongo). BEQUAERT, 1922, Bull. A. M. N. H., XLV, p. 311. W. DEW. MILLER, 1924, Bull. A. M. N. H., L, p. 324. SCHOUTEDEN, 1926, Rev. Z. A., XIII, p. 195 (Makaia Ntete; Temvo).—*Dendromus kasaicus* DUBOIS, 1911, Rev. Fr. O., II, p. 17 (type locality: Kasai distr.).—*Campothera caroli budongoensis* VAN SOMEREN, 1921, B. B. O. C., XLI, p. 105 (in part. Belgian Congo); 1922, Nov. Zool., XXIX, p. 64.—*Campethera caroli caroli* SCHOUTEDEN, 1923, Rev. Z. A., XI, pp. 329, 395 (Luebo; Kamaambi; Djoko Punda; Makumbi; Kwamouth); 1924, idem, XII, p. 416 (Tondou); 1925, idem, XIII, p. 12 (near Bolobo). STONE, 1936, Proc. Acad. Nat. Sci. Phila., LXXXVIII, p. 563 (Saidi; Ekibondo).—*Campethera caroli budongoensis* W. L. SCLATER, 1924, 'Syst. Av. Æth.,' pt. 1, p. 293 (Uelle distr.). BANNERMAN AND BATES, 1924, Ibis, p. 219. SCHOUTEDEN, 1936, Ann. Mus. Congo, Zool., I, f. 2, p. 101 (Kotili; Buta; Panga; Nava R.; Medje; Poko; Rungu; Mauda; Bondo Mabe).—*Dendromus kassaicus* SCHOUTEDEN, 1937, Bull. C. Z. C., XIII, p. 66.

SPECIMENS.—Stanleyville, ♀, Nov. 23. Panga, on Aruwimi R., ♀, Sept. 17. Avakubi, ♀, Aug. 12. Penge, ♀, Apr. 25. Ngayu, ♀, Dec. 10. Gamangui, ♂, Feb. 18; ♀, Jan. 31. Niangara, 2 ♂, Dec. 1, 18; 2 ♀, May 6, Dec. 16. Between Faradje and Aba, ♀, Nov. 27.

ADULTS.—Iris dark brown, bill dark gray, feet green with claws gray.

DISTRIBUTION OF THE SPECIES.—Sierra Leone to Cameroon and northern Angola; eastward to Mt. Elgon, Kavirondo district, Semliki Valley, Rutshuru Valley, and Kabambaré.

C. c. caroli occupies the whole Lower Guinea forest, extending out in gallery forests of the Uelle and Kasai, and reaching the Gold Coast and the forest patches of northern Angola. *C. c. arizelus* (Oberholser), with fewer and smaller buffy spots on underparts, and lighter rufous band on ear-region, inhabits the forests of Liberia. *C. c. budongoensis* van Someren,¹ of the heavily wooded areas in Uganda and Kavirondo, is supposedly greener—less golden—on the upper surface than typical *caroli*, with paler spotting below. The difference is slight at best, and I prefer to keep all the Belgian Congo birds with the typical form, although eastern specimens may differ slightly in the color of the back.

The wash of rufous brown sometimes seen on the breast of Congo and Cameroon examples is undoubtedly a stain from the bark of trees. On other individuals there is sometimes a strong green stain, of the color of Paris green, which was remarked upon by Kelsall² in Sierra Leone, and is to be seen in some Cameroon specimens as well as a few from the Congo. It comes perhaps from green algæ growing on bark or in rotten

¹ 1921, B. B. O. C., XLI, p. 105 (Bugoma forest, Uganda).

² 1914, Ibis, p. 214.

wood, and is remarkably permanent. In South America the rufous woodpeckers of the genus *Celeus* occasionally exhibit a very similar green stain.

The brown-eared woodpecker is a characteristic bird of the whole Congo forest, but does not ascend the mountains. Dr. Schouteden and I have both found it in the Mayombe forest. In the Ituri and at Lukolela it is common, a rather silent bird seen climbing on the lower half of forest trees, but not doing much pecking of wood. One or two may often be seen with a mixed bird party. Beyond the edge of unbroken forest in the Uelle it becomes rarer; and near Faradje we saw but a single pair, in the dense wood near Madrapili, on the road to Aba. One specimen in the Congo Museum came from the Molindi River, a tributary of the Rutshuru; and this woodpecker appears to be fairly common in suitable places in the northern half of the Kasai district. There is even one female in the Congo Museum from Dilolo Mission in the Lulua district.

Dissections of our specimens of *C. caroli* showed clearly that the dry season is the period of reproduction. In the Ituri and Uelle the sexual organs were well developed from November to February, inclusive. South of the equator, at Lukolela, I took a female with a soft egg in the oviduct on August 3.

Nests of this species, in holes in trees, were found several times by L. Petit¹ in the region of Landana. The eggs were three, and pure white, being incubated, he noted, by both sexes. Bates² reported nests in the Cameroon during January and February, with two eggs or young, though he believed they might lay as many as four eggs. Two eggs he found to measure 26×19 mm., their color being glossy white. Two eggs in the Congo Museum from Buta measure 26.9×17.7 and 27.1×17.8 mm.

When determining the sex, I found that in males of *Campethera* the left testis, which is apt to be slightly larger, often exhibits a very unusual shape, being bent abruptly outward at the anterior end. Such a condition was specially noted in two males of *C. c. caroli*, two of *C. nivosus herberti*, and one each of *C. n. nubica*, *C. punctuligera balia*, and *C. abingoni annectens*. It was probably passed over in some other cases, and is perhaps the usual state. I have not noticed it in woodpeckers of any other genus except *Colaptes auratus* of North America.

The food of *Campethera caroli* is largely of small ants, with their

¹ 1899, Mem. Soc. Zool. France, XII, p. 64.

² 1911, Ibis, p. 508.

larvæ or pupæ. Ants were found in all the five stomachs examined, but four caterpillars and a soft pupa—not of an ant—were also listed in their contents.

Campethera nivosa efulenensis (Chubb)

Dendromus efulenensis C. CHUBB, 1908, B. B. O. C., XXI, p. 92 (type locality: Efulen, Cameroon).—*Campothera nivosa* HARGITT, 1883, Ibis, p. 482 (Congo).—*Dendromus nivosus* REICHENOW, 1902, 'Vög. Afr.', II, p. 169 (Loemma R.).—*Campethera nivosa* DUBOIS, 1905, Ann. Mus. Congo, Zool., I, f. 1, p. 35 (in part. Kisantu).

DISTRIBUTION OF THE SPECIES.—Forests of Upper and Lower Guinea, from the Gambia to Cameroon, Fernando Po, Uganda, Mt. Elgon, Nandi district, southern Kasai, and northern Angola.

C. n. nivosa (Swainson) is the race of Upper Guinea, and *C. n. poensis* Alexander is confined to Fernando Po. *C. n. efulenensis* is said to differ from typical *nivosa* in being a little darker above, less washed with yellow, and the spots below more greenish buff, on a darker olive ground. Its wing measures 82–91 mm. This form extends from the forested Cameroon south to the forest areas of northern Angola. *C. n. herberti* of the Upper Congo and Uganda forests is very slightly differentiated from *efulenensis*. The dark streaks on throat and cheeks appear to be slightly narrower, and the general coloration of underparts not quite so dark, more washed with yellowish. Wings 79–88 mm. *C. n. yalensis* Bowen¹ of the Nandi and Kavirondo districts is rather similar to *herberti* in color, but has wings 87–92 mm.

There can be no doubt of the occurrence of *efulenensis* in the Mayombe forest, though no specimen has been reported from that area, because Petit found this little woodpecker on the Loemma River, not far to the northwest. The Congo Museum has an old mounted specimen from the vicinity of Kisantu, also an adult female and a young bird with tail not quite full-grown from Thysville.

Campethera nivosa herberti (Alexander)

Dendromus herberti ALEXANDER, 1908, B. B. O. C., XXI, p. 89 (type locality: Bwande, Ubangi R.).—*Campethera nivosa* DUBOIS, 1905, Ann. Mus. Congo, Zool., I, f. 1, p. 35 (in part. Popoi on Aruwimi R.). BEQUAERT, 1922, Bull. A. M. N. H., XLV, p. 311. W. DEW. MILLER, 1924, Bull. A. M. N. H., L, p. 324.—*Dendromus efulenensis herberti* REICHENOW, 1911, 'Wiss. Ergeb. D. Z.-Afr. Exp.', III, p. 281.—*Dendromus nivosus efulensis* SASSI, 1912, Ann. Naturh. Hofmus. Wien, XXVI, p. 389 (Beni; Moera; Beni-Mawambi; Mawambi; Ukaika; Mawambi-Irumu). SCHOUTEDEN, 1918, Rev. Z. A., V, p. 243; 1923, idem, XI, p. 330 (Basongo; Luebo; Kamaiambi; Macaco).—*Dendromus efulenensis* SCHOUTEDEN, 1914, Rev. Z. A., III,

¹ 1931, Proc. Acad. Nat. Sci. Phila., LXXXIII, p. 451 (Yala R., Kavirondo).

p. 264 (Kilo).—*Dendromus caroli* SCHOUTEDEN, 1918, Rev. Z. A., V, p. 243 (Zambo).—*Campothera nivosa herberti* BANNERMAN, 1920, Rev. Z. A., VII, p. 292 (Poko; Bosa-bangi on Ituri R.). VAN SOMEREN, 1922, Nov. Zool., XXIX, p. 64.—*Campothera nivosa herberti* CHAPIN, 1921, Auk, p. 542 (Medje). SCHOUTEDEN, 1924, Rev. Z. A., XII, p. 416 (Eala). W. L. SCLATER, 1924, 'Syst. Av. Æth.,' pt. 1, p. 294. BOWEN, 1931, Proc. Acad. Nat. Sci. Phila., LXXXIII, p. 451. SCHOUTEDEN, 1936 Ann. Mus. Congo, Zool., I, f. 2, p. 101 (Kotili; Panga; Poko; Nava R.; Rungu; Bondo Mabe).

SPECIMENS.—Avakubi, 3 ♂, Mar. 6, Oct. 6, Nov. 6; ♀, Jan. 11. Ngayu, 2 ♀, Dec. 20, 25. Gamangui, ♂ im., Jan. 30; ♀, Jan. 31. Medje, 2 ♂, Mar. 31, May 9; ♀ juv. Apr. 2. Niangara, 2 ♂, June 15, Nov. 23.

ADULT MALE.—Iris reddish brown; bill dark gray; feet green, of nearly same shade as plumage of back.

DISTRIBUTION.—From the middle Congo River near Bolobo and the Ubangi River east to the upper Uelle, the Budongo and Mabira forests in Uganda, and no doubt the Manyema. To the southward it extends to the Kasai district. Specimens from Lukolela and Luluabourg do not differ from those of the Ituri and Semliki Valley.

The young in juvenal plumage show the same sexual difference as adults, the young female having no red on crown or nape, while the young male has the nape-feathers tipped with red. These red tips are a little shorter and less lustrous than in the adult.

This common little green woodpecker of the Upper Congo is encountered singly or in pairs in virgin forest and second-growth woods, searching the trunks of small trees for ants. It keeps generally within a few yards of the ground, but without exhibiting the slightest terrestrial tendencies, and often accompanies foraging parties of passerine birds. I do not recall ever having heard its voice.

Food is furnished by the ever-abundant little black ants (*Crematogaster*) which build large brown earthy nests in the trees. They were found in all five stomachs from which I took notes; and the number of their larvæ and pupæ also ingested made me wonder whether the woodpeckers did not open a way into the nest itself. Small cavities were sometimes noticed in the sides of such nests of ants and of termites, and finally at Medje (March 31) the natives brought us a very similar arboreal termite nest, in which there was an excavation being used as a nest by this small woodpecker. A male bird had been trapped in it, and one of their white eggs was also preserved. The termites were still present in great numbers.

On returning to civilization I read with interest the description by

Bates¹ of very similar nests of *C. n. efulenensis* in the Cameroon, in structures built by ants as well as termites. The eggs were always two in number, white, and measured 22–25 × 16–18 mm. In a similar ant nest, but built by a larger sort of ant, Bates found a hole visited by *Agapornis pullaria*; and I may add that in a cavity in the side of an arboreal termite nest, between Banalia and Bengamisa, I discovered the nest of a dormouse (*Claviglis*) containing young.

Although adult specimens taken in the Ituri from October to early March showed little or no sign of breeding, a young bird fully fledged was taken at the end of January. Besides the nest at the end of March, we obtained a juvenal female in early April, and one dissection showed some evidence of breeding as late as May 8. In the Cameroon Mr. Bates has found this species nesting in December, January, April, and June; and thinks that they avoid only the second or heavier rainy season.

The development of the tongue is gradual in juvenile woodpeckers. In a nestling of this species, for instance, the hard tip of the tongue had as yet no barbs, being only slightly roughened along its edges. Similarly, the horns of the hyoids, running around the back of the skull, reached only to a point between the eyes—as in the adult *Verreauxia*—whereas in the adult they continue to the base of the bill.

It was in this young bird—in April, 1910—that I first noticed the small size of the innermost primary, and thus began my investigation of the primaries of nestling woodpeckers.²

KEY TO THE CONGO SPECIES OF *DENDROPICOS*

- 1.—Chest with round blackish dots, about 1.5 mm. in diameter, which sometimes widen into little bars; flanks and abdomen practically unmarked, gray with an olive-yellow wash.....*D. pæcilolæmus*.
Chest with much larger black spots, or streaked.....2.
- 2.—Breast with distinct longitudinal streaks, no spots; secondaries with more or less distinct traces of light barring on their outer webs; rectrices also with interrupted light bars.....*D. fuscescens*.
Breast with pear-shaped black spots (some 3 mm. wide), which occasionally extend toward the base of the feather so as to resemble broad streaks; outer webs of secondaries olive-green, with no sign of light bars; rectrices also without barring.....*D. gabonensis*.

Dendropicos fuscescens camacupæ Bowen

Dendropicos fuscescens camacupæ BOWEN, 1930, Proc. Acad. Nat. Sci. Phila., LXXXII, p. 89 (type locality: Villa General Machado, Angola).—*Picus hartlaubi*

¹ 1909, Ibis, p. 20; 1911, idem, p. 509.

² Chapin, 1921, Auk, pp. 531–552.

SCHALOW, 1886, J. f. O., pp. 426, 427 (Lugoma R.).—?*Dendropicus cardinalis* DUBOIS, 1886, Bull. Mus. Roy. Hist. Nat. Belg., IV, p. 147 (L. Tanganyika).—*Dendropicus hartlaubi* DUBOIS, 1886, Bull. Mus. Roy. Hist. Nat. Belg., IV, p. 147 (L. Tanganyika); 1905, Ann. Mus. Congo, Zool., I, f. 1, p. 35 (in part. Karema). MATSCHIE, 1887, J. f. O., p. 150. NEAVE, 1910, Ibis, p. 121 (Dikulwe R.; upper Lufira R.).—*Dendrobates cardinalis* DE SOUSA, 1886, Jorn. Sci. Lisboa, XI, p. 77 (Tenke); 1886, in Capello and Ivens, 'De Angola a Contra-Costa,' II, p. 443.—*Dendropicus hartlaubi* REICHENOW, 1902, 'Vög. Afr.,' II, p. 193 (in part. Lugoma R.; Tenke).—*Dendropicus zanzibari* MOURITZ, 1914, Ibis, p. 33 (Kalonga in S. E. Katanga).—*Dendropicus fuscescens fuscescens* C. GRANT, 1915, Ibis, p. 457 ("eastern Belgian Congo," i.e. Katanga). W. L. SCLATER, 1924, 'Syst. Av. Æth.,' pt. 1, p. 297.

DISTRIBUTION OF THE SPECIES.—Cape Province north to Somaliland, Eritrea, the Bahr-el-Ghazal, Benue River, and Senegal—but not in the central part of the Upper Congo forest. It has long been evident that *hartlaubi* and *lafresnayi* are not specifically distinct from *fuscescens*, and at last Admiral Lynes¹ and Jack Vincent² have rallied to this point of view.

Dendropicus fuscescens (Vieillot) is divisible into at least ten subspecies, and possibly several more will eventually be recognized. In southern and eastern Africa the back is boldly barred, toward the Congo this barring becomes weaker, and in Upper Guinea it practically disappears. The color of the back becomes greenest, too, in West Africa. The wing-length is greatest in southern Africa, gradually diminishing to the northward in both eastern and western Africa. The changes are gradual, and it is not easy to say where one race stops and the next one begins.

We may accept the following, provisionally: *D. f. fuscescens*, Cape Province north to Rhodesia and perhaps southern Angola³; *D. f. hartlaubi* Malherbe, northern Zululand through eastern coastlands to Lamu; *D. f. massaicus* Neumann, interior of Tanganyika Territory north to Kenya Colony and the Turkwell country; *D. f. hemprichii* (Ehrenberg), Jubaland to British Somaliland, Abyssinia, and Eritrea; *D. f. camacupæ* Bowen, highland of central Angola, Upper Katanga, and Marungu; *D. f. loandæ* Grant, northern Angola, eastward perhaps to the Lualaba R.; *D. f. sharpii*, savannas of southern Congo and Gaboon; *D. f. lepidus*, highlands from Kivu district to Mt. Elgon and southern Abyssinia; *D. f. camerunensis*, southern Cameroon east to Lake Albert and the Bahr-el-Jebel; *D. f. lafresnayi* Malherbe,⁴ Nigeria to the Gambia. Five of these races occur in the Belgian Congo.

¹ 1934, J. f. O., Sonderheft, pp. 68, 69.

² 1935, Ibis, p. 20.

³ See, however, Austin Roberts, 1924, Ann. Transvaal Mus., X, pp. 156, 157; 1935, idem, XVI pp. 112-117.

⁴ 1849, Rev. Zool., p. 533 ("Africa").

The type locality of *lafresnayi*, in my opinion, is not Gaboon, even though Verreaux¹ stated that "although sedentary in the Gaboon, it inhabits the whole coast as far as Senegal." Even in 1861, Malherbe² had seen no specimen from the Gaboon, and mentioned only one with definite locality, from Aguapim, Gold Coast. The type locality should therefore be Agaupim, and *zechi* Neumann is a synonym of *lafresnayi*.

The race found in the Gaboon is to be called *sharpii* Oustalet, and from this *camerunensis* differs only slightly, especially in the more uniform greenish color of the back. *D. f. lepidus* is only a little darker than *camerunensis*, with heavier streaks and more yellowish wash on the breast. *D. f. loandæ* is close to *sharpii*, but a little longer-winged and more boldly barred on the back; *camacupæ* is as long-winged as *fuscescens*, but a little more greenish above and more finely streaked on breast than *fuscescens*.

It is not without hesitation that I have adopted the name *camacupæ* for the form occurring in the southeastern Congo, with wings 92–100 mm. It seemed at first as though the name *centralis* Neumann³ might be applicable, but the wing-length in that form was given as only 90–93 mm. The race *loandæ* likewise has wings too short, 85–89 mm., and the male of *capriviensis* Roberts is said to have the forehead "pallid gray," not brown.

Dendropicos f. camacupæ inhabits the Upper Katanga and Marungu, and reaches Tembwe on the west shore of Lake Tanganyika, where Dr. Schouteden obtained nine examples. Other specimens in the Congo Museum are from Kiambi, Lukafu, Kapiri, Kansenia, Elisabethville, and Nieuwdorp. In Marungu Rockefeller and Murphy collected six examples at altitudes between 4100 and 6000 feet. This woodpecker is common in all the wooded savannas of the region. In Nyasaland, Belcher and Vincent found that the representatives of this species nest from July to October. Two eggs measured 20.5×16 and 21×15.5 mm.

Dendropicos fuscescens loandæ Grant

Dendropicos lafresnayi loandæ C. GRANT, 1915, B. B. O. C., XXXV, p. 101 (type locality: Loanda); 1915, Ibis, p. 463 (Malange, Angola).—?*Dendropicos hartlaubi* SCHOUTEDEN, 1918, Rev. Z. A., V, p. 244 (Dogodo).

DISTRIBUTION.—From the coast of northern Angola near Loanda to

¹ 1855, Rev. Mag. Zool., p. 272.

² 1861, 'Monographie des Picidés,' I, p. 204, III, Pl. XLIV, fig. 4.

³ 1900, J. f. O., p. 206 (Iringa, Tanganyika Terr.).

the middle Kwango River, the Lulua district, Kabalo on the Lualaba, and perhaps the savannas of the southern Manyema.

D. f. loandæ is a race intermediate between *camacupæ* and *sharpii*, with wings 85–91 mm. as a rule. The back is rather greenish, but always barred, except in the region near Lake Tanganyika. In the Congo Museum there is an adult female with wing 88 mm. from the Franz Joseph Falls of the Kwango River, and four examples from Kabalo with wings 86–91 mm. No specimen I have seen from the Kasai has wings long enough for this race. It must, however, be found in the Lulua district, though three females from Kinda and Funda Biabo, with wings 91–93 mm., approach *camacupæ*.

Three males from Munie Mboka, Dogodo, and Kalembelembe are of the size of *loandæ*, wings 86–89 mm., but greener and only indistinctly barred on the back. Their underparts are too pale for *lepidus*, so for the present they are best included with *loandæ*.

***Dendropicos fuscescens sharpii* Oustalet**

Dendropicus sharpii OUSTALET, 1879, Nouv. Arch. Mus., (2) II, p. 62 (type locality: Doumé, Ogowé R.); 1893, Naturaliste, (2) VII, p. 61.—*Dendropicus cardinalis* SHARPE, 1873, P. Z. S. Lond., p. 716 (Congo R.). BÜTTIKOFER, 1888, Notes Leyden Mus., X, p. 212 (Ango Ango).—*Dendropicus lafresnayi* HARGITT, 1883, Ibis, p. 425 (Landana); 1890, 'Cat. Birds Brit. Mus.,' XVIII, p. 301.—*Dendropicus tropicalis* REICHENOW, 1887, J. f. O., p. 302 (type locality: Leopoldville). HARTERT, 1900, Nov. Zool., VII, p. 33 (Ngombe).—*Dendropicus hartlaubi* REICHENOW, 1887, J. f. O., p. 308 (Kasongo). DUBOIS, 1905, Ann. Mus. Congo, Zool., I, f. 1, p. 35 (in part. Lower Congo). SALVADORI, 1915, Ann. Mus. Civ. Stor. Nat. Genova, (3) VI, p. 279 (Kasai).—*Dendropicus sharpei* OUSTALET, 1893, Naturaliste, (2) VII, p. 60 (Congo region).—*Dendropicos hartlaubi* REICHENOW, 1902, 'Vög. Afr.,' II, p. 193 (in part. Congo R.; Kasongo).—*Dendropicos lafresnaye* REICHENOW, 1902, 'Vög. Afr.,' II, p. 195.—*Dendropicos guineensis lafresnayi* NEUMANN, 1904, J. f. O., p. 400 (in part. Congo).—*Dendropicos guineensis lafresnaye* HESSE, 1912, Mitt. Zool. Mus. Berlin, VI, pp. 169, 171.—*Dendropicos lafresnayi lafresnayi* C. GRANT, 1915, Ibis, p. 461. BANNERMAN, 1922, Rev. Z. A., X, p. 96; 1933, 'Birds Trop. W. Afr.,' III, p. 441. SCHOUTEDEN, 1923, Rev. Z. A., XI, pp. 330, 395 (Kabambaie; Kwamouth); 1924, idem, XII, p. 268 (Kidada; Kisanu). W. L. SCLATER, 1924, 'Syst. Av. Æth.,' pt. 1, p. 298.—*Dendropicos fuscescens tropicalis* GROTE, 1923, J. f. O., p. 367 (Chinchoxo).—*Dendropicos fuscescens loandæ* SCHOUTEDEN, 1923, Rev. Z. A., XI, p. 330 (Tshisika).—*Dendropicos lafresnayi camerunus* SCHOUTEDEN, 1926, Rev. Z. A., XIII, p. 195 (Temvo).—*Dendropicos lafresnayi loandæ* SCHOUTEDEN, 1926, Rev. Z. A., XIII, p. 195 (Moanda).

SPECIMENS.—Boma, ♂, Jan. 25; ♀, Dec. 31.

ADULTS.—Iris dark red, bill blackish with base of mandible bluish gray, feet dull green.

DISTRIBUTION.—From the savannas of the Gaboon and the Congo coast eastward to the Kasai district, and probably to the Lualaba River near Kasongo. While found in clearings of the Mayombe forest, it has not yet been reported from within the southern border of the upper Congo Forest. I never saw it at Lukolela.

The reasons for my use of the name *sharpii* have been given above. This is a small race, wings 79–85 mm., yellowish green on the back, generally with rather well-marked dusky barring. The specimens from Moanda and Tshisika are not large enough for *loandæ*. In addition to the localities mentioned above, specimens have been taken at Thysville and Luluabourg. I have not examined any from Kasongo, and cannot therefore be certain that *sharpii* extends so far east.

We must not lose sight of the importance of the forest as a barrier in studying the distribution of this species. When crossing the Congo Forest from Yumbi to Medje, we saw *Dendropicos fuscescens* nowhere till we reached the clearings near the northern border of the forest. There the birds have a much greener, less barred back, and certainly represent a different race, which we call provisionally *camerunensis*.

Dendropicos f. sharpii seemed to be the only woodpecker at all common around Boma. It climbs in the scrubby trees of the savanna, and the one stomach examined held many insect larvæ (not of ants) and a few pupæ. Its note was well described by Petit,¹ who noted that it loves to climb upon the fruits of the baobab tree. Upon these it drums, giving also from time to time a call, "trrrrrriiiii," which may be repeated five or six times. It probably nests during the dry season.

***Dendropicos fuscescens camerunensis* Sharpe**

Dendropicos camerunensis SHARPE, 1907, Ibis, p. 443 (type locality: River Ja, Cameroon).—*Dendropicos lafresnayii* SHELLEY, 1888, P. Z. S. Lond., p. 40 (Tobbo).—*Dendropicos lafresnayi* O.-GRANT, 1910, Tr. Z. S. Lond., XIX, p. 413 (in part. lower Semliki Valley).—*Dendropicos lafresnayeii* REICHENOW, 1911, 'Wiss. Ergeb. D. Z.-Afr. Exp.,' III, p. 283 (in part. Beni; Kirk Falls). SASSI, 1912, Ann. Naturh. Hofmus. Wien, XXVI, p. 390 (in part. Kasindi; Beni). SCHOUTEDEN, 1918, Rev. Z. A., V, p. 244 (Kilo; Boga; Bulaimu).—*Dendropicos lafresnayi lepidus* SCLATER AND M.-PRAED, 1919, Ibis, p. 630 (Yambio). SCHOUTEDEN, 1936, Ann. Mus. Congo, Zool., I, f. 2, p. 101 (Buta; Poko; Mauda; Faradje; Abimva; Djala-sinda; Mahagi Port).—*Dendropicos lafresnayeii* SCHUBOTZ, 1921, 'Tageb. Emin Pascha,' VI, p. 102 (Tingasi; Makraka).—*Picus lepidus* EMIN, 1921, in Schubotz, 'Tageb. Emin Pascha,' VI, p. 278 (Bellima).—*Dendropicos lafresnayi lafresnayi* BANNERMAN, 1933, 'Birds Trop. W. Afr.,' III, p. 441 (in part. Ubangi R.; Uelle R.).—*Dendropicos fuscescens lepidus* STONE, 1936, Proc. Acad. Nat. Sci. Phila., LXXXVIII, p. 564 (Kasenyi; Ekibondo).

¹ 1899, Mem. Soc. Zool. France, XII, p. 65.

SPECIMENS.—Medje, ♂, Mar. 17; 2 ♀, May 15, June 5. Dungu, ♂, June 2. Faradje, ♀, Oct. 23.

ADULTS.—Iris red; bill dark gray, sometimes blue-gray below; feet grayish green.

DISTRIBUTION.—From the highland savannas of the Cameroon and clearings in the Cameroon forest eastward to the southern Bahr-el-Ghazal, clearings in the northern Ituri forest, and the Bahr-el-Jebel. Also the vicinity of Lake Albert, the upper Semliki Valley, and possibly in lowlands south to the northern end of Lake Tanganyika.

This form has sometimes been called *lafresnayi* and sometimes united with *lepidus*, but it seems to me separable from both. From *lafresnayi* of Upper Guinea it differs in being more distinctly striped below, and not quite so clearly green on the back. From *lepidus* it may be distinguished by its slightly lighter coloration and shorter wings. Five specimens of *camerunensis* from the type locality have wings 78–83. In seventeen skins from the Uelle district and Mahagi Port this measurement is 78–84. There is never more than a faint suggestion of dark barring on the back.

A male in the Congo Museum from Zambo in the Semliki Valley with wing 80 mm. seems to represent *camerunensis* rather than *lepidus*. It appears likely that the lowland birds from near Lake Edward differ from those of the forested mountains. I have even seen one male from Usumbura with unbarred green back and wing only 83 mm.

D. f. camerunensis one of the commonest woodpeckers in the Upper Uelle, where it is a savanna bird, feeding about the smaller trees. It penetrates to the clearings in the forest about Medje, but we never observed it near the Ituri or Aruwimi Rivers. I noticed it in lowland savannas near Lake Edward, but did not collect specimens. This is not an ant-eater. In one stomach I found whitish larvæ of other insects.

I suspect it is a dry-season breeder in the Uelle, for adult birds taken in March, May, June, and October all had quiescent reproductive organs.

***Dendropicos fuscescens lepidus* (Cabanis and Heine)**

Ipctonus lepidus CABANIS AND HEINE, 1863, 'Mus. Hein.', IV, pt. 2, p. 118 (type locality: Abyssinia).—*Dendropicus lafresnayi* O.-GRANT, 1908, Ibis, p. 309 (Kwidjwi I.); 1910, Tr. Z. S. Lond., XIX, p. 413 (in part. Mubuku Valley, 5000–6000 ft.).—*Dendropicos lafresnayeii* REICHENOW, 1911, 'Wiss. Ergeb. D. Z.-Afr. Exp.', III, p. 283 (in part. W. side of Ruwenzori, 1800 m.; Kwidjwi I.; L. Kivu; Rutshuru Plain; N. W. of L. Tanganyika, 1900 m.). SASSI, 1912, Ann. Naturh.

Hofmus. Wien. XXVI, p. 390 (in part. Baraka; Kisenyi; Kisenyi-Rutshuru; E. of Rutshuru Plain, 1600 m.).—*Dendropicos lafresnayi lepidus* C. GRANT, 1915, Ibis, p. 462 ("eastern Belgian Congo"). BANNERMAN, 1922, Rev. Z. A., X, p. 97. GYLDENSTOLPE, 1924, K. Svenska Vet. Akad. Handl., (3) I, No. 3, p. 233 (Kibati; Burunga; Mt. Karisimbi, 3700 m.; Mt. Mikeno, 3400-3700 m.). W. L. SCLATER, 1924, 'Syst. Av. Æth.,' pt. 1, p. 298 (Ruwenzori). SCHOUTEDEN, 1932, Rev. Z. A., XXII, p. 123 (Lulenga; Burunga; Ngoma; Nya-Muzinga; ? Usumbura); 1933, idem, XXII, p. 377.

DISTRIBUTION.—Western and southwestern Abyssinia to Uganda, Kenya Colony east of the Rift Valley, the country near Ruwenzori, Kivu Volcanoes, and highlands near Baraka on Lake Tanganyika.

This subspecies seems to be a trifle larger than *camerunensis*, a little more broadly striped on the chest, and more strongly washed with yellow on the underparts. Dark barring on the back is all but suppressed. Birds from Abyssinia and Uganda are said to have wings 80-87 mm., and this measurement is 82-87 for a series of twenty from the highlands of the eastern Congo, from Ruwenzori through the Kivu to the mountains northwest of Lake Tanganyika. A series of seven from Mt. Elgon agrees in color and size with those from the Kivu district.

This small woodpecker is found in the clearings of the lower mountain forest of Ruwenzori, up to 7000 feet. A young male, just out of the nest, was taken at Kalongi at the beginning of December. It must have been hatched during the period of heavy rains. About the Kivu Volcanoes it lives not only below the forest belt, near 6000 feet, but also in the *Hagenia* woods at 11,000 feet, together with *Mesopicos g. ruwenzori*. This is a striking example of the way in which the nature of the vegetation affects the altitudinal distribution of birds. The heath zone of Ruwenzori offers little or no food for a woodpecker, whereas the *Hagenias* of the volcanoes supply it in abundance. So this bird ascends at least 3500 feet higher there than on Ruwenzori, and lives amid cold and fog.

***Dendropicos pœcilolaemus* Reichenow**

Dendropicus pœcilolaemus REICHENOW, 1893, O. Mb., p. 30 (type locality: Songa, W. of L. Albert). O.-GRANT, 1910, Tr. Z. S. Lond., XIX, p. 413 (Mubuku Valley, 5000 ft.). BANNERMAN AND BATES, 1924, Ibis, p. 223 (E. Congo "forests"; Ubangi R. between Kemmo and Kwango; Guruba R.; Kibali R.; Uelle R.).—*Dendropicos pœcilolaemus* REICHENOW, 1902, 'Vög. Afr.,' II, p. 196 (Songa); 1911, 'Wiss. Ergeb. D. Z.-Afr. Exp.,' III, p. 283. SASSI, 1912, Ann. Naturh. Hofmus. Wien, XXVI, p. 391 (Irumu). SCHOUTEDEN, 1914, Rev. Z. A., III, p. 264 (Kilo); 1936, Ann. Mus. Congo, Zool., I, f. 2, p. 101 (Poko; Faradje; Mahagi Port). C. GRANT, 1915, Ibis, p. 464. LÖNNBERG, 1917, Arkiv f. Zool., X, No. 24, p. 19 (Rut-

shuru). SCLATER AND M.-PRAED, 1919, *Ibis*, p. 630 (Meridi). CHAPIN, 1921, *Auk*, p. 544 (Aba). GYLDENSTOLPE, 1924, *K. Svenska Vet. Akad. Handl.*, (3) I, No. 3, p. 234. W. L. SCLATER, 1924, 'Syst. Av. Æth.', pt. 1, p. 299.

SPECIMENS.—Pawa, ♀, July 6. Dungu, ♀ im., June 24. Faradje, ♂, Nov. 9; ♂ juv., Sept. 29. Aba, ♂, July 14; ♀, July 20; ♀ im., July 20. Garamba, ♂, June 20; ♀ im., June 29.

ADULTS.—Iris dark red, bill bluish gray with dusky culmen and tip, feet greenish.

DISTRIBUTION.—Northern Cameroon, Bahr-el-Ghazal and Uelle districts to Uganda and Ruwenzori, east to the Nandi country in Kenya Colony, and south on the eastern Congo border to Rutshuru. While shunning the heavy forests, it approaches their northern border as close as Poko and Pawa. One example was taken by Dybowski on the upper Kemo River in 1892. About the base of Ruwenzori it is found only below 5000 feet, climbing on *Erythrina*s or other small trees, even in the elephant-grass zone, but never entering the mountain forest.

In the savannas of the Upper Uelle this is a rather common woodpecker, often going in small parties—probably a pair of adults with their full-grown young. Their voice is frequently heard, sounding like a dry "chě-chě-chě-chě-chě—," and this note may be given also by rather young individuals.

The breeding season in the Uelle is believed to extend from May to August, for young recently fledged were taken in June and September, and a breeding female in July.

Our three young females all have some red on the posterior portion of the crown, but the red patch is not so extensive as in the young male, and does not include the nape in either sex at that age.

Like other members of the genus, *D. pæcilolæmus* feeds on insect larvæ, worm-like "grubs" which we found in two stomachs, or caterpillars, of which four were found in another case. One of the birds had also swallowed some adult insects of small size.

***Dendropicos gabonensis* (Verreaux)**

Dendrobates gabonensis J. AND E. VERREAUX, 1851, *Rev. Mag. Zool.*, Paris, p. 513 (type locality: Gaboon).—*Dendropicus lacuum* REICHENOW, 1893, *O. Mb.*, p. 178 (type locality: Karevia, between lakes Albert and Edward).—*Dendropicos gabonensis* REICHENOW, 1902, 'Vög. Afr.', II, p. 200; 1911, 'Wiss. Ergeb. D. Z.-Afr. Exp.', III, p. 283 (N. W. of Beni). SASSI, 1912, *Ann. Naturh. Hofmus. Wien*, XXVI, p. 391 (Beni; Beni-Mawambi; Mawambi; Ukaika). SCHOUTEDEN, 1914, *Rev. Z. A.*, III, p. 264 (Kilo); 1918, *idem*, V, p. 244 (Zambo); 1923, *idem*, XI, p. 330 (Kabambaie; Makumbi; Basongo; Luebo); 1924, *idem*, XII, p. 416 (Eala; Bikoro); 1925, *idem*, XIII, p. 12 (Kunungu); 1926, *idem*, XIII, p. 195 (Makaia

Ntete; Temvo; Kai Bumba). GYLDENSTOLPE, 1924, K. Svenska Vet. Akad. Handl., (3) I, No. 3, p. 234 (Beni). W. L. SCLATER, 1924, 'Syst. Av. Æth.,' pt. 1, p. 299 (Uelle distr.). BANNERMAN, 1933, 'Birds Trop. W. Afr.,' III, p. 445.—*Dendropicus gabonensis* SALVADORI, 1909, Ann. Mus. Civ. Stor. Nat. Genova, (3) IV, p. 321 (Buta-Dungu).

SPECIMEN.—Medje, ♂, Jan. 26.

ADULT MALE.—Iris reddish brown, bill blackish with base of mandible blue-gray, feet brownish green.

DISTRIBUTION.—From the coast of Cameroon and Gaboon and the Mayombe forest eastward to the southern Uelle and the Semliki Valley, southward also to the vicinity of Luebo in the Kasai district. It is limited rather closely to the lowland forest area, and has not yet been taken in the gallery forests of the Uelle.

The Congo Museum has a male from Buta, and eighteen other Congo specimens from localities listed above. Yet I have met with it only three times. Besides the example from Medje I have taken others near the Biangoro River at the western foot of Ruwenzori and at Ganda Sundi in the Mayombe.

My experience agrees with that of Bates,¹ who found it frequenting second growth and never virgin forest. The softer wood of most of the trees in former clearings is probably better suited to its needs, for it feeds on wood-boring insect larvæ, not on ants.

Yungipicus obsoletus obsoletus (Wagler)

Picus obsoletus WAGLER, 1829, Ibis, p. 510 (type locality: Senegambia).—*Dendropicus obsoletus* HARGITT, 1883, Ibis, p. 431 (Langomeri).—*Iyngipicus obsoletus* HARGITT, 1890, 'Cat. Birds Brit. Mus.,' XVIII, p. 336.—*Jungipicus obsoletus nigricans* NEUMANN, 1904, J. f. O., pp. 402, 403 (in part. Langomeri).—*Dendropicus obsoletus nigricans* REICHENOW, 1905, 'Vög. Afr.,' III, p. 825.—*Yungipicus obsoletus ingens* C. GRANT, 1915, Ibis, p. 466 (Uelle R.).—*Yungipicus obsoletus obsoletus* SCLATER AND M.-PRAED, 1919, Ibis, p. 631 (Yei). W. L. SCLATER, 1924, 'Syst. Av. Æth.,' pt. 1, p. 300. SCHOUTEDEN, 1936, Ann. Mus. Congo, Zool., I, f. 2, p. 101 (Mauda; Dramba; Niarembe; Mahagi Port).—*Dendropicus obsoletus obsoletus* BATES, 1930, 'Handbook Birds W. Afr.,' p. 290. BANNERMAN, 1933, 'Birds Trop. W. Afr.,' III, p. 448, Fig. 136.

SPECIMENS.—Nzoro, 2 ♀, Apr. 17, Aug. 10. Faradje, 3 ♂, Feb. 5, Oct. 5, Nov. 15; 3 ♀, Apr. 27, Oct. 14, Nov. 26. Garamba, ♀, June 12.

ADULTS.—Iris dark red, bill dusky with gray base, feet dusky greenish.

DISTRIBUTION OF THE SPECIES.—From Senegal across the Sudan to the Red Sea, southern Abyssinia, Kenya Colony, and the Mbulu district of Tanganyika Territory. *Y. o. obsoletus* ranges from Senegal and

¹ 1911, Ibis, p. 21.

Portuguese Guinea through the interior of the Gold Coast Colony, Northern Nigeria, Darfur, the Uelle district of the Belgian Congo, the White Nile, and Masindi in Uganda. Wing-length 76–86 mm. Reichenow's *camerunensis*, described from the Uam district of French Equatorial Africa, and renamed *batesi* by Sclater, may not be separable.¹

Yungipicus o. heuglini Neumann,² restricted to the Red Sea Province of the Sudan and Eritrea, differs by its smaller white spots on wing-coverts and remiges; its wings are said to measure 85–89 mm. *Y. o. nigricans* Neumann³ of southern Abyssinia, is darker gray-brown above, grayer and more streaked below, and with smaller white markings on remiges, none on wing-coverts; wing-length 82–86 mm. *Y. o. ingens* Hartert⁴ of Eastern Africa from Kitui and Nairobi to Mt. Elgon and Turkana, is variable in color but often very dark, with long wings, 84–92 mm. *Y. o. crateri* Sclater and Moreau⁵ of the Ngorongoro Crater in northern Tanganyika Territory is like *ingens*, but still darker.

This small gray woodpecker is fairly common in the northern half of the Uelle district, and apparently also at Mahagi Port. It is usually seen climbing silently about small dead trees in the savannas, especially on native farms, and reminds one of a tiny *Dryobates*.

Our dissections indicated breeding in the dry season, for the only bird with any enlargement of the gonads was taken in February, and a young bird was collected in April. Nesting was observed by J. D. Clarke in the Ilorin Province of Nigeria in February and March. A hole was excavated in the end of a dead branch about ten feet from the ground, and two glossy white eggs were laid. The young were fed on butterflies and other relatively large insects.

In two stomachs examined I noted small white "grubs," a small white caterpillar, and remains of hard insects.

***Polipicus elliotii* Cassin**

Polipicus elliotii CASSIN, 1863, Proc. Acad. Nat. Sci. Phila., p. 197 (type locality: Muni R., Gaboon).—*Mesopicus ellioti* O.-GRANT, 1910, Tr. Z. S. Lond., XIX, p. 412 (Mpanga forest near Fort Portal). BANNERMAN, 1920, Rev. Z. A., VII p. 292 (Poko; Landana). BERLIOZ, 1936, Bull. Mus. Paris, (2) VIII, p. 328 (Mbwhahi).—*Mesopicos ellioti* SASSI, 1912, Ann. Naturh. Hofmus. Wien, XXVI, p. 392 (Moera; Beni; Beni-Mawambi; Mawambi; Ukaika; Mawambi-Irumu). VAN SOMEREN, 1922, Nov. Zool., XXIX, p. 66 (Ituri; L. Kivu). SCHOUTEDEN, 1923, Rev. Z. A., XI, p. 330 (Luebo).—*Mesopicus elliotii* GYLDENSTOLPE, 1924, K. Svenska Vet. Akad.

¹ See Bannerman and Bates, 1924, Ibis, pp. 224, 531; Grote, 1925, J. f. O., p. 79; Bates, 1930 Handbook Birds W. Afr., p. 290.

² 1904, J. f. O., p. 402 (Ghati Sati, Mareb R.).

³ 1904, J. f. O., p. 402 (Uma R., S. Abyssinia).

⁴ 1900, Nov. Zool., VII, p. 33 (Nairobi).

⁵ 1935, B. B. O. C., LVI, p. 15 (Ngorongoro Crater).

Handl., (3) I, No. 3, p. 235.—*Mesopicos elliotii* W. L. SCLATER, 1924, 'Syst. Av. Æth.,' pt. 1, p. 303. BANNERMAN, 1933, 'Birds Trop. W. Afr.,' III, p. 459, Fig. 141.

SPECIMENS.—Panga, on Aruwimi R., ♂, Sept. 17. Avakubi, ♂, Feb. 28; ♀, May 22. Medje, ♂ im., Jan. 18.

ADULT MALE.—Iris dark crimson; maxilla blackish with light gray tip, mandible light blue-gray; feet dull green.

ADULT FEMALE.—Iris rather light reddish brown; otherwise like male.

DISTRIBUTION.—Cameroon to Gaboon and northern Angola, east through the Congo to the Bomokandi River, the base of Ruwenzori, and eastern Uganda. On the south it reaches Luluabourg in the Kasai district, for Father Callewaert sent us one male of unusually dark coloration. Dr. Schouteden's specimen from Luebo also seems darker than birds from the northeastern Congo forest. The specimen reported from Mbwahi by Berlioz was received with a shipment of birds from that highland locality near Lake Kivu. But it bore no original label, and its origin is not absolutely certain. This male example is brighter green than any in the Congo Museum, and rather broadly streaked below. It would be very surprising to find this woodpecker in a mountain forest.

For a Dryobatine woodpecker the present species has an unusually short, rounded wing, with large outermost primary. The genus *Polipicus* Cassin deserves recognition for two species, *elliotii* and *johnstoni*.

Elliot's woodpecker I found only in the area of heavy forest, sometimes in tall trees overlooking old second-growth, sometimes accompanying mixed flocks of insectivorous birds that went hunting through the lower forest growth. On one occasion *Campethera caroli* and *Campethera nivosa* were included in the same party. *Polipicus* is however no ant-eater, but hews beetle-larvæ from the wood, several of them being found in each of the three stomachs we opened. One bird had also eaten some fully developed insects.

One of the males collected was drumming on a tree (September 17), repeating at intervals, like *Mesopicos xantholophus*, but not very loudly. The species also gives an excited, reiterated vocal note, resembling slightly that of *Mesopicos goertæ*.

Our four specimens were all non-breeding. Between Mawambi and Irumu, however, Grauer secured two young in juvenal plumage in November and February, which I examined in the Vienna Museum. Both were labeled as males, and have the color-pattern much as in the adult male, but the plumage softer, underparts much grayer, and markings generally not so clean-cut. The red of the hind-crown is less bril-

liant, because the black bases of the feathers show through. It is curious then to note that in our immature male the nape is largely black, as in the female, with red nuchal feathers of the adult plumage coming in at both sides, as though it had previously been without any red on the head.

KEY TO THE CONGO SPECIES OF *MESOPICOS*

- 1.—Rump red; underparts gray or gray-and-olive, without lighter spotting. 2.
 Rump not red, though feathers may be tipped with yellow; breast olive-brown, with conspicuous light spots of whitish or pale yellowish. *M. xantholophus*.
- 2.—Throat gray, chest with a strong olive wash, a deep red patch on middle of abdomen. *M. griseocephalus*.
 Underparts generally lighter than in preceding, chest like throat, and lacking any strong greenish wash; middle of abdomen with an orange patch, or often only a yellow wash; flanks often faintly barred with dusky. *M. goertæ*.

Mesopicos goertæ agmen Bates

Mesopicos goertæ agmen BATES, 1932, B. B. O. C., LIII, p. 74 (type locality 40 miles E. of Wagadugu, Upper Volta).—*Dendropicus immaculatus* SHARPE, 1873, P. Z. S. Lond., p. 717 (Congo R.).—*Dendrobates immaculatus* SHARPE AND BOUVIER, 1878, Bull. Soc. Zool. France, III, p. 73 (Shiloango R.).—*Mesopicos goertan* HARGITT, 1890, 'Cat. Birds Brit. Mus.,' XVIII, p. 368 (in part. Lower Congo). OUSTALET, 1893, Naturaliste, (2) VII, p. 60 ("Congo").—*Mesopicos goertæ poicephalus* REICHENOW, 1902, 'Vög. Afr.,' II, p. 186 ("Ubangi R."; Congo). SCLATER AND M.-PRAED, 1919, Ibis, p. 632 (Congo R. mouth). W. L. SCLATER, 1924, 'Syst. Av. Æth.,' pt. 1, p. 302.—*Mesopicus goertæ goertæ* C. GRANT, 1915, Ibis, p. 468 (in part. Congo mouth).—*Mesopicus goertæ* DE RIEMAECKER, 1927, Rev. Z. A., XIV, p. 274 (Kongolo).—*Mesopicos goertæ centralis* BANNERMAN, 1933, 'Birds Trop. W. Afr.,' III, p. 453 (in part. Portuguese Congo).

DISTRIBUTION OF THE SPECIES.—Senegal and Gambia east to the Nile below Khartoum, northern Abyssinia, Kavirondo district, and Ruanda. Not in the equatorial forests, but on the south from the Gaboon coast and northern Angola to the Lualaba River.¹

Mesopicos g. goertæ (Müller), from Senegal to Mopti on the upper Niger, is a light-colored race with a diffuse wash of yellowish on underparts. *M. g. koenigi* Neumann is another pale race, more distinctly barred, ranging from Timbuktu along the edge of the desert to the Nile Valley below Khartoum. *M. g. agmen* is grayer beneath than *goertæ*, with a restricted yellow abdominal patch. It extends from the Gambia eastward to Darfur and the White Nile, and apparently also south of the equatorial forest from the Gaboon to the Lualaba. *M. g. centralis* is a little darker than *agmen*, with the abdominal patch more

¹ *M. spodocephalus* (Bonaparte), with two races in southern Abyssinia and East Africa, is often regarded as conspecific, though much more richly colored.

orange, sometimes a little orange-red. It is found from the highland savannas of the Cameroon eastward to the Uelle district and Kavi-rondo, and south to Ruanda. *M. g. abessinicus* Reichenow of northern Abyssinia and Sennar has still more red on abdomen, so that it is often said to form the link with the *spodocephalus* group.

Woodpeckers of this species from the southern savannas are certainly paler in color than *M. g. centralis*, and I shall call them *agmen* provisionally. From the savannas of Middle Cameroon Grote¹ described a race, *oreites*, which was supposedly lighter yellowish gray beneath than *centralis*, with slightly shorter wings, 103–109 mm. I have seen specimens from the region of Djang in Cameroon which I took to be *agmen*, but should *oreites* prove valid it may also be the race of the southern Congo.

There are specimens in the Congo Museum from Boma, Luluabourg, and Kabalo. I find the wings of seven examples from this southern region to measure 104–112 mm. The wing-length of *centralis* in Congo territory is usually 108–116 mm. The bird of this species listed by Oustalet (1893) is a male from the upper Kemo River, and is colored much like the birds of the southern Congo. Its wing measures 111 mm., while those of five skins of *agmen* from Futa Jalon and Dahomey vary from 112 to 117 mm.

This gray-breasted woodpecker must be rather scarce in the Lower Congo and Kasai, in view of the paucity of records. Father Cal-lewaert sent us only two from Luluabourg. It would seem that the species has extended its range to the south either by way of clearings along the coast or across the narrowest part of the Cameroon forest.

Mesopicos goertæ centralis Reichenow

Mesopicos goertæ centralis REICHENOW, 1900, O. Mb., p. 59 (type locality: Ndussuma, W. of L. Albert); 1902, 'Vög. Afr.', II, p. 187 (Nyangabo); 1911, 'Wiss. Ergeb. D. Z.-Afr. Exp.', III, p. 282. SCLATER AND M.-PRAED, 1919, Ibis, p. 633. CHAPIN, 1921, Auk, p. 544 (Faradje). HARTERT, 1921, Nov. Zool., XXVIII, p. 103. GROTE, 1923, O. Mb., p. 79. W. L. SCLATER, 1924, 'Syst. Av. Æth.', pt. 1, p. 302. BANNERMAN, 1933, 'Birds Trop. W. Afr.', III, p. 453 (in part. Niam-Niam). SCHOUTEDEN, 1936, Ann. Mus. Congo, Zool., I. f. 2, p. 101 (Faradje; Niarembe; Mahagi Port).—*Mesopicos goertæ* SHARPE, 1884, Journ. Linn. Soc. Lond., Zool., XVII, p. 431 (Semio). HARGITT, 1890, 'Cat. Birds Brit. Mus.', XVIII, p. 368 (in part. Semio). HARTERT, 1899, in Anson, 'Under African Sun,' App., p. 335 (Fajao in Unyoro). SALVADORI, 1911, Ann. Mus. Stor. Nat. Genova, (3) V, p. 445 (Uelle).—*Mesopicos goertæ poliocephalus* NEUMANN, 1904, J. f. O., p. 396 (Congo to L. Victoria and upper White Nile).—*Mesopicos pæocephalus* O.-GRANT,

¹ 1923, O. Mb., p. 78 (Bafia distr.).

1910, Tr. Z. S. Lond., XIX, p. 412 (Mubuku Valley, 5000 ft.; Mokia).—*Mesopicus goertae poicephalus* SASSI, 1912, Ann. Naturh. Hofmus. Wien, XXVI, p. 391 (Kasindi-Beni). SCHOUTEDEN, 1918, Rev. Z. A., V, p. 243 (old Mission St. Gustave). SCLATER AND M.-PRAED, 1919, Ibis, p. 631 (Yambio; Yei).—*Mesopicus goertae centralis* C. GRANT, 1915, Ibis, pp. 467, 468.—*Mesopicus goertae goertae* C. GRANT, 1915, Ibis, p. 468 (in part. Ubangi and Uelle rivers).—*Mesopicus goertae poicephalus* BANNERMAN, 1922, Rev. Z. A., X, p. 93 (N. Belgian Congo).

SPECIMENS.—Faradje, 2 ♂, Feb. 14, Nov. 5; 5 ♀, Feb. 20, Mar. 15, Nov. 5, Dec. 2, 3; ♂, juv., Feb. 20; ♀ juv., Feb. 20. Aba, ♂, July 19.

ADULTS.—Iris dark brown; maxilla blackish, mandible blue-gray with dusky tip; feet dark gray.

NESTLINGS.—Iris dark grayish brown; maxilla blackish, mandible grayish white save for blackish tip, swellings at corners of mouth yellowish white; feet light bluish gray.

DISTRIBUTION.—Cameroon to the Ubangi and Uelle districts, southern Bahr-el-Ghazal, Lado, Uganda, and north Kavirondo. Also the savannas east of the Ituri forest, from Lake Albert to the Ruindi Plain, south of Lake Edward, and Gabiro in Ruanda. There seems to be no intergradation between *M. g. centralis* and *M. spodocephalus rhodeogaster* in the Kavirondo country, the former occurring at Kakamega, the latter at Kisumu. They are even said to occur side by side from Mt. Elgon to Baringo.¹

Two examples in the Congo Museum from Mahagi Port are a trifle lighter on the underparts and more extensively washed with yellow on abdomen than the majority from the Uelle, Semliki Valley, Ruindi Plain, and Gabiro. I saw this woodpecker occasionally at Kasenyi and in the upper Semliki Valley, but it usually does not ascend beyond 5000 feet.

About Faradje in the Upper Uelle, it is a common bird, keeping always out in the dry scrubby savannas, and often attracting attention by its protracted chattering note. I never saw it go to the ground, and believe it to live mainly on wood-boring insect larvæ. These were found in the three stomachs I examined specially, but there were also remains of adult beetles in two cases. On one occasion I saw this woodpecker catching winged termites in midair.

The nest is excavated in a tree trunk, and the young are reared in the Uelle during the dry season, in January and February. Adults taken in February showed enlargement of the sexual glands, which was lacking at all other seasons, even in two December birds. At Lado

¹ van Someren, 1932, Nov. Zool., XXXVII, p. 283.

Emin¹ found a nest on December 27 with two white eggs. In Uganda, on the other hand, Dr. van Someren reported May, June, and July as the breeding season. There July is a rather dry month.

Both of our young birds have conspicuous patches of lustrous red on the crown, but that of the female is more restricted in size, scarcely reaching the nape. This coloration is lost, of course, in the adult female.

Mesopicos griseocephalus ruwenzori Sharpe

Mesopicos ruwenzori SHARPE, 1902, B. B. O. C., XIII, p. 8 (type locality: Ruwenzori). O.-GRANT, 1910, Tr. Z. S. Lond., XIX, p. 411 (Mubuku Valley, 8000 ft.).—*Mesopicos ruwenzori* REICHENOW, 1903, 'Vög. Afr.', II, p. 718.—*Mesopicos griseocephalus kiwuensis* REICHENOW, 1905, 'Vög. Afr.', III, p. 824 (type locality: L. Kivu).—*Mesopicos griseocephalus ruwenzori* REICHENOW, 1911, 'Wiss. Ergeb. D. Z.-Afr. Exp.', III, p. 282 (Rugege forest; base of Mt. Karisimbi). SASSI, 1912, Ann. Naturh. Hofmus. Wien, XXVI, p. 392 (N. W. of L. Tanganyika; Kwidjwi I.). W. L. SCLATER, 1924, 'Syst. Av. Æth.', pt. 1, p. 303 (in part. Mts. round L. Kivu; Ruwenzori). NEUMANN, 1926, O. Mb., p. 80. LYNES, 1934, J. f. O., Sonderheft, p. 136. MOREAU, 1936, B. B. O. C., LVII, p. 13 (in part).—*Mesopicos griseocephalus ruwenzori* GLYDENSTOLPE, 1924, K. Svenska Vet. Akad. Handl., (3) I, No. 3, p. 235 (Kibati; Mt. Karisimbi, 3700 m.; Mt. Mikeno, 3600 m.).—*Mesopicos griseocephalus ruwenzorii* SCHOUTEDEN, 1929, Bull. C. Z. C., V, p. 76 (Albert Nat. Park).—*Mesopicos griseocephalus ruwenzorii* SCHOUTEDEN, 1932, Rev. Z. A., XXII, p. 123 (Lulenga; Burunga; Nya-Muzinga); 1933, idem, XXII, p. 377 (Ruhengere; Bigogo).—*Mesopicos ruwenzorii* SCHOUTEDEN, Bull. Séances Inst. Roy. Col. Belge, IV, p. 154 (in part. Ruwenzori; Kivu).

DISTRIBUTION OF THE SPECIES.—In heavily wooded areas from Cape Province to northern Transvaal, also in the highlands of Nyasaland, Uluguru, Usambara, Kilimanjaro, Angola, Katanga, Marungu, Kivu district, and Ruwenzori.

M. g. griseocephalus (Boddaert) inhabits Cape Province, Natal, and Transvaal. Its back is rather dull green, red abdominal patch small or wanting, wings 102–112 mm., and culmen (to base) 24–30 mm. *M. g. kilimensis* Neumann, from Kilimanjaro and Mt. Meru to Usambara and Uluguru, is still duller in color, without red on abdomen, wings 102–107 mm., culmen 18–24 mm. *M. g. ruwenzori* occupies the highlands from Ruwenzori to the southern Kivu district, and is more yellowish green than *griseocephalus* on back and chest, with large red abdominal patch, wings 108–115 mm., culmen (to base) 22–29 mm. *M. g. persimilis* of Angola, the southeastern Congo, and northern Nyasaland is like *ruwenzori* but has shorter wings, 103–110 mm., and apparently a little more whitish barring on the flanks.

¹ Schubotz, 1921, 'Tageb. Emin Pascha,' VI, pt. 2, p. 102.

This is an excellent example of a bird ranging from South Africa up into the highlands of eastern Africa near the equator, and restricted there to rather high levels. On eastern Ruwenzori Woosnam found *M. g. ruwenzori* at altitudes from 6000–10,000 feet, but mostly in the forest zone below 8000 feet. For some unknown reason I failed to collect a single specimen on West Ruwenzori, but in the Kivu district it is widely distributed. At Kabara, 11,000 feet, between Mts. Mikenno and Kari-simbi, it is rather common in the *Hagenia* woods. Dr. Schouteden collected a small series near Lulenga and Burunga, at about 6400 feet; and in addition to the localities cited above the Congo Museum now has specimens from Mt. Sabinyo, 9800 feet, the pass between Sabinyo and Gahinga, 8500 feet, Nyabitsindi between Visoke and Musule, 7870 feet, and Bitashimwa north of Lulenga, at 6400 feet. G. F. de Witte obtained two specimens near Nzulu on the north shore of Lake Kivu, and Dr. J. C. Phillips shot one at the post of Kisenyi. G. Babault showed me an example from the vicinity of the Mokoto Lakes, at 5900 feet.

Keeping very much to the forest, this woodpecker is usually found singly or in pairs, climbing on the larger trees. Once I heard one drum, but did not notice any vocal call. A female obtained at the northwest base of Mt. Mikenno on June 27 was ready to breed. Of four stomachs examined by me, three contained insect larvæ, while two held remains of hard-shelled insects.

***Mesopicos griseocephalus persimilis* Neumann**

Mesopicos griseocephalus persimilis NEUMANN, 1933, Verh. Orn. Ges. Bayern, XX, p. 227 (type locality: Chipepe, Bailundu, Angola).—*Mesopicos ruwenzori* NEAVE, 1910, Ibis, p. 122 (Kambove; Bunkeya R.).—*Mesopicos griseocephalus ruwenzori* W. L. SCLATER, 1924, 'Syst. Av. Æth.', pt. 1, p. 303 (in part. Katanga). MOREAU, 1936, B. B. O. C., LVII, p. 13 (in part).—*Mesopicos ruwenzorii* SCHOUTEDEN, 1933, Bull Séances Inst. Roy. Col. Belge, IV, p. 154 (in part. Marungu; Katanga).

DISTRIBUTION.—Highlands of Angola east to the Katanga, Marungu, and northern Nyasaland. Not very common in the Katanga, where according to Neave it shows a marked preference for patches of dense forest. It is found sometimes at relatively low levels, for de Witte collected one example at Kilwa on Lake Moero, only a little over 3000 feet above sea-level; and De Riemaecker has another from Futwe, near the confluence of the Luombwa with the Luapula River. In Marungu, on the other hand, Rockefeller and Murphy obtained a pair at Sambwe, 6100 feet.

Mesopicos xantholophus (Hargitt)

Dendropicos xantholophus HARGITT, 1883, Ibis, p. 173 (type locality: Gaboon).—*Dendropicos africanus* SHARPE AND BOUVIER, 1876, Bull. Soc. Zool. France, I, p. 312 (Nemlao).—*Mesopicos xantholophus* SHARPE, 1884, Journ. Linn. Soc. Lond., Zool., XVII, p. 430 (Semio; Congo R.); 1890, in Jameson, 'Story of Rear Column,' pp. 400, 406 (Stanley Pool-Aruwimi R.; Aruwimi R.). REICHENOW, 1887, J. f. O., p. 302 (Leopoldville). SHELLEY, 1890, Ibis, p. 168 (Lower Congo; Niam-Niam). HARGITT, 1890, 'Cat. Birds Brit. Mus.,' XVIII, p. 375 (Ndoruma). OUSTALET, 1893, Naturaliste, (2) VII, p. 60 ("Congo"). EMIN, 1894, J. f. O., p. 167 (old Irumu). DUBOIS, 1905, Ann. Mus. Congo, Zool., I, f. 1, p. 35 (Banalia; L. Leopold II; Mayombe). O.-GRANT, 1908, Ibis, p. 309 (Ponthierville). SALVADORI, 1911, Ann. Mus. Civ. Stor. Nat. Genova, (3) V, p. 446 (Zone of Gurba-Dungu). LÖNNBERG, 1917, Arkiv f. Zool., X, No. 24, p. 18.—*Dendropicus pecilei* OUSTALET, 1886, Naturaliste, III, p. 299 (type locality: Diele, Fr. Congo).—*Mesopicos xantholophus* REICHENOW, 1902, 'Vög. Afr.,' II, p. 188 (Kinyawanga; Manyanga; "Ubangi R."); 1911, 'Wiss. Ergeb. D. Z.-Afr. Exp.,' III, p. 282 (near Beni; Avakubi). LÖNNBERG, 1907, Arkiv f. Zool., III, No. 21, p. 8 (Kingoyi). SASSI, 1912, Ann. Naturh. Hofmus. Wien, XXVI, p. 393 (Beni; Moera; Beni-Mawambi; Mawambi; Ukaika; Mawambi-Irumu). SCHOUTEDEN, 1914, Rev. Z. A., III, p. 264 (Kilo); 1918, idem, V, p. 244 (Zambo; Kabambare; Lesse); 1923, idem, XI, p. 330 (Basongo; Luebo; Dumbi; Kabambaie; Ngombe in Kasai; Tshisika); 1924, idem, XII, p. 416 (Eala; Tondou); 1925, idem, XIII, p. 12 (Kunungu; Mongende); 1936, Ann. Mus. Congo, Zool., I, f. 2, p. 102 (Poko; Medje; Mauda). W. L. SCLATER, 1924, 'Syst. Av. Æth.,' pt. 1, p. 303. BANNERMAN, 1933, 'Birds Trop. W. Afr.,' III, p. 456, Fig. 139.—*Picus (Dendromus) xantholophus* OUSTALET, 1904, Bull. Mus. Paris, p. 433 (Fort de Possel).—*Mesopicos xantholophus xantholophus* GYLDENSTOLPE, 1924, K. Svenska Vet. Akad. Handl., (3) I, No. 3, p. 236 (Kartushi; Simbo).—*Mesopicos xantholophus chloroticus* HARTERT, 1925, Nov. Zool., XXXII, p. 146 (N. Tanganyika).

SPECIMENS.—Avakubi, ♂, Oct. 17. Penge, ♀, Apr. 18; im. (sex?), Apr. 26. Ngayu, ♂, Dec. 22. Bafwabaka, ♂ im., Jan. 3. Gamangui, ♀, Feb. 10. Medje, ♂, May 17. Between Faradje and Aba, ♂, ♀, Oct. 6.

ADULTS.—Iris reddish brown to dull dark red; maxilla dark gray, mandible light gray; feet greenish gray, claws more bluish.

DISTRIBUTION.—Forested Cameroon, south to the Lower Congo and forest patches of northern Angola, eastward across the whole Congo forest, and extending out in gallery forests and patches of lowland forest to the Upper Uelle, the base of Mt. Elgon, the Nandi district, Semliki Valley, Manyema district, and southern Kasai. Birds from Uganda are not separable, although they were given the name *chloroticus* by van Someren.¹

This is the largest woodpecker of the Congo forests. It is rather common there, and climbs far up in the tall trees, even about the borders of clearings. It hacks vigorously at wood, and occasionally is heard

¹ 1921, B. B. O. C., XLI, p. 105 (Lugalambo, Uganda).

drumming noisily, though hardly for more than one second at a time. Once I shot a female which had just been watched drumming, so the practice is not wholly restricted to males.

In the gallery forests of the Kasai the species is common, and there are two examples in the Congo Museum from Baaba in the Kwango district. In the Uelle it occurs sparingly in wooded places northward to Semio and eastward almost to Aba. Dybowski's specimens mentioned by Oustalet (1893) were collected in the Mayombe forest and at Bangui on the Ubangi River. I have taken one at Ganda Sundi in the Belgian Mayombe, and Dr. Schwetz obtained another at Tshela.

M. xantholophus shows considerable resemblance in the form of its beak and pattern of head and neck to the genus *Thripias*, and Bates¹ has proposed its removal to that genus. Adult males of *xantholophus* are distinguished from females by golden yellow streaks on the posterior half of the crown, the nape in both sexes being blackish. In the immature male the feathers of nearly the whole crown are more lightly tipped with yellow. The immature specimen without sex from Penge has yellow tips on the crown-feathers. I believe that it is probably a young female, because of the length of its beak, 26 mm., as compared with 28 mm. in the young male.

In spite of the slight change of season in its forested equatorial habitat, this woodpecker does not remain in breeding condition throughout the year, but seems to nest only in the driest portion of the year. From Avakubi northward this begins with December, a time when we found evidence of breeding; and we secured young birds in January and also in April, at the end of the dry period.

As befits a strong-billed woodpecker, *Mesopicus xantholophus* ignores ants, and preys on wood-boring beetle-larvæ. These we found in four of the five stomachs investigated. One bird had eaten only fully developed insects, probably beetles, and another had included them in its catch.

***Thripias namaquus namaquus* (Lichtenstein)**

Picus namaquus A. A. H. LICHTENSTEIN, 1793, 'Cat. Rer. Rar. Hamburg,' p. 17 (type locality: Interior of S. Africa).—*Dendropicus schoënsis* DUBOIS, 1886, Bull. Mus. Roy. Hist. Nat. Belg., IV, p. 147 (L. Tanganyika).—[*Picus*] *namaquus* SCHALOW, 1886, J. f. O., p. 418 (Lufuku R., Marungu).—*Mesopicus namaquus* DUBOIS, 1905, Ann. Mus. Congo, Zool., I, f. 1, p. 35 (Mpala; Katanga).—*Thripias namaquus* SALVADORI, 1907, Boll. Mus. Zool. Anat. Torino, XXII, No. 570, p. 2 (near Lukonzolwa). SCHOUTEDEN, 1930, Rev. Z. A., XVIII, p. 284 (Elisabethville).

¹ 1936, B. B. O. C., LVII, pp. 15-17.

DISTRIBUTION OF THE SPECIES.—Zululand, Transvaal, and Bechuanaland, north to northern Angola, the eastern Congo, Somaliland, Abyssinia, Darfur, and westward to Bozum in French Equatorial Africa. *T. n. namaquus* of southern Africa extends to northern Angola, the Katanga, Marungu, and Nyasaland. The black stripe behind the eye scarcely extends behind the ear-coverts, its chest is grayish and barred.

T. n. schoensis (Rüppell) of Somaliland, southern Abyssinia, northern Kenya Colony, and the Anglo-Egyptian Sudan has the ear-stripe heavier, and extending much farther back, while the chest is blackish with whitish spots. The upperparts are darker and less greenish. While this race inhabits the Bahr-el-Ghazal Province, it seems not to reach the northeastern Congo. In Kenya Colony it extends southward at least to Molo, where Captain Caldwell obtained a female.

Birds of intermediate coloration are widely distributed in eastern Africa, from Tanganyika Territory and Kenya Colony to Uganda and the district near Lake Edward. The chest is more spotted than barred, its ground-color not very dark; the ear-stripe continues a short distance beyond the ear-coverts. For such birds I shall use the name *T. n. decipiens*.¹ *T. n. saturatus* Berlioz² is supposedly a dark race from French Equatorial Africa.

The typical race of the bearded woodpecker is fairly common in the wooded savannas of the Upper Katanga, where I have seen it between Elisabethville and Kipushi. The Congo Museum has specimens from Kinda in the Lulua district, Kapiri, Elisabethville, Kasenga, and Tembwe on Lake Tanganyika. Rockefeller and Murphy obtained three specimens in the savanna woods of Marungu, at altitudes between 3850 and 5650 feet. They noted it as common there.

The long wings of this bird make it a powerful flier, and it has a large, efficient beak. It goes commonly in pairs, and its loud drumming seems to serve as a call-note, which is answered in the same way by the bird's mate. Each call consists of four regular taps. In addition it utters a loud nasal scream.

Breeding probably takes place in the dry season. The nest is chiseled out in a tree-trunk, and the eggs were said by Nehr Korn to measure 25×17.5 mm. Carlisle gave dimensions that are considerably larger, 30.4×18.2 mm.

¹ Moreau (1936, B. B. O. C., LVII, pp. 10, 11) regards *decipiens* as synonymous with *namaquus*.

² 1934, Bull. Mus. Hist. Nat. Paris, (2) VI, p. 230 (Bozum).

***Thripias namaquus decipiens* (Sharpe)**

Mesopicus decipiens SHARPE, 1884, Journ. Linn. Soc. Lond., Zool., XVII, p. 430 ("Zanzibar"; but type from Shimba Hills near Mombasa).—*Thripias namaquus* HARTERT, 1900, Nov. Zool., VII, p. 32 (Usongora).—*Mesopicos namaquus* SASSI, 1912, Ann. Naturh. Hofmus. Wien, XXVI, p. 391 (Kisaka).—*Mesopicos namaquus schoensis* SASSI, 1912, Ann. Naturh. Hofmus. Wien, XXVI, p. 391 (Kasindi-Beni).—*Mesopicus schoensis semischoensis* LÖNNBERG, 1917, Arkiv f. Zool., X, No. 24, p. 18 (type locality: Kasindi).—*Thripias namaquus semischoensis* W. L. SCLATER, 1924, 'Syst. Av. Æth.,' pt. 1, p. 301. GYLDENSTOLPE, 1926, Arkiv f. Zool., XIX A, No. 1, p. 76. FRIEDMANN, 1930, Bull. 153, U. S. Nat. Mus., p. 489. GRANVİK, 1934, Rev. Z. A. XXV, p. 55.

DISTRIBUTION.—Central Tanganyika Territory, Kenya Colony, north to the Tana River and Nairobi, southwestern Uganda, and the northern shore of Lake Edward.

In the vicinity of Lake Edward *Thripias n. decipiens* extends a little way into Congo territory, about Kasindi and the upper Semliki Valley. Possibly it will also be found in Urundi or Ruanda, for Grauer collected some race of the species in the Kisaka district. One might expect this woodpecker in the Rutshuru Plain, where there are acacia woods and areas of Euphorbia scrub similar to those near Kasindi; but records are wanting.

In East Africa *decipiens* is widely distributed, not only in the desert thorn-bush and savannas grown up with acacia trees, but also about the edges of the mountain-forest patches near Nairobi. In the Congo it is distinctly a lowland bird.

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