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and by a Committee composed of the best Ornithologists of the World

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P. WYTSMAN
Zoologist

BRUSSELS (Belgium)
108, Boulevard du Nord, 108

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by E. Hartert, of Zoological Museum, Tring.

With one coloured plate. Roy. 4°

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The work will be entirely published in English.

Bird

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PUBLISHED BY

P. WYTSMAN, ZOOLOGIST

SPECIMEN OF LETTERPRESS

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BRUSSELS (BELGIUM)

SPECIMEN PLATE POST FREE ON DEMAND

FAM. EURYLÆMIDÆ

BY ERNST HARTERT

WITH 1 COLOURED PLATE

N former times, when the ornithological system was chiefly founded on the external structure of the bill and feet, the *Eurylæmidæ* were mostly arranged among the « *Picariæ* » or « *Coraciiformes* », generally near *Coracias*, because the bill of the *Eurylæmidæ* has a great outward resemblance to that of a *Coracias*. As long ago as 1840, however, attention has been drawn to the fact that the pterylography was that of Passerine birds, Blanchard declared that the sternum was more Passerine, Garrod and Forbes have studied the palate, trachea and structure of the foot and pronounced their main features as Passerine, Kutter called attention to the nidology and oology, which are also Passerine. It is therefore now universally admitted that the *Eurylæmidæ* are Passerine birds, though abnormal and best placed at the top of that order, as a distinct group.

The sternum of the *Eurylæmidæ*, although the manubrium sterni is not forked, differs widely from that of *Coracias* and all its main features are truly Passerine; the palate is ægithognathous, the nasals holorhinal; the dorsal vertebræ are heterocoelous. The flexor longus hallucis leads to the hallux and sends down a tendon to the flexor perforans digitorum, which leads to the three front-digits. The hallux is thus incapable of independant action. The oil-gland is small and nude.

The bill is very wide, flat, but higher and distinctly ridged in the *Calyptomenina*, the nasals basal, round, open, either quite exposed or overgrown with bristly feathers, or lineiform. The metatarsus is sometimes covered in front with some large, very distinctly separated scutellæ while in other forms the scutellæ are mostly fused, thus forming a long lamina, divided only on the lower end, near the toes. The back of the metatarsus is somewhat rugose, covered with

more or less distinct scutellae. The third and fourth toes are united for nearly half their length, the toes have very strong claws. The body is thickly covered with soft feathers without aftershafts. The moderate wings have ten to eleven primaries, the tip is formed by the third and fourth, fourth, or fourth and fifth primaries, the second is sometimes a little, sometimes much shorter, the first always shorter than the following ones. The secondaries are nine or ten in number. The tail is of various shapes and consists of twelve rectrices. The sexes are alike in plumage or the females are (in *Calyptomena*) much duller than the males.

The *Eurylamidae* build large oval or roundish nests with an entrance-hole near the top, often overhung by a protecting roof and elongated into a sort of tail. The inner lining consists mostly of green leaves. They are suspended from branches on trees and bushes, those of some species usually overhanging the water. The eggs are three to five in number and they are milky-white or creamy-buff with dark brown or rufous spots and dots, sometimes also unspotted. The young generally much resemble the adults, but some are partially spotted with white.

These birds are not very active. I found them to feed on insects, but *Calyptomena* and others are said to eat soft berries and other fruits. Their notes are soft whistles (*Calyptomena*) or a peculiar whirring song (*Eurylaimus*, *Cymbirhynchus*), which has gained them the Malayan name rain-bird, as the Malays compare the sound with that produced by the rain falling on the leaves of the forest, and a soft whistling call-note.

The distribution of the *Eurylamidae* is not very wide. They are peculiar to the Oriental Region, being distributed from the Southern Himalayas to Siam and Cambodia, throughout the Malayan Peninsula to Sumatra, Borneo and Java, and reoccurring on the Philippine Islands.

Bibliography. Slater, The Ibis (1872), p. 177; id., Cat. Birds Brit. Mus. Vol. 14, p. 454-470 (1888). — Sharpe, Hand-list Birds, Vol. 3, p. 1-3 (1901). — Dubois, Syn. Avium, p. 204-206 (1900). — Cf. also : Nitzsch, Pterylographie, p. 109 (1840). — Blanchard, Ann. Sc. Nat. (4), Vol. 11, p. 92 (1859). — Garrod, Proc. Zool. Soc. Lond. (1877), p. 447. — Forbes, Proc. Zool. Soc. Lond. (1880), p. 382. — Hartert & Kutter, Journ. f. Orn. (1889), p. 391-400.

Two subfamilies can be distinguished :

LYPTOMENINÆ

Alminal ridge. Nostrils in a large hole near the base of the bill, half (or more) protected by a membrane, entirely hidden by the frontal feathers, which project forwards and reach to about the middle of the bill or more.

The *Calyptomeninae* consist of a single genus.

SUBFAM. B. EURYLÆMINÆ

Bill much flatter, not with a well-marked ridge, the frontal feathers normal, not covering part of the bill, nostrils near the base of the bill, in front of the frontal feathers, or lineiform, in a slit near the middle of the bill.

The *Eurylaminae* are conveniently divided into 6 genera.

1. GENUS CALYPTOMENA RAFFLES

Calyptomena Raffles, Trans. Linn. Soc. Lond. Vol. 13, p. 295 (1822) (type of the genus *C. viridis*); Sclater, Cat. Birds Brit. Mus. Vol. 14, p. 455 (1888).

Characters. This is a somewhat aberrant genus of the *Eurylæmidæ*. The high, ridged bill projects only half or less than that beyond the frontal feathers. The back of the metatarsus is soft in life, rough in the skin, with noticeable separate scutellæ near the base. The front is covered with five large scutes. The feathers cover about the basal third of the metatarsus, which is hardly as long as the middle toe. The wing is very broad, the secondaries being very long, the tip of the longest primaries not more than about 2 cm. longer than the secondaries. The third primary is longest, the fourth hardly shorter or fully as long, the second distinctly less, the first much shorter, sometimes not much longer than the secondaries. The tail is slightly rounded, nearly square, about two thirds of the length of the wing. Colouration green with black, one species (*C. hosei*) with the middle of the undersurface blue. Nest a rough mass of material, suspended from a branch, eggs cream-colour, unspotted.

Geographical Distribution of the Species. From Southern Tenasserim throughout the Malayan Peninsula to Sumatra and Borneo.

Only three species are known :

<i>Largest, without blue, but with a black patch on the foreneck</i>	<i>C. WHITEHEADI.</i>
<i>Medium, middle of underside blue</i>	<i>C. HOSEI.</i>
<i>Smallest, without blue and without black patch on foreneck</i>	<i>C. VIRIDIS.</i>

1. **Calyptomena viridis** Raffles.

Calyptomena viridis Raffles, Trans. Linn. Soc. Lond. Vol. 13, p. 293 (1822) (Sumatra).

Calyptomena viridis Raffles, cf. Sclater, Cat. Birds Brit. Mus. Vol. 14, p. 455 (1888).

Tenasserim,
Malay Peninsula,
Sumatra, Borneo.

2. **Calyptomena hosei** Sharpe.

Calyptomena hosei Sharpe, Ann. & Mag. Nat. Hist. (6). Vol. 9, p. 349 (1892)
(Mts N. W. Borneo).

Calyptomena hosei Sharpe, cf. Sclater, Cat. Birds Brit. Mus. Vol. 14, p. 455 (1888).

Mountains of N. W.
Borneo.

3. **Calyptomena whiteheadi** Sharpe.

Calyptomena whiteheadi Sharpe, Proc. Zool. Soc. Lond. p. 558 (1887) (Mts. N.W. Borneo);

The Ibis (1888), p. 5 (Mt. Kina Balu).

Calyptomena whiteheadi Sharpe, cf. Sclater, Cat. Birds Brit. Mus. Vol. 14, p. 457 (1888).

Mountains of N. W
Borneo.

Key of the Genera of the Eurylæminæ

The *Eurylæminæ* embrace six fairly distinct genera :

1. — Nostrils rounded, basal	2.
Nostrils elongated, near the middle of the bill	Genus CYMBIRHYNCHUS.
2. — Tail consisting of narrow, elongated feathers, longer than the wing	Genus PSARISOMUS.
Tail consisting of comparatively wider feathers, much shorter than the wing.	3.
3. — Bill at base wider than length of exposed part of culmen	Genus CORYDON.
Bill at base less wide than length of exposed culmen	4.
4. — With a naked caruncle round the eye	Genus SARCOPHANOPS.
No naked caruncle round the eye	5.
5. — Plumage harder, tail shorter	Genus EURYLEMUS.
Plumage softer, tail longer.	Genus SERILOPHUS.

1. GENUS CORYDON LESSON

Corydon Lesson, Man. Orn. p. 177 (1828) (type of the genus *C. sumatranus*); Slater, Cat. Birds Brit. Mus. Vol. 14, p. 466 (1888).

Characters. The bill is enormously wide at base, measuring considerably more from one angle of the mouth to the other, than the length of the exposed culmen. The round nostrils are almost hidden by feathers, the cutting edges of the upper jaw are curved and overlapping. The scutes in front of the metatarsus are distinct, the back has a sharp edge. The tail is strongly graduated but only about two thirds the length of the wing. The feathers of the body are hard and somewhat stiff. The colouration is very peculiar among the *Eurylamidae*, as the plumage is dull black, the throat dull fulvous-white, narrow white bars on tail and wings and a very peculiar, quite concealed orange and white patch on the back. *Corydon* feeds on insects (large beetles, orthoptera, etc.) and hunts not only in daytime, but also in the twilight. The nidification is not yet known.

Geographical Distribution of the Species. Only one species, inhabiting Southern Tenasserim, the Malay Peninsula, Sumatra and Borneo.

1. *Corydon sumatranus* (Raffles).

Coracias sumatranus Raffles, Trans. Linn. Soc. Lond. Vol. 13, p. 303 (1822) (Sumatra).

Corydon sumatranus (Raffles) cf. Slater, Cat. Birds Brit. Mus. Vol. 14, p. 466.

Southern Tenasserim
Malay Peninsula,
Sumatra, Borneo.

2. GENUS EURYLAIMUS HORSFIELD

Eurylaimus Horsfield, Trans. Linn. Soc. Lond. Vol. 13, p. 170 (1822) (type of the genus *E. javanicus*). Slater, Cat. Birds Brit. Mus. Vol. 14, p. 463 (1888).

Synonym : *Platyrrhynchus* Vieillot, Gal. Ois. Vol. 1, p. 199 (1825).

Characters. Bill very wide and flat, culmen strongly curved, the ridge not sharp and not strongly marked. The cutting edge of the upper bill bulges out near the base and overlaps the lower bill, but not nearly as much as in *Corydon*. The under mandible is nearly straight. Nostril round, quite free though immediately in front of the frontal feathering. *E. javanicus* has two elongated narrow feathers on the sides of the upper back. The feathers of the head and neck more especially in *E. javanicus*, are somewhat hard and stiff. The metatarsus is distinctly, though not much, longer than the middle toe. The scutes in front of the metatarsus are fused, only the lowest one being still well defined, the upmost portion of the metatarsus is covered with feathers. The tail is much rounded, the lateral rectrices being $1\frac{1}{2}$ to $2\frac{1}{2}$ cm. shorter than the middle pair, the tail is about three quarters the length of the wing. The third and fourth primaries are about or nearly equal and longest, the first distinctly longer than the secondaries. The nest is a suspended bag, hanging on branches of trees, the eggs are spotted.

The two species are very unlike each other.

Geographical Distribution of the Species. They range from Southern Tenasserim over the Malay Peninsula to Sumatra, Java and Borneo.

1. — Much larger, head and throat vinous brown or vinaceous grey *E. JAVANICUS*.

2. — Much smaller, head and throat black *E. OCHROMELAS*.

1. **Eurylaimus javanicus** Horsfield

Eurylaimus javanicus Horsfield, Trans. Linn. Soc. Lond. Vol. 13, p. 170 (1822) (Java)
Eurylaimus javanicus Horsfield, cf. Slater, Cat. Birds Brit. Mus. Vol. 14, p. 463 (1888).

Southern Tenasserim,
 Malay Peninsula,
 Siam, Cambodia,
 Sumatra, Borneo and Java.

2. **Eurylaimus ochromelas** Raffles.

Eurylaimus ochromelas Raffles, Trans. Linn. Soc. Lond. Vol. 13, p. 297 (1822) (Sumatra).
Eurylaimus ochromelas Raffles, cf. Slater, Cat. Birds Brit. Mus. Vol. 14, p. 465 (1888).

Tenasserim, Malay
 Peninsula, Sumatra,
 Borneo.

3. GENUS **SERILOPHUS** SWAINSON

Serilophus Swainson, Classif. of Birds. Vol. 2, p. 262 (1837) (type of the genus *S. lunatus*), Slater, Cat. Birds Brit. Mus. Vol. 14, p. 460 (1888).

Characters. The members of the genus *Serilophus* are nearest allied to *Eurylaimus*, but their bills are smaller and the tails and wings are longer, moreover the plumage is wonderfully soft and silky to the touch. The scales in front of the metatarsus are almost quite fused. The middle secondaries are unusually broad. The females have a silvery white band across the lower throat, which is not found in the males. The nests are as usual, the eggs spotted.

Four forms of the genus are known. One of these, *Serilophus rubropygia*, has the longest primaries normal, with rounded tips, while *S. lunatus* and its two allies have them suddenly and sharply pointed. While *S. rubropygia* is of course a totally distinct species, the other three forms are better regarded as subspecies, i. e. geographical races. They may be distinguished as follows :

1.	{	Primaries rounded at the tips	S. RUBROPYGIA.
Primaries pointed at the tips.		S. LUNATUS.	
2.	{	Sides of face rusty buff	S. LUNATUS LUNATUS.
		Sides of face grey, inner secondaries entirely cinnamon	S. LUNATUS ROTHSCILDI.
		Sides face brownish grey, inner webs of inner secondaries slaty-grey with pale cinnamon tips.	S. LUNATUS POLIONOTUS.

Geographical Distribution of the Species. Two species, one of them in three subspecies, ranging from the Himalayas throughout the Indo-Burmese countries to the mountains of the Malay Peninsula and Hainan.

1. **Serilophus rubropygia** (Hodgson).

Raya rubropygia Hodgson, Journ. Asiat. Soc. Beng. Vol. 8, p. 36 (1839) (Nepal).
Serilophus rubropygius (Hodgson) cf. Slater, Cat. Birds Brit. Mus. Vol. 14, p. 461 (1888).

Himalayas below
 5000 feet, Assam to
 Arrakan and Manipur.

2. **Serilophus lunatus lunatus** (Gould).

Eurylaimus lunatus Gould, Proc. Zool. Soc. Lond. p. 133 (1833).
Serilophus lunatus (Gould) cf. Slater, Cat. Birds, Brit. Mus. Vol. 14, p. 460 (1888).

Tenasserim, Pegu,
 Karennee.

3. **Serilophus lunatus rothschildi** Hartert & Butler.

Serilophus rothschildi Hartert & Butler, Bull. Brit. Orn. Cl. Vol. 7, p. 1 (1898).

Perak Mountains,
 Malay Peninsula.

4. **Serilophus lunatus polionotus** Rothschild.

Serilophus lunatus polionotus Rothschild, Bull. Brit. Orn. Cl. Vol. 14, p. 7 (1903).

Island of Hainan.

4. GENUS **SARCOPHANOPS** SHARPE

Sarcophanops Sharpe, Trans. Linn. Soc. Lond. (Zool.), (2), Vol. 1, p. 344 (1879), (type of the genus *S. steerii*), Slater, Cat. Birds Brit. Mus. Vol. 14, p. 462 (1838).

Characters. The two Philippine *Eurylæmidæ* or Broadbills (Hornrachen) have a peculiar wattle-like ring of naked skin round the eyes, as it is found in *Arses telescopthalmus*

and allies, a group of Papuan Flycatchers. Otherwise they do not differ essentially from the genus *Eurylaimus*. The sexes differ in the colour of the undersurface which is vinaceous-grey in the males, white in the females.

Geographical Distribution of the Species. Two forms, inhabiting some of the Philippine Islands, are known.

1. — *Upperside slate-grey* S. STEERII.
2. — *Upperside vinous brown* S. SAMARENSIS.

1. ***Sarcophanops steerii*** Sharpe.

Sarcophanops steerii Sharpe, Trans. Linn. Soc. Lond. Zool. (2), Vol. 1, p. 344, pl. 54 (1887).
Sarcophanops steerii Sharpe, cf. Sclater, Cat. Birds Brit. Mus. Vol. 14, p. 462 (1888).

Philippine Islands
 (Dinagat, Mindanao,
 Basilan).

2. ***Sarcophanops samarensis*** Steere.

Sarcophanops samarensis, Steere, List Birds & Mamm. Philipp. p. 23 (1890).

Philippine Islands
 (Samar, Leyte).

5. GENUS PSARISOMUS SWAINSON

Psarisomus Swainson, Classif. of Birds, Vol. 2, p. 261 (1837) (type of the genus *P. dalhousiæ*);
 cf. Sclater, Cat. Birds Brit. Mus. Vol. 14, p. 457 (1888).

Synonyms : *Crossodera* Gould, Icones Avium, pl. 1 (1837). — *Raya* Hodgson, Journ. Asiat. Soc. Bengal, Vol. 8, p. 36 (1839). — *Sinius* Hodgson, op. cit., Vol. 10, p. 27 (1841). — *Simornis*, Hodgson, Gray's Zool. Misc. p. 82 (1844).

Characters. This gaily coloured group differs from all the rest of the *Eurylæmidæ* in its very strongly graduated, long tail with rather narrow rectrices, while the nostrils are rounded and basal, as usual, but in a rather large groove and partly hidden by small and stiff frontal plumes. The lateral pair of rectrices is only two fifths the length of the central ones. The colour is beautiful : green (much lighter underneath), yellow throat, black pileum with a blue central patch and greenish yellow patches of elongated and narrow feathers behind the eyes. The nest is rather long, inside lined with fresh leaves, and is remarkable for the large porch, which overhangs the entrance-hole. The eggs are spotted. These birds catch insects on the wing, like other *Eurylæmidæ*, especially Orthoptera. Three forms, undoubtedly subspecies of one species, can be distinguished.

Geographical Distribution of the Species. From the Himalaya mountains through Assam, Burma, to mountain of the Malay Peninsula, Sumatra, and Borneo.

1. — *Green on underside richer, darker, wing slightly longer, tips of feathers on sides of neck more yellow* P. DALHOUSIÆ DALHOUSIÆ.
 2. — *Green on underside equally rich and dark as in 1, but wing slightly shorter, tips of feathers on sides of neck more white* P. DALHOUSIÆ PSITTACINUS.
 3. — *Green on underside paler, more white towards the bases of the feathers, wing as short as in 2, tips of feathers on sides of neck much more white than yellow* P. DALHOUSIÆ BORNEENSIS, subsp. nov.
1. ***Psarisomus dalhousiæ dalhousiæ*** (Jameson). Himalaya Mountains.
Eurylaimus dalhousiæ Jameson, Edinb. New Phys. Journ. Vol. 18, p. 589 (1835). Assam, Manipur.
Psarisomus dalhousiæ (Jameson), cf. Sclater, Cat. Birds Brit. Mus. Vol. 14, p. 458 (1888). Cachar, Burma, &c.

(1) Burmese birds have been separated as *P. assimilis* by Gould. The differences he mentions may be found to exist if a good series could be compared.

2. **Psarisomus dalhousiæ psittacinus** (Müller). Sumatra.
Eurylaimus psittacinus Müller, Tijdschr. Nat. Gesch. Vol. 2, p. 349, pl. 5 (1835).
Psarisomus dalhousiæ (Müller) cf. Sclater, Cat. Birds Brit. Mus. Vol. 14 p. 458 (1888).
3. **Psarisomus dalhousiæ borneensis** Hartert, subsp. nov. Mountains of N. W. Borneo.
 (Type ♂ no. 2451, Kina Balu, Borneo 12. April 1888, collected by John Whitehead, in Mus. Rothschild). The blue on the primaries is also lighter in the Bornean form, the other differences are stated on p. 6.

6. GENUS CYMBIRHYNCHUS VIGORS

Cymbirhynchus Vigors, Mem. Raffles, p. 654 (1830); Sclater, Cat. Birds Brit. Mus. Vol. 14, p. 468 (1898).

Characters. The genus *Cymbirhynchus* differs from all the other *Eurylamidae* in the form of the nostrils, which are longitudinal, and are situated in about the middle of the upper mandible. The bill is higher than in the other genera of *Eurylaminae* (though not as high as in the *Calyptomeninae*) and has a sharp ridge along the culmen. The colour of the bill is in life a most beautiful greenish sky-blue with yellow base and edges, the iris is of a most lovely golden moss-green. These marvellous colours, however, disappear entirely in the dried skins. At the base of the bill are two very conspicuous long and strong, and a few smaller bristles. The tail is very strongly graduated, the lateral rectrices being about half as long as the central pair, and the tail is nearly as long as the wing. The metatarsus in front is divided into only four scutes, the upper one of which reaches over half the length of the metatarsus, the back of which is a soft skin in life, shrivelled up in the skin.

The scapulars are most peculiarly shaped: the upper ones are greatly elongated, narrow, pointed, and of a white colour, thus forming a very conspicuous white line on each side of the black back. The rest of the plumage is red and black. The plumage covering the upperside, breast and abdomen is soft, that of the throat more compact and very hard, the earcoverts quite stiff and hard. Nests pendant bags, eggs spotted. The young bird has spotted wing-coverts.

Geographical Distribution of the Species. Borneo, Sumatra, Malay Peninsula, North to Arrakan and Pegu. One species composed of three subspecies.

1. — Tail usually without white C. MACRORHYNCHUS MACRORHYNCHUS.
2. — Tail with white bars on inner webs C. MACRORHYNCHUS LEMNISCATUS.
3. — Tail with white bars on both webs of outer rectrices C. MACRORHYNCHUS AFFINIS.

1. **Cymbirhynchus macrorhynchus macrorhynchus** (Gmelin). Borneo.
Todus macrorhynchus Gmelin, Syst. Nat. Vol. 1, p. 446 (1788) (No locality, figure shows the Bornean form).
Cymborhynchus macrorhynchus (Gmelin) cf. Sclater, Cat. Birds Brit. Mus. Vol. 14, p. 468 (1888).
2. **Cymbirhynchus macrorhynchus lemniscatus** (Raffles). Sumatra,
Eurylamus lemniscatus Raffles, Trans. Linn. Soc. Lond. Vol. 13, p. 175 (1821). Malay Peninsula to Tenasserim,
3. **Cymbirhynchus macrorhynchus affinis** Blyth. Arrakan and Pegu (Burmah).
Cymbirhynchus affinis Blyth, Journ. Asiat. Soc. Beng. Vol. 15, p. 312 (1872).
Cymborhynchus affinis Blyth, cf. Sclater, Cat. Birds Brit. Mus. Vol. 14, p. 472 (1888).

Explanation of Plate

- Fig. 1. *Corydon sumatranus* (Raffles), head.
— 2. *Eurylæmus javanicus* Horsfiels, head.
— 3. *Cymbirhynchus macrorhynchus* (Gmelin), head.
— 4. *Calyptomena viridis* Raffles, head.
— 5. *Serilophus lunatus rothschildi* Hartert & Butler.
— 6. *Sarcophanops steerii* Sharpe, head.
— 7. *Psarisomus dalhousiæ*, (Jameson), tail.

(All figures are of the natural size).

Tring (Herts), 30th. November 1903.

FAM. LORIIDÆ

1. LORIUS HYPENOCHRONS. 2. IB. UNDERSIDE OF THE WING. 3. LORIUS DEVITTATUS.
5. LORIUS ERYTHROTHORAX. 6. LORIUS DONICELLA. 7. IB. FOOT.

WASHINGTON
JUN 10 1906

1ST PART

SPECIMEN PART

PASSERES

GENERA AVIUM

PUBLISHED BY

P. WYTSMAN

ZOOLOGIST

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FAM. EURYLÆMIDÆ

by ERNST HARTERT

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PASSERES

FAM. EURYLÆMIDÆ

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BY ERNST HARTERT

WITH I COLOURED PLATE

IN former times, when the ornithological system was chiefly founded on the external structure of the bill and feet, the *Eurylæmidæ* were mostly arranged among the « *Picariæ* » or « *Coraciiformes* », generally near *Coracias*, because the bill of the *Eurylæmidæ* has a great outward resemblance to that of a *Coracias*. As long ago as 1840, however, attention has been drawn to the fact that the pterylography was that of Passerine birds, Blanchard declared that the sternum was more Passerine, Garrod and Forbes have studied the palate, trachea and structure of the foot and pronounced their main feature as Passerine, Kutter called attention to the nidology and oology, which are also Passerine. It is therefore now universally admitted that the *Eurylæmidæ* are Passerine birds, though abnormal and best placed at the top of that family, as a distinct group.

The sternum of the *Eurylæmidæ*, although the manubrium sterni is not forked, differs widely from that of *Coracias* and all its main features are truly Passerine; the palate is ægithognathous, the nasals holorhinal; the dorsal vertebræ are heterocoelous. The flexor longus hallucis leads to the hallux and sends down a tendon to the flexor perforans digitorum, which leads to the three front-digits. The hallux is thus incapable of independent action. The oil-gland is small and nude.

The bill is very wide, flat, but higher and distinctly ridged in the *Calyptomina*, the nasals basal, round, open, either quite exposed or overgrown with bristly feathers, or lineiform. The metatarsus is sometimes covered in front with some large, very distinctly separated scutellæ while in other forms the scutellæ are mostly fused, thus forming a long lamina, divided only on the lower end, near the toes. The back of the metatarsus is somewhat rugose, covered with

more or less distinct scutellae. The third and fourth toes are united for nearly half their length, the toes have very strong claws. The body is thickly covered with soft feathers without aftershafts. The moderate wings have ten to eleven primaries, the tip is formed by the third and fourth, fourth, or fourth and fifth primaries, the second is sometimes a little, sometimes much shorter, the first always shorter than the following ones. The secondaries are nine or ten in number. The tail is of various shapes and consists of twelve rectrices. The sexes are alike in plumage or the females are (in *Calyptomena*) much duller than the males.

The *Eurylæmidæ* build large oval or roundish nests with an entrance-hole near the top, often overhung by a protecting roof and elongated into a sort of tail. The inner lining consists mostly of green leaves. They are suspended from branches on trees and bushes, those of some species usually overhanging the water. The eggs are three to five in number and they are milky-white or creamy-buff with dark brown or rufous spots and dots, sometimes also unspotted. The young generally resemble the adults much, but some are partially spotted with white.

These birds are not very active. I found them to feed on insects, but *Calyptomena* and others are said to eat soft berries and other fruits. Their notes are soft whistles (*Calyptomena*) or a peculiar whirring song (*Eurylaimus*, *Cymbirhynchus*), which has gained them the Malayan name rain-bird, as the Malays compare the sound with that produced by the rain falling on the leaves of the forest, and a soft whistling call-note.

The distribution of the *Eurylæmidæ* is not very wide. They are peculiar to the Oriental Region, being distributed from the Southern Himalayas to Siam and Cambodia, throughout the Malayan Peninsula to Sumatra, Borneo and Java, and reoccurring on the Philippine Islands.

Bibliography. Sclater, The Ibis (1872), p. 177; id., Cat. Birds Brit. Mus. Vol. 14, p. 454-470 (1888). — Sharpe, Hand-list Birds, Vol. 3, p. 1-3 (1901). — Dubois, Syn. Avium, p. 204-206 (1900). — Cf. also : Nitzsch, Pterylographie, p. 109 (1840). — Blanchard, Ann. Sc. Nat. (4), Vol. 11, p. 92 (1859). — Garrod, Proc. Zool. Soc. Lond. (1877), p. 447. — Forbes, Proc. Zool. Soc. Lond. (1880), p. 382. — Hartert & Kutter, Journ. f. Orn. (1889), p. 391-400.

Two subfamilies can be distinguished :

SUBFAM. A. CALYPTOMENINÆ

Bill much higher, with a well-marked culminal ridge. Nostrils in a large hole near the base of the bill, half (or more) protected by a membrane, entirely hidden by the frontal feathers, which project forwards and reach to about the middle of the bill or more.

The *Calyptomeninæ* consist of a single genus.

SUBFAM. B. EURYLÆMINÆ

Bill much flatter, not with a well-marked ridge, the frontal feathers normal, not covering part of the bill, nostrils near base of bill, in front of the frontal feathers, or lineiform, in a slit near the middle of the bill.

The *Eurylæminæ* are conveniently divided into 6 genera.

1. GENUS CALYPTOMENA RAFFLES

Calyptomena Raffles, Trans. Linn. Soc. Lond. Vol. 13, p. 295 (1822) (type of the genus *C. viridis*);
 Sclater, Cat. Birds Brit. Mus. Vol. 14, p. 455 (1888).

Characters. This genus is a somewhat aberrant genus of the *Eurylæmidæ*. The high, ridged bill projects only half or less than that beyond the frontal feathers. The back of the metatarsus is soft in life, rough in the skin, with noticeable separate scutellæ near the base. The front is covered with five large scutes. The feathers cover about the basal third of the metatarsus, which is hardly as long as the middle toe. The wing is very broad, the secondaries being very long, the tip of the longest primaries not more than about 2 cm. longer than the secondaries. The third primary is longest, the fourth hardly shorter or fully as long, the second distinctly less, the first much shorter, sometimes not much longer than the secondaries. The tail is slightly rounded, nearly square, about two thirds the length of the wing. Colouration green with black, one species (*C. hosei*) with the middle of the undersurface blue. Nest a rough mass of material, suspended from a branch, eggs cream-colour, unspotted.

Geographical Distribution of the Species. From Southern Tenasserim throughout the Malayan Peninsula to Sumatra and Borneo.

Only three species are known :

Largest, without blue, but with a black patch on the foreneck *C. WHITEHEADI*.
Medium, middle of underside blue *C. HOSEI*.
Smallest, without blue and without black patch on foreneck *C. VIRIDIS*.

1. **Calyptomena viridis** Raffles.

Calyptomena viridis Raffles, Trans. Linn. Soc. Lond. Vol. 13, p. 293 (1822) (Sumatra).
Calyptomena viridis Raffles, cf. Sclater, Cat. Birds Brit. Mus. Vol. 14, p. 455 (1888).

Tenasserim,
 Malay Peninsula,
 Sumatra, Borneo.

2. **Calyptomena hosei** Sharpe.

Calyptomena hosei Sharpe, Ann. & Mag. Nat. Hist. (6). Vol. 9, p. 349 (1892)
 (Mts N. W. Borneo).
Calyptomena hosei Sharpe, cf. Sclater, Cat. Birds Brit. Mus. Vol. 14, p. 455 (1888).

Mountains of N. W.
 Borneo.

3. **Calyptomena whiteheadi** Sharpe.

Calyptomena whiteheadi Sharpe, Proc. Zool. Soc. Lond. p. 558 (1887) (Mts. N.W. Borneo);
 The Ibis (1888), p. 5 (Mt. Kina Balu).
Calyptomena whiteheadi Sharpe, cf. Sclater, Cat. Birds Brit. Mus. Vol. 14, p. 457 (1888).

Mountains of N. W.
 Borneo.

Key of the Genera of the Eurylæminæ

The *Eurylæminæ* embrace six fairly distinct genera :

1. — Nostrils rounded, basal 2.
 Nostrils elongated, near the middle of the bill Genus CYMBIRHYNCHUS.
2. — Tail consisting of narrow, elongated feathers, longer than the wing Genus PSARISOMUS.
 Tail consisting of comparatively wider feathers, much shorter than the wing. 3.
3. — Bill at base wider than length of exposed part of culmen Genus CORYDON.
 Bill at base less wide than length of exposed culmen 4.
4. — With a naked caruncle round the eye Genus SARCOPHANOPS.
 No naked caruncle round the eye 5.
5. — Plumage harder, tail shorter Genus EURYLÆMUS.
 Plumage softer, tail longer. Genus SERILOPHUS.

1. GENUS CORYDON LESSON

Corydon Lesson, Man. Orn. p. 177 (1828) (type of the genus *C. sumatranus*); Sclater, Cat. Birds Brit. Mus. Vol. 14, p. 466 (1888).

Characters. The bill is enormously wide at base, measuring considerably more from one angle of the mouth to the other, than the length of the exposed culmen. The round nostrils are almost hidden by feathers, the cutting edges of the upper jaw are curved and overlapping. The scutes in front of the metatarsus are distinct, the back has a sharp edge. The tail is strongly graduated but only about two thirds the length of the wing. The feathers of the body are hard and somewhat stiff. The colouration is very peculiar among the *Eurylaimidae*, as the plumage is dull black, the throat dull fulvous-white, narrow white bars on tail and wings and a very peculiar, quite concealed orange and white patch on the back. *Corydon* feeds on insects (large beetles, orthoptera, etc.) and hunts not only in daytime, but also in the twilight. The nidification is not yet known.

Geographical Distribution of the Species. Only one species, inhabiting Southern Tenasserim, the Malay Peninsula, Sumatra and Borneo.

1. *Corydon sumatranus* (Raffles).

Coracias sumatranus Raffles, Trans. Linn. Soc. Lond. Vol. 13, p. 303 (1822) (Sumatra).

Corydon sumatranus (Raffles) cf. Sclater, Cat. Birds Brit. Mus. Vol. 14, p. 466.

Southern Tenasserim,
Malay Peninsula,
Sumatra, Borneo.

2. GENUS EURYLAIMUS HORSFIELD

Eurylaimus Horsfield, Trans. Linn. Soc. Lond. Vol. 13, p. 170 (1822) (type of the genus *E. javanicus*). Sclater, Cat. Birds Brit. Mus. Vol. 14, p. 463 (1888).

Synonym : *Platyrynchos* Vieillot, Gal. Ois. Vol. 1, p. 199 (1825).

Characters. Bill very wide and flat, culmen strongly curved, the ridge not sharp and not strongly marked. The cutting edge of the upper bill bulges out near the base and overlaps the under bill, but not nearly as much as in *Corydon*. The under mandible is nearly straight. Nostrils round, quite free, though immediately in front of the frontal feathering. *E. javanicus* has two elongated, narrow feathers on the sides of the upper back. The feathers of the head and neck, more especially in *E. javanicus*, are somewhat hard and stiff. The metatarsus is distinctly, though not much, longer than the middle toe. The scutes in front of the metatarsus are fused, only the lowest one being still well defined, the upmost portion of the metatarsus covered with feathers. The tail is much rounded, the lateral rectrices being $1\frac{1}{2}$ to $2\frac{1}{2}$ cm. shorter than the middle pair, the tail is about three quarters the length of the wing. The third and fourth primaries are about or nearly equal and longest, the first distinctly longer than the secondaries. The nest is a suspended bag, hanging on branches of trees, the eggs are spotted.

The two species are very unlike each other.

Geographical Distribution of the Species. They range from Southern Tenasserim over the Malay Peninsula to Sumatra, Java and Borneo.

1. — *Much larger, head and throat vinous brown or vinaceous grey* *E. JAVANICUS*.
2. — *Much smaller, head and throat black* *E. OCHROMELAS*.

1. **Eurylaimus javanicus** Horsfield

Eurylaimus javanicus Horsfield, Trans. Linn. Soc. Lond. Vol. 13, p. 170 (1822) (Java)
Eurylaimus javanicus Horsfield, cf. Sclater, Cat. Birds Brit. Mus. Vol. 14, p. 463 (1888).

Southern Tenasserim,
 Malay Peninsula,
 Siam, Cambodia,
 Sumatra, Borneo and Java.

2. **Eurylaimus ochromelas** Raffles.

Eurylaimus ochromelas Raffles, Trans. Linn. Soc. Lond. Vol. 13, p. 297 (1822) (Sumatra).
Eurylaimus ochromelas Raffles, cf. Sclater, Cat. Birds Brit. Mus. Vol. 14, p. 465 (1888).

Tenasserim, Malay
 Peninsula, Sumatra,
 Borneo.

3. GENUS **SERILOPHUS** SWAINSON

Serilophus Swainson, Classif. of Birds. Vol. 2, p. 262 (1837) (type of the genus *S. lunatus*), Sclater, Cat. Birds Brit. Mus. Vol. 14, p. 460 (1888).

Characters. The members of the genus *Serilophus* are nearest allied to *Eurylaimus*, but their bills are smaller and the tails and wings are longer, moreover the plumage is wonderfully soft and silky to the touch. The scales in front of the metatarsus are almost quite fused. The middle secondaries are unusually broad. The females have a silvery white band across the lower throat, which is not found in the males. The nests are as usual, the eggs spotted.

Four forms of the genus are known. One of these, *Serilophus rubropygia*, has the longest primaries normal, with rounded tips, while *S. lunatus* and its two allies have them suddenly and sharply pointed. While *S. rubropygia* is of course a totally distinct species, the other three forms are better regarded as subspecies, i. e. geographical races. They may be distinguished as follows :

1.	{	<i>Primaries rounded at the tips</i>	<i>S. RUBROPYGIA.</i>
<i>Primaries pointed at the tips.</i>		<i>S. LUNATUS.</i>	
2.	{	<i>Sides of face rusty buff</i>	<i>S. LUNATUS LUNATUS.</i>
		<i>Sides of face grey, inner secondaries entirely cinnamon</i>	<i>S. LUNATUS ROTHSCILDI.</i>
		<i>Sides face brownish grey, inner webs of inner secondaries slaty-grey with pale cinnamon tips.</i>	<i>S. LUNATUS POLIONOTUS.</i>

Geographical Distribution of the Species. Two species, one of them in three subspecies, ranging from the Himalayas throughout the Indo-Burmese countries to the mountains of the Malay Peninsula and Hainan.

1. **Serilophus rubropygia** (Hodgson).

Raya rubropygia Hodgson, Journ. Asiat. Soc. Beng. Vol. 8, p. 36 (1839) (Nepal).
Serilophus rubropygius (Hodgson) cf. Sclater, Cat. Birds Brit. Mus. Vol. 14, p. 461 (1888).

Himalayas below
 5000 feet, Assam to
 Arrakan and Manipur.

2. **Serilophus lunatus lunatus** (Gould).

Eurylaimus lunatus Gould, Proc. Zool. Soc. Lond. p. 133 (1833).
Serilophus lunatus (Gould) cf. Sclater, Cat. Birds, Brit. Mus. Vol. 14, p. 460 (1888).

Tenasserim, Pegu,
 Karennee.

3. **Serilophus lunatus rothschildi** Hartert & Butler.

Serilophus rothschildi Hartert & Butler, Bull. Brit. Orn. Cl. Vol. 7, p. 1 (1898).

Perak Mountains,
 Malay Peninsula.

4. **Serilophus lunatus polionotus** Rothschild.

Serilophus lunatus polionotus Rothschild, Bull. Brit. Orn. Cl. Vol. 14, p. 7 (1903).

Island of Hainan.

4. GENUS **SARCOPHANOPS** SHARPE

Sarcophanops Sharpe, Trans. Linn. Soc. Lond. (Zool.), (2), Vol. 1, p. 344 (1879), (type of the genus *S. steerii*). Sclater, Cat. Birds Brit. Mus. Vol. 14, p. 462 (1838).

Characters. The two Philippine *Eurylæmidæ* or Broadbills (Hornrachen) have a peculiar wattle-like ring of naked skin round the eyes, as it is found in *Arses telescopthalmus*

and allies, a group of Papuan Flycatchers. Otherwise they do not differ essentially from the genus *Eurylaimus*. The sexes differ in the colour of the undersurface which is vinaceous-grey in the males, white in the females.

Geographical Distribution of the Species. Two forms, inhabiting some of the Philippine Islands, are known.

1. — *Upperside slate-grey* S. STEERII.
2. — *Upperside vinous brown* S. SAMARENSIS.

1. **Sarcophanops steerii** Sharpe.

Sarcophanops steerii Sharpe, Trans. Linn. Soc. Lond. Zool. (2), Vol. 1, p. 344, pl. 54 (1888).

Sarcophanops steerii Sharpe, cf. Sclater, Cat. Birds Brit. Mus. Vol. 14, p. 462 (1888).

Philippine Islands
(Dinagat, Mindanao,
Basilan).

2. **Sarcophanops samarensis** Steere.

Sarcophanops samarensis, Steere, List Birds & Mamm. Philipp. p. 23 (1890).

Philippine Islands
(Samar, Leyte).

5. GENUS PSARISOMUS SWAINSON

Psarisomus Swainson, Classif. of Birds, Vol. 2, p. 261 (1837) (type of the genus *P. dalhousiæ*);
cf. Sclater, Cat. Birds Brit. Mus. Vol. 14, p. 457 (1888).

Synonyms : *Crossodera* Gould, Icones Avium, pl. 1 (1837). — *Raya* Hodgson, Journ. Asiat. Soc. Bengal, Vol. 8, p. 36 (1839). — *Sinius* Hodgson, op. cit., Vol. 10, p. 27 (1841). — *Simornis*, Hodgson, Gray's Zool. Misc. p. 82 (1844).

Characters. This gaily coloured group differs from all the rest of the *Eurylamidae* in its very strongly graduated, long tail with rather narrow rectrices, while the nostrils are rounded and basal, as usual, but in a rather large groove and partly hidden by small and stiff frontal plumes. The lateral pair of rectrices is only two fifths the length of the central ones. The colour is beautiful : green (much lighter underneath), yellow throat, black pileum with a blue central patch and greenish yellow patches of elongated and narrow feathers behind the eyes. The nest is rather long, inside lined with fresh leaves, and is remarkable for the large porch, which overhangs the entrance-hole. The eggs are spotted. These birds catch insects on the wing, like other *Eurylamidae*, especially Orthoptera. Three forms, undoubtedly subspecies of one species, can be distinguished. One species, which must be divided into three subspecies.

Geographical Distribution of the Species. From the Himalaya mountains through Assam, Burma, the mountains of the Malayan Peninsula, Sumatra and Borneo.

1. — *Green on underside richer, darker, wing slightly longer, tips of feathers on sides of neck more yellow* P. DALHOUSIÆ DALHOUSIÆ.
2. — *Green on underside equally rich and dark as in 1, but wing slightly shorter, tips of feathers on sides of neck more white* . . . P. DALHOUSIÆ PSITTACINUS.
3. — *Green on underside paler, more white towards the bases of the feathers, wing as short as in 2, tips of feathers on sides of neck much more white than yellow* P. DALHOUSIÆ BORNEENSIS, subsp. nov. †

1. **Psarisomus dalhousiæ dalhousiæ** (Jameson).

Eurylaimus dalhousiæ Jameson, Edinb. New Phys. Journ. Vol. 18, p. 589 (1835).

Psarisomus dalhousiæ (Jameson), cf. Sclater, Cat. Birds Brit. Mus. Vol. 14, p. 458 (1888).

Himalaya Mountains,
Assam, Manipur,
Cachar, Burma (1).

(1) Burmese Birds have been separated as *P. assimilis* by Gould. The differences the mentions may be found to be stated with reason if a good series could be compared.

2. **Psarisomus dalhousiæ psittacinus** (Müller).

Sumatra.

Eurylaimus psittacinus Müller, Tijdschr. Nat. Gesch. Vol. 2, p. 349, pl. 5 (1835).*Psarisomus dalhousiæ* (Müller) cf. Sclater, Cat. Birds Brit. Mus. Vol. 14 p. 458 (1888).3. **Psarisomus dalhousiæ borneensis** Hartert, subsp. nov.

Mountains of N. W.

(Type ♂ no. 2451, Kina Balu, Borneo 12. April 1888, collected by John Whitehead, in Mus. Rothschild). The blue on the primaries is also lighter in the Bornean form, the other differences are stated on p. 6.

Borneo.

6. GENUS CYMBIRHYNCHUS VIGORS

Cymbirhynchus Vigors, Mem. Raffles, p. 654 (1830); Sclater, Cat. Birds Brit. Mus. Vol. 14, p. 468 (1898).

Characters. The genus *Cymbirhynchus* differs from all the other *Eurylæmidæ* in the form of the nostrils, which are longitudinal, and are situated in about the middle of the upper mandible. The bill is higher than in the other genera of *Eurylæminæ* (though not as high as in the *Calyptomeninæ*) and has a sharp ridge along the culmen. The colour of the bill is in life a most beautiful greenish sky-blue with yellow base and edges, the iris is of a most lovely golden moss-green. These marvellous colours, however, disappear entirely in the dried skins. At the base of the bill are two very conspicuous long and strong, and a few smaller bristles. The tail is very strongly graduated, the lateral rectrices being about half as long as the central pair, and the tail is nearly as long as the wing. The metatarsus is in front divided into only four scutes, the upper one of which reaches over half the length of the metatarsus, the back of which is a soft skin in life, shrivelled up in the skin.

The scapulars are most peculiarly shaped : the upper ones are greatly elongated, narrow, pointed, and of a white colour, thus forming a very conspicuous white line on each side of the black back. The rest of the plumage is red and black. The plumage covering the upperside, breast and abdomen is soft, that of the throat more compact and very hard, the earcoverts quite stiff and hard. Nests pendant bags, eggs spotted. The young bird has spotted wing-coverts.

Geographical Distribution of the Species. Borneo, Sumatra, Malay Peninsula, North to Arrakan and Pegu. One species composed of three subspecies.

1. — Tail usually without white C. MACRORHYNCHUS MACRORHYNCHUS.
2. — Tail with white bars on inner webs C. MACRORHYNCHUS LEMNISCATUS.
3. — Tail with white bars on both webs of outer rectrices C. MACRORHYNCHUS AFFINIS.

1. **Cymbirhynchus macrorhynchus macrorhynchus** (Gmelin).

Borneo.

Todus macrorhynchus Gmelin, Syst. Nat. Vol. 1, p. 446 (1788) (No locality, figure shows the Bornean form).*Cymborhynchus macrorhynchus* (Gmelin) cf. Sclater, Cat. Birds Brit. Mus. Vol. 14, p. 468 (1888).2. **Cymbirhynchus macrorhynchus lemniscatus** (Raffles).

Sumatra,

Eurylæmus lemniscatus Raffles, Trans. Linn. Soc. Lond. Vol. 13, p. 175 (1821).Malay Peninsula to
Tenasserim,3. **Cymbirhynchus macrorhynchus affinis** Blyth.

Arrakan and Pegu

Cymbirhynchus affinis Blyth, Journ. Asiat. Soc. Beng. Vol. 15, p. 312 (1878 ?)*Cymborhynchus affinis* Blyth, cf. Sclater, Cat. Birds Brit. Mus. Vol. 14, p. 47 a (1888).

(Burmah).

Explanation of Plate

- Fig. 1. *Corydon sumatranus* (Raffles), head.
— 2. *Eurylæmus javanicus* Horsfield, head.
— 3. *Cymbirhynchus macrorhynchus* (Gmelin), head.
— 4. *Calypomena viridis* Raffles, head.
— 5. *Serilophus lunatus rothschildi* Hartert & Butler.
— 6. *Sarcophanops steerii* Sharpe, head.
— 7. *Psarisomus dalhousiæ* (Jameson), tail.

(All figures in natural size).

Tring (Herts), 30th. November 1903.

FAM. EURYLÆMIDÆ

1. CORYDON SUMATRANUS. 2. EURYLÆMUS JAVANICUS. 3. CYMBIRHYNCHUS MACRORHYNCHUS. 4. CALYPTOMENA VIRIDIS.
5. SERILOPHUS LUNATUS ROTHSCHILDI. 6. SARCOPHANOPS STEERII. 7. PSARISOMUS. (tail).

1ST PART

PASSERES

GENERA AVIUM

EDITED BY

P. WYTSMAN

WITH CONTRIBUTIONS BY MESSRS. P. L. SCLATER, R. BOWDLER SHARPE,
W. R. OGILVIE-GRANT, E. HARTERT, C. E. HELLMAYR, T. SALVADORI, &^a

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WITH 1 COLOURED PLATE

1905

PRICE 3/9 (FR. 4.75)

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The sternum of the *Eurylæmidæ*, although the manubrium sterni is not forked, differs widely from that of *Coracias* and all its main features are truly Passerine; the palate is ægithognathous, the nasals holorhinal; the dorsal vertebræ are heterocoelous. The flexor longus hallucis leads to the hallux and sends down a tendon to the flexor perforans digitorum, which leads to the three front-digits. The hallux is thus incapable of independant action. The oil-gland is small and nude.

The bill is very wide, flat, but higher and distinctly ridged in the *Calyptomenina*, the nasals basal, round, open, either quite exposed or overgrown with bristly feathers, or lineiform. The metatarsus is sometimes covered in front with some large, very distinctly separated scutellæ, while in other forms the scutellæ are mostly fused, thus forming a long lamina, divided only on the lower end, near the toes. The back of the metatarsus is somewhat rugose, covered with

more or less distinct scutellae. The third and fourth toes are united for nearly half their length, and the toes have very strong claws. The body is thickly covered with soft feathers without aftershafts. The moderate wings have ten to eleven primaries, the tip is formed by the third and fourth, fourth, or fourth and fifth primaries, the second is sometimes a little, sometimes much shorter, the first always shorter than the following ones. The secondaries are nine or ten in number. The tail is of various shapes and consists of twelve rectrices. The sexes are alike in plumage or the females are (in *Calyptomena*) much duller than the males.

Habits. The *Eurylæmidæ* build large oval or roundish nests with an entrance-hole near the top, often overhung by a protecting roof and elongated into a sort of tail. The inner lining consists mostly of green leaves. They are suspended from branches on trees and bushes, those of some species usually overhanging the water. The eggs are three to five in number and they are milky-white or creamy-buff with dark brown or rufous spots and dots, sometimes also unspotted. The young generally much resemble the adults, but some are partially spotted with white.

These birds are not very active. I found them to feed on insects, but *Calyptomena* and others are said to eat soft berries and other fruits. Their notes are soft whistles (*Calyptomena*) or a peculiar whirring song (*Eurylaimus*, *Cymbirhynchus*), which has gained them the Malayan name rain-bird, as the Malays compare the sound with that produced by the rain falling on the leaves of the forest, and a soft whistling call-note.

Range. The distribution of the *Eurylæmidæ* is not very wide. They are peculiar to the Oriental Region, being distributed from the Southern Himalayas to Siam and Cambodia, throughout the Malayan Peninsula to Sumatra, Borneo and Java, and reoccurring on the Philippine Islands.

Bibliography. Sclater, *The Ibis* (1872), p. 177; id., *Cat. Birds Brit. Mus. Vol. 14*, p. 454-470 (1888). — Sharpe, *Hand-list Birds*, Vol. 3, p. 1-3 (1901). — Dubois, *Syn. Avium*, p. 204-206 (1900). — Cf. also : Nitzsch, *Pterylographie*, p. 109 (1840). — Blanchard, *Ann. Sc. Nat. (4)*, Vol. 11, p. 92 (1859). — Garrod, *Proc. Zool. Soc. Lond.* (1877), p. 447. — Forbes, *Proc. Zool. Soc. Lond.* (1880), p. 382. — Hartert & Kutter, *Journ. f. Orn.* (1889), p. 391-400.

Two subfamilies can be distinguished :

SUBFAM. A. CALYPTOMENINÆ

Bill much higher, with a well-marked culminal ridge. Nostrils in a large hole near the base of the bill, half (or more) protected by a membrane, entirely hidden by the frontal feathers, which project forwards and reach to about the middle of the bill or more.

The *Calyptomeninæ* consist of a single genus.

SUBFAM. B. EURYLÆMINÆ

Bill much flatter, not with a well-marked ridge, the frontal feathers normal, not covering part of the bill, nostrils near the base of the bill, in front of the frontal feathers, or lineiform, in a slit near the middle of the bill.

The *Eurylæminæ* are conveniently divided into 6 genera.

1. GENUS CALYPTOMENA RAFFLES

Calyptomena Raffles, Trans. Linn. Soc. Lond. Vol. 13, p. 295 (1822) (type of the genus *C. Viridis*); Sclater, Cat. Birds Brit. Mus. Vol. 14, p. 455 (1888).

Characters. This is a somewhat aberrant genus of the *Eurylæmidæ*. The high, ridged bill projects only half or less than that beyond the frontal feathers. The back of the metatarsus is soft in life, rough in the skin, with noticeable separate scutellæ near the base. The front is covered with five large scutes. The feathers cover about the basal third of the metatarsus, which is hardly as long as the middle toe. The wing is very broad, the secondaries being very long, the tip of the longest primaries not more than about 2 cm. longer than the secondaries. The third primary is longest, the fourth hardly shorter or fully as long, the second distinctly less, the first much shorter, sometimes not much longer than the secondaries. The tail is slightly rounded, nearly square, about two thirds of the length of the wing. Colouration green with black, one species (*C. hosei*) with the middle of the undersurface blue. Nest a rough mass of material, suspended from a branch, eggs cream-colour, unspotted.

Geographical Distribution. From Southern Tenasserim throughout the Malay Peninsula to Sumatra and Borneo.

Only three species are known :

- Largest, without blue, but with a black patch on the foreneck* *C. WHITEHEADI*.
Medium, middle of underside blue *C. HOSEI*.
Smallest, without blue and without black patch on foreneck *C. VIRIDIS*.

1. **Calyptomena viridis** Raffles (Plate, Fig. 4.).

Calyptomena viridis Raffles, Trans. Linn. Soc. Lond. Vol. 13, p. 293 (1822) (Sumatra).
Calyptomena viridis Raffles, cf. Sclater, Cat. Birds Brit. Mus. Vol. 14, p. 455 (1888).

Tenasserim,
 Malay Peninsula,
 Sumatra, Borneo.

2. **Calyptomena hosei** Sharpe.

Calyptomena hosei Sharpe, Ann. & Mag. Nat. Hist. (6). Vol. 9, p. 349 (1892)
 (Mts N. W. Borneo).
Calyptomena hosei Sharpe, cf. Sclater, Cat. Birds Brit. Mus. Vol. 14, p. 455 (1888).

Mountains of N. W.
 Borneo.

3. **Calyptomena whiteheadi** Sharpe.

Calyptomena whiteheadi Sharpe, Proc. Zool. Soc. Lond. p. 558 (1887) (Mts. N.W. Borneo);
 The Ibis (1888), p. 5 (Mt. Kina Balu).
Calyptomena whiteheadi Sharpe, cf. Sclater, Cat. Birds Brit. Mus. Vol. 14, p. 457 (1888).

Mountains of N. W.
 Borneo.

KEY OF THE GENERA OF THE EURYLÆMINÆ

The *Eurylæminæ* embrace six fairly distinct genera :

1. — Nostrils rounded, basal 2.
 Nostrils elongated, near the middle of the bill Genus CYMBIRHYNCHUS.
2. — Tail consisting of narrow, elongated feathers, longer than the wing Genus PSARISOMUS.
 Tail consisting of comparatively wider feathers, much shorter than the wing. 3.
3. — Bill at base wider than length of exposed part of culmen Genus CORYDON.
 Bill at base less wide than length of exposed culmen 4.
4. — With a naked caruncle round the eye Genus SARCOPHANOPS.
 No naked caruncle round the eye 5.
5. — Plumage harder, tail shorter Genus EURYLAIMUS.
 Plumage softer, tail longer. Genus SERILOPHUS.

1. GENUS CORYDON LESSON

Corydon Lesson, Man. Orn. p. 177 (1828) (type of the genus *C. sumatranus*); Sclater, Cat. Birds Brit. Mus. Vol. 14, p. 466 (1888).

Characters. The bill is enormously wide at base, measuring considerably more from one angle of the mouth to the other, than the length of the exposed culmen. The round nostrils are almost hidden by feathers, the cutting edges of the upper jaw are curved and overlapping. The scutes in front of the metatarsus are distinct, the back has a sharp edge. The tail is strongly graduated but only about two thirds the length of the wing. The feathers of the body are hard and somewhat stiff. The colouration is very peculiar among the *Eurylamidae*, as the plumage is dull black, the throat dull fulvous-white, narrow white bars on tail and wings and a very peculiar, quite concealed orange and white patch on the back. *Corydon* feeds on insects (large beetles, orthoptera, etc.) and hunts not only in daytime, but also in the twilight. The nidification is not yet known.

Geographical Distribution. Only one species, inhabiting Southern Tenasserim, the Malay Peninsula, Sumatra and Borneo.

1. *Corydon sumatranus* (Raffles) (Plate, Fig. 1.).

Coracias sumatranus Raffles, Trans. Linn. Soc. Lond. Vol. 13, p. 303 (1822) (Sumatra).

Corydon sumatranus (Raffles) cf. Sclater, Cat. Birds Brit. Mus. Vol. 14, p. 466.

Southern Tenasserim,

Malay Peninsula,

Sumatra, Borneo.

2. GENUS EURYLAIMUS HORSFIELD

Eurylaimus Horsfield, Trans. Linn. Soc. Lond. Vol. 13, p. 170 (1822) (type of the genus *E. javanicus*). Sclater, Cat. Birds Brit. Mus. Vol. 14, p. 463 (1888).

Synonym : *Platyrhynchus* Vieillot, Gal. Ois. Vol. 1, p. 199 (1825).

Characters. Bill very wide and flat, culmen strongly curved, the ridge not sharp and not strongly marked. The cutting edge of the upper bill bulges out near the base and overlaps the lower bill, but not nearly as much as in *Corydon*. The under mandible is nearly straight. Nostrils round, quite free, though immediately in front of the frontal feathering. *E. javanicus* has two elongated, narrow feathers on the sides of the upper back. The feathers of the head and neck, more especially in *E. javanicus*, are somewhat hard and stiff. The metatarsus is distinctly, though not much, longer than the middle toe. The scutes in front of the metatarsus are fused, only the lowest one being still well defined, the upmost portion of the metatarsus is covered with feathers. The tail is much rounded, the lateral rectrices being $1\frac{1}{2}$ to $2\frac{1}{2}$ cm. shorter than the middle pair, the tail is about three quarters the length of the wing. The third and fourth primaries are about or nearly equal and longest, the first distinctly longer than the secondaries. The nest is a suspended bag, hanging on branches of trees, the eggs are spotted.

The two species are very unlike each other.

Geographical Distribution. They range from Southern Tenasserim over the Malay Peninsula to Sumatra, Java and Borneo.

1. — *Much larger, head and throat vinous brown or vinaceous grey* E. JAVANICUS.

2. — *Much smaller, head and throat black* E. OCHROMELAS.

1. **Eurylaimus javanicus** Horsfield

Eurylaimus javanicus Horsfield, Trans. Linn. Soc. Lond. Vol. 13, p. 170 (1822) (Java)
Eurylæmus javanicus Horsfield, cf. Sclater. Cat. Birds Brit. Mus. Vol. 14, p. 463 (1888).

Southern Tenasserim,
 Malay Peninsula,
 Siam, Cambodia,
 Sumatra, Borneo and Java.
 Tenasserim, Malay
 Peninsula, Sumatra,
 Borneo.

2. **Eurylaimus ochromelas** Raffles.

Eurylæmus ochromelas Raffles, Trans. Linn. Soc. Lond. Vol. 13, p. 297 (1822) (Sumatra).
Eurylæmus ochromelas Raffles, cf. Sclater. Cat. Birds Brit. Mus. Vol. 14, p. 465 (1888).

3. GENUS **SERILOPHUS** SWAINSON

Serilophus Swainson, Classif. of Birds. Vol. 2, p. 262 (1837) (type of the genus *S. lunatus*), Sclater, Cat. Birds Brit. Mus. Vol. 14, p. 460 (1888).

Characters. The members of the genus *Serilophus* are nearest allied to *Eurylaimus*, but their bills are smaller and the tails and wings are longer, moreover the plumage is wonderfully soft and silky to the touch. The scales in front of the metatarsus are almost quite fused. The middle secondaries are unusually broad. The females have a silvery white band across the lower throat, which is not found in the males. The nests are as usual, the eggs spotted.

Four forms of the genus are known. One of these, *Serilophus rubropygia*, has the longest primaries normal, with rounded tips, while *S. lunatus* and its two allies have them suddenly and sharply pointed. While *S. rubropygia* is of course a totally distinct species, the other three forms are better regarded as subspecies, i. e. geographical races. They may be distinguished as follows :

1.	{	Primaries rounded at the tips	<i>S. RUBROPYGIA.</i>
Primaries pointed at the tips.		<i>S. LUNATUS</i> (2).	
	{	Sides of face rusty buff	<i>S. LUNATUS LUNATUS.</i>
		Sides of face grey, inner secondaries entirely cinnamon	<i>S. LUNATUS ROTHSCILDI.</i>
2.	{	Sides of face brownish grey, inner webs of inner secondaries slaty-grey with pale cinnamon tips	<i>S. LUNATUS POLIONOTUS.</i>

Geographical Distribution. Two species, one of them in three subspecies, ranging from the Himalayas throughout the Indo-Burmese countries to the mountains of the Malay Peninsula and Hainan.

1. **Serilophus rubropygia** (Hodgson).

Raya rubropygia Hodgson, Journ. Asiat. Soc. Beng. Vol. 8, p. 36 (1839) (Nepal).
Serilophus rubropygius (Hodgson) cf. Sclater, Cat. Birds Brit. Mus. Vol. 14, p. 461 (1888).

Himalayas below
 5000 feet, Assam to
 Arrakan and Manipur.

2. **Serilophus lunoatus lunatus** (Gould).

Eurylaimus lunatus Gould, Proc. Zool. Soc. Lond. p. 133 (1833).
Serilophus lunatus (Gould) cf. Sclater. Cat. Birds, Brit. Mus. Vol. 14, p. 460 (1888).

Tenasserim, Pegu,
 Karennee.

3. **Serilophus lunoatus rothschildi** Hartert & Butler (**Plate, Fig. 5.**).

Serilophus rothschildi Hartert & Butler, Bull. Brit. Orn. Cl. Vol. 7, p. 1 (1898).

Perak Mountains,
 Malay Peninsula.

4. **Serilophus lunatus polionotus** Rothschild.

Serilophus lunatus polionotus Rothschild, Bull. Brit. Orn. Cl. Vol. 14, p. 7 (1903).

Island of Hainan.

4. GENUS **SARCOPHANOPS** SHARPE

Sarcophanops Sharpe, Trans. Linn. Soc. Lond. (Zool.), (2), Vol. 1, p. 344 (1879), (type of the genus *S. steerii*). Sclater, Cat. Birds Brit. Mus. Vol. 14, p. 462 (1838).

Characters. The two Philippine *Eurylæmidæ* or Broadbills (Hornrachen) have a peculiar wattle-like ring of naked skin round the eyes, as it is found in *Arses telescopthalmus*

and allies, a group of Papuan Flycatchers. Otherwise they do not differ essentially from the genus *Eurylaimus*. The sexes differ in the colour of the undersurface which is vinaceous-grey in the males, white in the females.

Geographical Distribution. Two forms, inhabiting some of the Philippine Islands, are known.

1. — *Upperside slate-grey* S. STEERII.
2. — *Upperside vinous brown* S. SAMARENSIS.

1. **Sarcophanops steerii** Sharpe (**Plate, Fig. 6.**).
Sarcophanops steerii Sharpe, Trans. Linn. Soc. Lond. Zool. (2), Vol. 1, p. 344, pl. 54 (1887).
Sarcophanops steerii Sharpe, cf. Sclater, Cat. Birds Brit. Mus. Vol. 14, p. 462 (1888).
Philippine Islands
(Dinagat, Mindanao, Basilan).
- 2 **Sarcophanops samarensis** Steere.
Sarcophanops samarensis, Steere, List Birds & Mamm. Philipp. p. 23 (1890).
Philippine Islands
(Samar, Leyte).

5. GENUS PSARISOMUS SWAINSON

Psarisomus Swainson, Classif. of Birds, Vol. 2, p. 261 (1837) (type of the genus *P. dalhousiæ*); cf. Sclater, Cat. Birds Brit. Mus. Vol. 14, p. 457 (1888).

Synonyms : *Crossodera* Gould, Icones Avium, pl. 1 (1837). — *Raya* Hodgson, Journ. Asiat. Soc. Bengal, Vol. 8, p. 36 (1839). — *Sinius* Hodgson, op. cit., Vol. 10, p. 27 (1841). — *Simornis*, Hodgson, Gray's Zool. Misc. p. 82 (1844).

Characters. This gaily coloured group differs from all the rest of the *Eurylamidae* in its very strongly graduated, long tail with rather narrow rectrices, while the nostrils are rounded and basal, as usual, but in a rather large groove and partly hidden by small and stiff frontal plumes. The lateral pair of rectrices is only two fifths the length of the central ones. The colour is beautiful : green (much lighter underneath), yellow throat, black pileum with a blue central patch and greenish yellow patches of elongated and narrow feathers behind the eyes. The nest is rather long, inside lined with fresh leaves, and is remarkable for the large porch, which overhangs the entrance-hole. The eggs are spotted. These birds catch insects on the wing, like other *Eurylamidae*, especially Orthoptera. Three forms, undoubtedly subspecies of one species, can be distinguished.

Geographical Distribution. From the Himalaya mountains through Assam, Burma, the mountains of the Malayan Peninsula, Sumatra and Borneo.

1. — *Green on underside richer, darker, wing slightly longer, tips of feathers on sides of neck more yellow* P. DALHOUSIÆ DALHOUSIÆ.
 - 2 — *Green on underside equally rich and dark as in 1, but wing slightly shorter, tips of feathers on sides of neck more white* . . . P. DALHOUSIÆ PSITTACINUS.
 - 3 — *Green on underside paler, more white towards the bases of the feathers, wing as short as in 2, tips of feathers on sides of neck much more white than yellow* P. DALHOUSIÆ BORNEENSIS, subsp. nov. †
1. **Psarisomus dalhousiæ dalhousiæ** (Jameson) (**Plate, Fig. 7.**).
Eurylaimus dalhousiæ Jameson, Edinb. New Phys. Journ. Vol. 18, p. 589 (1835).
Psarisomus dalhousiæ (Jameson), cf. Sclater, Cat. Birds Brit. Mus. Vol. 14, p. 458 (1888).
Himalaya Mountains,
Assam, Manipur,
Cachar, Burma (1).

(1) Burmese birds have been separated as *P. assimilis* by Gould. The differences he mentions may be found to exist if a good series could be compared.

2. **Psarisomus dalhousiæ psittacinus** (Müller). Sumatra.
Eurylaimus psittacinus Müller, Tijdschr. Nat. Gesch. Vol. 2, p. 349, pl. 5 (1835).
Psarisomus dalhousiæ (Müller) cf. Sclater, Cat. Birds Brit. Mus. Vol. 14 p. 458 (1888).
3. **Psarisomus dalhousiæ borneensis** Hartert, subsp. nov. Mountains of N. W. Borneo.
 (Type ♂ no. 2451, Kina Balu, Borneo 12. April 1888, collected by John Whitehead, in Mus. Rothschild). The blue on the primaries is also lighter in the Bornean form, the other differences are stated on p. 6.

6. GENUS CYMBIRHYNCHUS VIGORS

Cymbirhynchus Vigors, Mem. Raffles, p. 654 (1830); Sclater, Cat. Birds Brit. Mus. Vol. 14, p. 468 (1898).

Characters. The genus *Cymbirhynchus* differs from all the other *Eurylæmidæ* in the form of the nostrils, which are longitudinal, and are situated in about the middle of the upper mandible. The bill is higher than in the other genera of *Eurylæminæ* (though not as high as in the *Calyptomeninæ*) and has a sharp ridge along the culmen. The colour of the bill is in life a most beautiful greenish sky-blue with yellow base and edges, the iris is of a most lovely golden moss-green. These marvellous colours, however, disappear entirely in the dried skins. At the base of the bill are two very conspicuous long and strong, and a few smaller bristles. The tail is very strongly graduated, the lateral rectrices being about half as long as the central pair, and the tail is nearly as long as the wing. The metatarsus in front is divided into only four scutes, the upper one of which reaches over half the length of the metatarsus, the back of which is a soft skin in life, shrivelled up in the skin.

The scapulars are most peculiarly shaped : the upper ones are greatly elongated, narrow, pointed, and of a white colour, thus forming a very conspicuous white line on each side of the black back. The rest of the plumage is red and black. The plumage covering the upperside, breast and abdomen is soft, that of the throat more compact and very hard, the earcoverts quite stiff and hard. Nests pendant bags, eggs spotted. The young bird has spotted wing-coverts.

Geographical Distribution. Borneo, Sumatra, Malay Peninsula, North to Arrakan and Pegu. One species composed of three subspecies.

1. — Tail usually without white *C. MACRORHYNCHUS MACRORHYNCHUS*.
 2. — Tail with white bars on inner webs *C. MACRORHYNCHUS LEMNISCATUS*.
 3. — Tail with white bars on both webs of outer rectrices *C. MACRORHYNCHUS AFFINIS*.

1. **Cymbirhynchus macrorhynchus macrorhynchus** (Gmelin). (Plate, Fig. 3). Borneo.
Todus macrorhynchus Gmelin, Syst. Nat. Vol. 1, p. 446 (1788) (No locality, figure shows the Bornean form).
Cymborhynchus macrorhynchus (Gmelin) cf. Sclater, Cat. Birds Brit. Mus. Vol. 14, p. 468 (1888).
2. **Cymbirhynchus macrorhynchus lemniscatus** (Raffles). Sumatra,
Eurylæmus lemniscatus Raffles, Trans. Linn. Soc. Lond. Vol. 13, p. 175 (1821). Malay Peninsula to Tenasserim,
3. **Cymbirhynchus macrorhynchus affinis** Blyth. Arrakan and Pegu (Burmah).
Cymbirhynchus affinis Blyth, Journ. Asiat. Soc. Beng. Vol. 15, p. 312 (1872).
Cymborhynchus affinis Blyth, cf. Sclater, Cat. Birds Brit. Mus. Vol. 14, p. 47 a (1888).

EXPLANATION OF PLATE

- Fig. 1. *Corydon sumatranus* (Raffles).
— 2. *Eurylaimus javanicus* Horsfield.
— 3. *Cymbirhynchus macrorhynchus* (Gmelin).
— 4. *Calypomena viridis* Raffles.
— 5. *Serilophus lunatus rothschildi* Hartert & Butler.
— 6. *Sarcophanops steerii* Sharpe.
— 7. *Psarisomus dalhousiæ* (Jameson).

(All figures are of the natural size).

Tring (Herts), 30th. April 1903.

FAM. EURYLEMIDÆ

1. CORYDON SUMATRANUS. 2. EURYLAIMUS JAVANICUS. 3. CYMBIRHYNCHUS MACRORHYNCHUS. 4. CALYPTOMENA VIRIDIS.
5. SERILOPHUS LUNATUS ROTHSCILDI. 6. SARCOPHANOPS STEERII. 7. PSARISOMUS DALHOUSIEI.

2^d PART

PICARIÆ

GENERA AVIUM

EDITED BY

P. WYTSMAN

WITH CONTRIBUTIONS BY MESSRS. P. L. SCLATER, R. BOWDLER SHARPE,
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PICARIÆ

FAM. TODIDÆ

by P. WYTSMAN

WITH 1 COLOURED PLATE

1905

PRICE 3/1 FR. 3.85

FAM. TODIDÆ

FAM. TODIDÆ

BY P. WYTSMAN

THE type of this small platyrostral family, *Todus viridis*, was known since Linnæus, who has described it for the first time in his *Systema Naturæ* Vol. 1, p. 178 (1766). At present all the authors have admitted the *Todidæ* to form a special family. Dr. R. Bowdler Sharpe in his *Catalogue of Birds in the British Museum* Vol. 17, p. 333 (1892) placed the family between the *Momotidæ* and the *Coliidæ*, in his *Hand-List of the Genera and Species of Birds*, Vol. 2, p. 78 (1900) between the *Momotidæ* and the *Caprimulgidæ* and Alphonse Dubois in his *Synopsis Avium* Vol. 1, p. 95 (1899-1902) between the *Momotidæ* and the *Meropidæ*. Other authors have placed it otherwise, but all the ornithologists are at present in accord to consider these beautiful species or subspecies of the genus *Todus* as forming a special and distinct family.

If we admit the oldest species known, the *Todus viridis* of Linnæus, as the type of the family and if we examine carefully the other forms described since, it is evident that the three species described under the names of *T. subulatus*, *T. multicolor* and *T. hypochondriacus* agree in their main features and that the characteristics which distinguish them from *T. viridis* are not very important ones, so that we may consider them as subspecies or local varieties of the type *T. viridis*, as they strictly represent the latter geographically.

Todus pulcherrimus described by R. Bowdler Sharpe (*The Ibis* p. 353, pl. 3, fig. 3 (1874); id. *Cat. Birds Brit. Mus.* Vol. 17, p. 336 (1892), does not seem to have sufficient characters to constitute a different species or variety and I quite agree with Dr. E. Hartert, of Tring, who informs me that he considers it merely an individual aberration of *T. viridis hypochondriacus*. If it actually came from Jamaica, it must have been brought there from St. Domingo.

KEY TO THE GENUS *TODUS*

1. — *Flanks with more or less pink.*
- a. *Chest washed with green, moustachial stripe greyish, lores green, abdomen pale yellow in the middle* *T. VIRIDIS VIRIDIS.*
 - b. *Chest with a brownish grey wash, moustachial stripe whitish, lores green, abdomen yellow in the middle* *T. VIRIDIS SUBULATUS.*
 - c. *Chest with a clear grey wash, moustachial stripe whitish, lores yellow, abdomen white in the middle* *T. VIRIDIS MULTICOLOR.*
2. — *Flanks without any pink colour* *T. VIRIDIS HYPOCHONDRIACUS.*

Characters. I have not had the opportunity to examine the anatomical characters of the species of this small family, and therefore reproduce what Sharpe says in Vol. 17 of the *Cat. of Birds in the British Museum* p. 333 (1892) : « The palate is desmognathous, the basipterygoid » processe is absent. The sternum with four notches on the posterior margin open and not » converted into foramina as in the *Momotis*. Caeca large. The ambiens muscle is absent and no » carotid arteries are present. The spinal feather-tract is well defined on the neck, and is not » forked on the back. The oil-gland with well-developed tufts. The foot is anisodactyle. »

The bill is long, in triangular shape, moderately long, straight and flat and acuminate. There are some black bristles near the nostrils before the eyes. The top of the head, the hind neck, the back are green in all the species or subspecies. The tail is moderately long, the tail feathers, numbering 10, are green above and grey below, and the upper tail coverts are green, the under tail coverts yellowish. The throat is carmine or reddish. The chest is pale yellowish, greenish or pinkish. The flanks are carmine or yellowish. The secondaries, the primary coverts, the greater, median and lesser wing coverts and bastard wings are green, with the underside blackish. The foot is anisodactyle, the tarsus is slender, the toes are long and of the same thickness as the tarsus. The eyes are very pale grey (Gosse) in *T. viridis*.

Actual nest none, a hole being tunnelled by the birds themselves, at the end of which the eggs are deposited. The eggs are four in number and are white.

Bibliography. Murie, *The Ibis*, p. 644 (1872). — Sharpe, *The Ibis*, p. 339 (1874). — Cory, *Birds of West Indies*, p. 164 (1889). — Gosse, *Birds of Jamaica* (1857). — Sharpe, *Cat. Birds Brit. Mus.* Vol. 17, p. 333 (1892). — Dubois, *Synopsis Avium*, Vol. 1, p. 95 (1899).

Range. This family is entirely confined to the Greater Antilles (Jamaica, S. Domingo, Cuba, Porto Rico).

GENUS *TODUS* LINNÆUS

Todus Linnaeus, *Syst. Nat.* Vol. 1, p. 178 (1766) (Type of the genus *T. viridis*); Sharpe, *Cat. Birds Brit. Mus.* Vol. 17, p. 333 (1892).

Geographical Distribution. Peculiar to the Greater Antilles (Jamaica, S. Domingo and Haiti, Cuba, Porto Rico). One species in four distinct subspecies.

1. **Todus viridis viridis** (Linnæus) (1) (Type of the family) (Plate, Fig. 1, 2, 3, 4). Jamaica.
Todus viridis Linnaeus, Syst. Nat. Vol. 1, p. 178 (1766).
Todus viridis Linnaeus, cf. Sharpe, Cat. Birds Brit. Mus. Vol. 17, p. 334 (1892).
 Total length 3.7 inches, culmen 0.75, wing 1.85, tail 1.5, tarsus 0.55.
2. **Todus viridis subulatus** (Gray) (Plate, Fig. 5). S. Domingo.
Todus subulatus Gray, Gen. Birds, Vol. 1, p. 63, pl. 22 (1847). Haiti.
Todus subulatus Gray, cf. Sharpe, Cat. Birds Brit. Mus. Vol. 17, p. 339 (1892).
 Total length 4.4 inches, culmen 0.8, wing 1.95, tail 1.65, tarsus 0.55.
3. **Todus viridis multicolor** (Gould) (Plate, Fig. 6). Cuba.
Todus multicolor Gould, Icon. Avium, pl. 2 (1837).
Todus multicolor Gould, cf. Sharpe, Cat. Birds Brit. Mus. Vol. 17, p. 335 (1892).
 Total length 3.6 inches, culmen 0.75, wing 1.7, tail 1.3, tarsus 0.55.
4. **Todus viridis hypochondriacus** (Bryant) (Plate, Fig. 7). Porto Rico.
Todus hypochondriacus Bryant, Proc. Bost. Soc. Nat. Hist. Vol. 11, p. 39 (1866).
Todus hypochondriacus Bryant, cf. Sharpe, Cat. Birds Brit. Mus. Vol. 17, p. 336 (1892).
 Total length 3.7 inches, culmen 0.9, wing 1.85, tail 1.3, tarsus 0.55.

Habits. In all parts of Jamaica the Tody is a very common bird. On the summit of Bluefields Mountain, about 3,000 feet from the level of the sea, and particularly where the deserted provision-grounds are overgrown with a thicket, almost impenetrable, of jointer or joint-wood, this bird is especially abundant. Always conspicuous from its bright grass-green coat, and crimson-velvet gorget, it is still a very tame bird; yet this seems rather the tameness of indifference than of confidence; it will allow a person to approach very near, and, if disturbed, alight on another twig a few yards distant. We have often captured specimens with the butterfly net, and struck them down with a switch, and it is not uncommon for the little boys to creep up behind one, and actually to clap the hand over it as it sits, and thus secure it. It is a general favourite, and has received the favourite name of Robin Redbreast. I have never seen the Tody on the ground; but it hops about the twigs of low trees, searching for minute insects, occasionally uttering a querulous, sibilant note. But more commonly it is seen sitting patiently on a twig, with the head drawn in, the beak pointing upwards, the loose plumage puffed out, when it appears much larger than it is. It certainly has an air of stupidity when thus seen. But this abstraction is more apparent than real; if we watch it, we shall see that the odd looking grey eyes are glancing hither and thither, and that, ever and anon, the bird sallies out upon a short and feeble flight, snaps at something in the air, and returns to his twig to swallow it.

I have never seen the Tody eating vegetable food; but I have occasionally found in its stomach, among minute coleopterous and hymenopterous insects, a few small seeds. One, which I kept in a cage, would snatch worms from me with impudent audacity; and then beat them violently against the perch or sides of the cage to divide, before he swallowed, them.

One, captured with a net in April, on being turned into a room, began immediately to catch flies, and other minute insects that flitted about. At this employment he continued incessantly, and most successfully, all that evening, and all the next day from earliest dawn to dusk. He would sit on the edge of the tables, on the lines, on shelves, or on the floor; ever

(1) The employment of trinomials, so much dreaded by some ornithologists, is nevertheless most advisable. Nothing is more clear, more easy to remember, and more practical.

Doubtless *Todus viridis subulatus* is shorter and simpler than *Todus viridis* var. *subulatus* or *Todus viridis* subsp. *subulatus*. The trinomial nomenclature will doubtless be generally employed in Ornithology when its usefulness and practicality will be evident.

glancing about, now and then flitting up into the air, when the snap of his beak announced a capture, and he returned to some station to eat it. He would peep into the lowest and darkest corners, even under the tables, for the little globose, long-legged spiders, which he would drag from their webs and swallow. He sought these also about the ceiling and walls, and found very many. I have said that he continued at this employment all day without intermission, and, though I took no account, I judged that, on an average, he made a capture per minute. Water in a basin was in the room, but I did not see him drink, though occasionally he perched on the brim; and when I inserted his beak into the water, he would not drink. Though so actively engaged in his own occupation, he cared nothing for the presence of man; he sometimes alighted voluntarily on our heads, shoulders, or fingers; and when sitting, would permit me at any time to put my hand over it, though, when in the hand, he would struggle to get out.

The inhabitants of Jamaica are not in the habit of domesticating many of the native birds; else this is one of the species which would become a favourite pet. (cf. Gosse, *Birds of Jamaica*, p. 72, London 1847).

EXPLANATION OF PLATE

Fig. 1, 2, 3, 4. *Todus viridis viridis* (Linnæus).

— 5. *Todus viridis subulatus* (Gmelin).

--- 6. *Todus viridis multicolor* (Gould).

— 7. *Todus viridis hypocondriacus* (Bryant).

(All figures are of the natural size).

Brussels, 1st June 1905.

FAM. TODIDÆ

1. 2. 3. 4. TODUS VIRIDIS VIRIDIS. 5. TODUS VIRIDIS SUBULATUS. 6. TODUS VIRIDIS MULTICOLOR.
7. TODUS VIRIDIS HYPOCHONDRIACUS.

1000

GENERA AVIUM

EDITED BY

P. WYTSMAN

WITH CONTRIBUTIONS BY MESSRS. P. L. SCLATER, R. BOWDLER SHARPE,
W. R. OGILVIE-GRANT, E. HARTERT, C. E. HELLMAYR, T. SALVADORI, &^a

PSITTACI

FAM. STRINGOPIDÆ

by T. SALVADORI

WITH 1 COLOURED PLATE

1905

PRICE 2/9 (FR. 3.40)

FAM. STRINGOPIDÆ

FAM. STRINGOPIDÆ

BY T. SALVADORI

HE type of this family is a very extraordinary bird which combines the characters of the Parrots with the appearance of an owl. The distinguishing points of the family are as follows : The sternum is incomplete, with only a rudimentary keel. The orbital ring is complete. The bill is thick, swollen on the sides, with no notch; underside of the hook provided with a file-like surface; gonys rounded with five ridges and four grooves. The nostrils are open in a naked cere, much swollen. The wing is short and rounded; fourth and fifth or even sixth primaries the longest; first nearly equal to the ninth. The tail is short, rounded, with the feathers acuminate. The tarsus is rather long, covered with rounded scales; nails moderately long and stretched. The feathers are rather soft, those surrounding the eyes disposed in a kind of circle, as in the owls.

Range. Only one genus confined to New Zealand.

GENUS STRINGOPS GRAY

Strigops Gray, Gen. Birds, Vol. 2, p. 426 (1845).

Characters. The same as those of the family.

Two species of this genus have been described, but probably one of them is based on an individual variety.

a. Upper surface sap-green; larger	S. HABROPTILUS.
b. Upper surface bluish; smaller	S. GREYI.

1. **Stringops habroptilus** Gray (**Plate, Fig. 1a, b, c, d, e**).

New Zealand

Stringops habroptilus Gray, Gen. Birds Vol. 2, p. 427, pl. cv (1845).*Stringops habroptilus* Finsch, cf. Salvadori, Cat. Birds Brit. Mus. Vol. 20, p. 599 (1891).2 **Stringops greyi** Gray (doubtful)

Patria ignota.

Stringops greyi Gray, Ibis, p. 230 (1862).*Stringops greyi* Finsch, cf. Salvadori, Cat. Birds Brit. Mus. Vol. 20, p. 601 (1891).

We have also figured a yellow variety kindly lent us by Sir Walter Buller (**Plate, Fig. 2**).

EXPLANATION OF PLATE

Fig. 1a. *Stringops habroptilus* Gray.

— 1b. — — — Feather of the breast.

— 1c. — — — Feather of the flanks.

— 1d. — — — Feather of the back.

— 1e. — — — Foot.

— 2. *Stringops habroptilus* Gray. Yellow variety.

Turin, 15th March 1905.

FAM. STRINGOPIDÆ

1. 1a. STRINGOPS HABROPTILUS. 1b. IB. FEATHER OF THE BREAST. 1c. IB. FEATHER OF THE FLANKS.
1d. IB. DORSAL FEATHER. 1e. IB. FOOT. 2. VAR. LUTEA.

4TH PART

PSITTACI

GENERA AVIUM

EDITED BY

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PSITTACI FAM. NESTORIDÆ

by T. SALVADORI

WITH 2 COLOURED PLATES

1905

PRICE 2/11 (FR. 3.60)

PRINTED AND PUBLISHED BY V. VERTENEUIL & L. DESMET, BRUSSELS

FAM. NESTORIDÆ

FAM. NESTORIDÆ

BY T. SALVADORI

THE *Nestoridæ* form a very distinct family among the Psittaci.

Characters. The bill is rather long, longer than deep, much compressed with the culmen grooved along the middle; the hook of the bill underneath nearly smooth, but with superficial longitudinal ridges; under mandible with the gonys nearly straight, or slanting in a gentle curve towards the tip (*cf. Cat. Birds Brit. Mus. Vol. 20, p. 3 (1891) fig. 1, bill and under surface of the hook*). The cere partly covered with hairy feathers. The tongue with a delicate fringe of hairs at the tip. The tail-feathers 12, with the shafts pointed and projecting beyond the webs. The feathers soft, those at the base of the lower mandible projecting forward and hairy. The tarsus is rather long, like that of *Stringops*. The orbital ring is complete. The colouring of the feathers is generally brown, relieved with red and yellow.

Habits. The *Nestoridæ*, like all the Parrots do, have their nests in hollow trees, or in the crevices of the rocks, and lay from two to four white eggs. They live in woods, or among shrubby rocks on high mountains, feeding on insects and their larvæ, and also on a variety of juicy berries; they are very fond of sucking nectar from the crimson flowers of the Rata (*Metrosideros robusta*). It is a well known fact that one species of Nestor (*N. notabilis*) in its wild state has a great penchant for raw flesh, attacking the sheep to obtain it. The species of this genus are easily tamed.

Range. The *Nestoridæ* are confined to the New Zealand subregion.

PSITTACI

Bibliography : Garrod, Proc. Zool. Soc. Lond. (1872), p. 787-789 (tongue).— Buller, Birds New Zeal. p. 39-57 (1873); id. op. cit. 2d. ed. p. 150-175, pls. 17, 18 (1888).— Salvadori, Cat. Birds Brit. Mus. Vol. 20, p. 4-10 (1891). — Lorenz, Verh. Zool. Bot. Ges. Wien, p. 197-199 (1896).— Dubois, Syn. Av. Vol. 1, p. 27 (1899). — Sharpe, Handl. Birds, Vol. 2, p. 1 (1899).

The *Nestoridae* consist of a single genus.

GENUS NESTOR WAGLER

Nestor Wagler, Mon. Psitt. p. 505 (1832) (ex-Lesson, Tr. d'Orn. p. 190 (1831)) (type of the genus *Psittacus meridionalis* Gmelin); Salvadori, Cat. Birds Brit. Mus. Vol. 20, p. 4-10 (1891).

KEY OF THE SPECIES

No yellow band across the breast :

Underparts olive-brown, with no red tinge whatever; bill very long, but not much curved N. NOTABILIS.

Abdomen and under tail-coverts tinged with red.

Larger; wing 29 to 31 cm.; crown paler ashy N. MERIDIONALIS.

Smaller; wing 26 to 28 cm.; crown darker ashy. N. SEPTENTRIONALIS.

A broad yellowish-white band across the breast :

Bill not more than two inches long (= 5 cm.).

Larger; fore-neck and upper breast hoary; wing 11.8 inches (= 50 cm.). N. ESSLINGI.

Smaller; fore-neck and upper breast light brown, with the feathers tinged with yellow; wing 10.3 inches (= 43 cm.). N. PRODUCTUS.

Bill extremely long, 3.8 inches (= 93 mm.) and curved in a semicircle N. NORFOLCENSIS.

Geographical Distribution. The six species known are confined to the New Zealand Subregion.

1. *Nestor notabilis* Gould (Plate, Fig. 2, 2a).

Nestor notabilis Gould, Proc. Zool. Soc. Lond. p. 94 (1856); Salvadori, Cat. Birds Brit. Mus. Vol. 20, p. 4 (1891).

South Island
(New Zealand)

2. *Nestor meridionalis* (Gmelin) (Plate, Fig. 4, 4a, 4b).

Psittacus meridionalis Gmelin, Syst. Nat. Vol. 1, p. 333, n° 98 (1788).

Nestor meridionalis Gray, cf. Salvadori, Cat. Birds Brit. Mus. Vol. 20, p. 5 (1891).

South Island
(New Zealand)

3. *Nestor septentrionalis* Lorenz (Plate, Fig. 1, 1a).

Nestor septentrionalis Lorenz, Verh. zool. bot. Ges. Wien, p. 198 (1896).

North Island
(New Zealand)

4. *Nestor esslingi* Souancé (doubtful).

Nestor esslingi Souancé, Rev. et Mag. Zool. p. 223 (1856); Salvadori, Cat. Birds Brit. Mus. Vol. 20, p. 8 (1891).

Unknown

5. *Nestor productus* (Gould) (extinct) (Plate, Fig. 3).

Ptytolophus productus Gould, Proc. Zool. Soc. Lond. p. 19 (1836).

Nestor productus Gould, cf. Salvadori, Cat. Birds Brit. Mus. Vol. 20, p. 9 (1891).

Philip Island

6. *Nestor norfolcensis* Pelzeln (doubtful).

Nestor norfolcensis Pelzeln, Sitzb. K. Akad. Wissensch. Wien, Bd. 41, p. 322-325, (1860); Salvadori, Cat. Birds Brit. Mus. Vol. 20, p. 10 (1891); Forbes & Robinson, Bull. Liverp. Mus. Vol. 1, p. 5, pl. 1 (1892).

Norfolk Island

I have never seen a specimen of *Nestor septentrionalis*. Dr. E. Hartert writes to me that in Tring Museum there are four specimens from North Island which are sufficiently distinct from

FAM. NESTORIDÆ

1. NESTOR SEPTENTRIONALIS. 1a. 1b. PRIMARIES. 2. NESTOR NOTABILIS. 2a. 1b. FEATHER OF THE BREAST.
3. NESTOR PRODUCTUS. 4. NESTOR MERIDIONALIS. 4a. 1b. DORSAL FEATHER. 4b. 1b. FOOT.

the South Island ones; still it appears that it is not always easy to perceive the difference if single specimens only are compared.

The value of *N. esslingi* as a species is also questioned.

Dr. H. O. Forbes and Mr. H. C. Robinson have thrown some doubts as to *N. norfolcensis* being different from *N. productus*, but the two birds inhabiting two Islands I should say that they must have been different.

Dr. E. Hartert has sent me word that he is convinced that the bill of the so-called *N. norfolcensis* is an overgrown cage-bird bill.

EXPLANATION OF PLATE

Fig. 1. *Nestor septentrionalis* Lorenz.

- 1^a. — — — Primaries.
 - 2. *Nestor notabilis* Gould.
 - 2^a. — — — Feather of the breast.
 - 3. *Nestor productus* (Gould).
 - 4. *Nestor meridionalis* (Gmelin).
 - 4^a. — — — Dorsal feather.
 - 4^b. — — — Foot.
-

Turin, 15th April 1905.

5TH PART

PSITTACI

GENERA AVIUM

EDITED BY

P. WYTSMAN

WITH CONTRIBUTIONS BY MESSRS. P. L. SCLATER, R. BOWDLER SHARPE,
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PSITTACI

FAM. CACATUIDÆ

by T. SALVADORI

WITH 2 COLOURED PLATES

1905

PRICE 6/0 (FR. 7.50)

PRINTED AND PUBLISHED BY V. VERTENEUIL & L. DESMET, BRUSSELS

FAM. CACATUIDÆ

FAM. CACATUIDÆ

BY T. SALVADORI

THE *Cacatuidæ* form a very distinct family among the *Psittaci* and may be easily distinguished.

Characters. Sternum complete. Orbital ring completely ossified, with a process bridging the temporal fossa. Nostrils open in a cere not much swollen, generally naked, but sometimes feathered. Bill very deep, deeper than long, with the upper mandible generally much compressed; hook of the upper mandible nearly perpendicular, except in *Licmetis*, and with a file-like surface underneath. Tarsus short. Head always crested.

As a rule, only the left carotid present.

Habits. The habits of the Kakatoes are very similar to those of the other Parrots.

Range. The *Cacatuidæ* range over the Australian Region, and also in the Philippines.

Bibliography. Slater, Proc. Zool. Soc. Lond. p. 182-189 (1862); Finsch, Die Papageien, Vol. 1, p. 256-378; Salvadori, Cat. Birds Brit. Mus. Vol. 20, p. 101-136; Rothschild & Hartert, Novit. Zool. Vol. 8, p. 531 (1901).

Two subfamilies can be easily distinguished :

SUBFAM. A. CACATUINÆ

Tail-feathers broad, not pointed.

This subfamily contains 5 genera.

SUBFAM. B. CALOPSITTACINÆ

Tail-feathers narrow, and pointed.

This subfamily consist of a single genus.

KEY OF THE GENERA OF THE CACATUINÆ

- A. Checks entirely naked; upper mandible much compressed and much narrower than the under mandible; feathers of the crest very long and narrow Genus MICROGLOSSUS.
- B. Checks feathered.
- a. Tail rather long, the outer tail-feathers shorter than the others; feathers of the crest broad; bill short, much curved and very high; general colour brown or black Genus CALYPTORHYNCHUS.
- b. Tail moderate, nearly even.
- a'. General colour above and below grey; head and crest red in the male; cere feathered Genus CALLOCEPHALUM.
- b'. General colour white or rosy white, except in *Cacatua roseicapilla*, which is grey above, rose colour on the head and below.
- a''. Bill with the hook of the upper mandible of the ordinary size and nearly perpendicular Genus CACATUA.
- b''. Bill with the hook of the upper mandible very long, slender and projecting forward Genus LICMETIS.

Besides the above mentioned genera, to the *Cacatuidæ* has been assigned by Prof. A. Milne-Edwards also the genus *Lophopsittacus* containing a single extinct species, but according to Prof. A. Newton, it seems that its place in the system is far from being satisfactorily established; geographical distribution is not in favour of *Lophopsittacus* belonging to the *Cacatuidæ*.

GENUS LOPHOPSITTACUS NEWTON

Lophopsittacus Newton, Proc. Zool. Soc. Lond. p. 350 (1875) (type of the genus *Psittacus mauritianus* (Owen)).

Lophopsittacus mauritianus (Owen) (extinct).

Mauritius.

Psittacus mauritianus, Owen, The Ibis, p. 168 (1866).

Psittacus (*Lophopsittacus*) *mauritianus*, Newton, Proc. Zool. Soc. Lond. p. 349, 350 (1875).

Lophopsittacus mauritianus, Newton, cf. Salvadori, Cat. Birds Brit. Mus. Vol. 20, p. 102 (1901).

1. GENUS MICROGLOSSUS GEOFFROY ST-HILAIRE

Microglossus Geoffroy St-Hilaire, Ms.; Vieillot, Gal. des Ois. Vol. 1, p. 47, pl. 50 (1821-1823) (type of the genus *Psittacus aterrimus* Gmelin); Salvadori, Cat. Birds Brit. Mus. Vol. 20, p. 102 (1891).

Synonyms: *Solenoglossus*, Ranz. Elem. Zool. Vol. 3, pt. 2, p. 18 (1821); *Microglossum* Vigors, Zool. Journ. Vol. 2, p. 63 (1825); *Microglossa* Voigt, Cuv. Uebers. p. 47 (1831); *Eurhynchus* « Latreille » Lesson, Tr. d'Orn. p. 183 (1831); *Macroglossum* Temminck, Coup d'œil sur les Poss. Néerl. Vol. 3, p. 405 (1849).

Geographical Distribution. The two species known are confined to the Papuan sub-region.

KEY OF THE SPECIES

- a. Larger; wing about 15 inches or 350 to 400 mm (fide R. & H.). M. ATERRIMUS.
 b. Smaller; wing about 12.8 inches or 310 to 350 mm. (fide R. & H.) M. ALECTO.

1. *Microglossus aterrimus* (Gmelin) (Plate 1, Fig. 4).

New Guinea.

Psittacus aterrimus Gmelin, Syst. Nat. Vol. 1, p. 330, no 93 (1788).

N. Australia.

Microglossus aterrimus Vieillot, cf. Salvadori, Cat. Birds Brit. Mus. Vol. 20, p. 103 (1891);

Büttikoffler, Not. Leyd. Mus. Vol. 16, p. 166, 167 (19th. Nov. 1894) (juv.).

Microglossus salvadorii Meyer, Bull. Brit. Orn. Cl. Vol. 4, n. 21, p. 6 (21th. Nov. 1894)

(juv.); cf. Sharpe, Hand-List Birds. Vol. 2, p. 9 (1900).

2. *Microglossus alecto* (Lesson).

Aru Islands and

Eurhynchus alecto Lesson, Compl. de Buffon, Vol. 9, p. 200 (1837).

W. Papuan Islands.

Microglossus alecto Bonaparte, Consp. Av. Vol. 1, p. 7 (1850).*Microglossus aterrimus part.*, Salvadori, Cat. Birds Brit. Mus. Vol. 20, p. 103 (1891).*Microglossus aterrimus alecto* Rothschild & Hartert, Novit. Zool. Vol. 8, p. 77 (1901).

It appears to me that the *Microglossi* from the Aru Islands and the Western Papuan Islands although smaller than those from the main land can scarcely be considered as forming a distinct species.

2. GENUS CALYPTOHRYNCHUS VIGORS & HORSFIELD

Calyptorhynchus Vigors & Horsfield, Trans. Linn. Soc. Lond. Vol. 15, p. 264 (1826) (type of the genus *Psittacus banksii* Latham); Salvadori, Cat. Birds Brit. Mus. Vol. 20, p. 106 (1891).

Synonym : *Banksianus* Lesson, Tr. d'Orn. p. 179 (1831).

Characters. Cheeks feathered; tail rather long; the outer tail-feathers shorter than the others; feathers of the crest broad; bill short, much curved and very high; general colour brown or black.

KEY OF THE SPECIES

A. A light patch on the ear-coverts.

a. Patch on the ear-coverts and tail-band white C. BAUDINI.

b. Patch on the ear-coverts and tail-band yellow.

a'. Larger, wing from 18 to 16 inches (= 457-405 mm) C. FUNERUS

b'. Smaller, wing from 15 to 14 inches (= 382-355 mm) C. XANTHONOTUS.

B. No light patch on the ear-coverts; tail-band red in the adult males, red, more or less tinged with yellow and crossed by black narrow bands in the immature birds, and perhaps also in the adult females.

c. Head and neck like the body glossy greenish black.

c'. Larger; total length about 24 inches (= 610 mm); crest longer.

c''. Bill smaller and less powerful C. BANKSI.

b''. Bill larger, much more powerful C. MACRORHYNCHUS.

d'. Smaller; total length about 22 inches (= 560 mm); crest shorter C. STELLATUS.

d. Head and neck brown; upper parts glossy greenish black C. VIRIDIS.

Geographical Distribution. The members of this genus are confined to Australia and Tasmania.

1. *Calyptorhynchus baudini* Vigors.

S. W. Australia

Calyptorhynchus baudini Vigors, in Lear's Parrots, pl. 6 (1832); cf. Salvadori, Cat. Birds Brit. Mus. Vol. 20, p. 106 (1891).

2. ***Calyptorhynchus funereus*** (Shaw). S. E. Australia.
Psittacus funereus Shaw, Nat. Misc. pl. 186 (1789).
Calyptorhynchus funereus Vigors & Horsfield, cf. Salvadori, Cat. Birds Brit. Mus. Vol. 20,
p. 107 (1891). Tasmania.
3. ***Calyptorhynchus xanthonotus*** Gould. Tasmania.
Calyptorhynchus xanthonotus Gould, Proc. Zool. Soc. Lond. p. 151 (1837); cf. Salvadori,
Cat. Birds Brit. Mus. Vol. 20, p. 108 (1891). S. Australia.
4. ***Calyptorhynchus banksii*** (Latham) (Plate 1, Fig. 3). E. Australia.
Psittacus banksii Latham, Ind. Orn. Vol. 1, p. 107, n. 76 (Joung) (1790). New S. Wales.
Calyptorhynchus banksii Vieillot & Horsfield, cf. Salvadori, Cat. Birds Brit. Mus. Vol. 20,
p. 109 (1891). Victoria.
5. ***Calyptorhynchus macrorhynchus*** Gould. N. Australia.
Calyptorhynchus macrorhynchus Gould, Proc. Zool. Soc. Lond. p. 138 (1842); cf. Salvadori,
Cat. Birds Brit. Mus. Vol. 20, p. 111 (1891).
6. ***Calyptorhynchus stellatus*** Wagler. W. Australia.
Calyptorhynchus stellatus Wagler, Mon. Psitt. p. 685, t. 27 (av. jun.) (1832); cf. Salvadori,
Cat. Birds Brit. Mus. Vol. 20, p. 111 (1891).
7. ***Calyptorhynchus viridis*** (Vieillot). E. Australia.
Cacatua viridis Vieillot, Nouv. Dict. Vol. 17, p. 12 (1817).
Calyptorhynchus viridis, Vieillot, cf. Salvadori, Cat. Birds Brit. Mus. Vol. 20, p. 112 (1891).

3. GENUS CALLOCEPHALUM LESSON

Callocephalon Lesson, in Bougainville, Voy. Thétis, p. 311 (1837) (type of the genus *Psittacus galeatus* Latham).

Synonym : *Corydon* Wagler (nec Lesson), Mon. Psitt. p. 504 (1832).

Characters. Cheeks feathered; tail moderate, nearly even; cere feathered; general colour above and below grey; head and crest red in the male.

Geographical Distribution. Only one species confined to Australia.

1. ***Callocephalum galeatum*** (Latham) (Plate 1, Fig. 5). S. E. Australia.
Psittacus galeatus Latham, Suppl. Ind. Orn. p. 23, n. 13 (1802). Tasmania
Callocephalon galeatum Gray, cf. Salvadori, Cat. Birds Brit. Mus. Vol. 20, p. 113 (1891).

4. GENUS CACATUA VIEILLOT

Cacatua Vieillot, Nouv. Dict. Vol. 17, p. 6 (1817) (type *Psittacus albus* P. S. L. Müller).

Synonyms : *Plyctolophus*, Vieillot, Anal. p. 26, 70 (1816). — *Eolophus* Bonaparte, Rev. & Mag. Zool. p. 155 (1854). — *Ducorpsius* Bonaparte, Compt. Rend. Acad. Sc. Paris, Vol. 44, p. 537 (1857). — *Lophochroa* Bonaparte, op. cit. — *Camptolophus* Sundevall, Meth. Nat. Av. disp. Tent. p. 69 (1872).

Characters. Cheeks feathered; tail moderate, nearly even; bill with the hook of the upper mandible of the ordinary size and nearly perpendicular; general colour white or rosy white, except in *Cacatua roseicapilla*, which is grey above, rose colour on the head and below.

Geographical Distribution. The fourteen species known inhabit Australia, the Austro-Malay subregion and the Philippines.

KEY OF THE SPECIES

A. *Feathers of the crest narrow, with the slender point recurved at the extremity.*

a. *Crest yellow; cere naked.*

a'. *Crest sulphur-yellow.*

a''. *Feathers of the body white.*

a'''. *Larger, wing from 15-13 inches (= 388-330 mm.).*

- a⁴. Naked skin round the eyes white; feathers of the crest more pointed and more recurved C. GALERITA.
- b⁴. Naked skin round the eyes blue; feathers of the crest less pointed and less recurved C. TRITON.
- b⁵. Smaller; wing about 9 inches (= 228 mm.) C. PARVULA.
- b⁶. Feathers of the body white, slightly but constantly tinged with sulphur-yellow; yellow patch on the ear-coverts very conspicuous. C. SULPHUREA.
- b⁷. Crest orange-yellow C. CITRINOCHRISTATA.
- b. Crest vermillion at the base, with a yellow band in the middle of the vermillion part, white at the tip; cere feathered C. LEADBEATERI.
- B. Feathers of the crest broadened, and not recurved at the extremity.
- c. Larger, total length from 20-18 inches (= 508-456 mm.); feathers of the crest very long; cere naked.
- c¹. Crest white. C. ALBA.
- d¹. Crest sulphur-yellow C. OPHTHALMICA.
- e¹. Crest vermillion. C. MOLUCCENSIS.
- d. Smaller; total length from 16-12.6 inches (= 408-315 mm.); feathers of the crest moderate; cere feathered.
- f¹. Under surface white.
- f². Under tail-coverts white.
- f³. Lores stained with red.
- f⁴. Naked skin round the eyes largely extended into a bare blue open space below C. GYMNOPIA.
- g⁴. Naked skin round the eyes nearly circular.
- g⁵. Larger; wing 10 inches (= 254 mm.) C. SANGUINEA.
- h⁵. Smaller; wing 9 inches (= 228 mm.) C. GOFFINI.
- g⁶. Lores white C. DUCORPSI.
- g⁷. Under tail-coverts pale vermillion, edged with white C. HAEMATUROPYGIA.
- g⁸. Under surface rose-colour; upper surface grey C. ROSEICAPILLA.

1. *Cacatua galerita* (Latham).

Australia, Tasmania.

Psittacus galeritus Latham. Ind. Orn. Vol. 1, p. 109, n. 80 (1790).*Cacatua galerita* Vieillot, cf. Salvadori, Cat. Birds Brit. Mus. Vol. 20, p. 116 (1891).2. *Cacatua triton* (Temminck) (Plate 2, Fig. 2).

New Guinea and

Psittacus triton Temminck, Coup d'œil gén. sur les Poss. Néerl. Vol. 3, p. 405 (note) (1849). Papuan Islands.*Cacatua triton* Sclater, cf. Salvadori, Cat. Birds Brit. Mus. Vol. 20, p. 118 (1891).

The birds from the Western Papuan Islands (Waigiu, Salawatti, Mysol and Aru Islands) have been attributed to a smaller race or subspecies (*C. macrolopha* (Rosenb.), Nat. Tijdschr. Ned. Ind. Vol. 23, p. 45 (1861), while those from the Eastern Papuan Islands (Sud-est, Rossel, St. Aignan, Fergusson, Trobriand and Woodlark Islands) have also been separated as a distinct race (*C. trobriandi* Finsch. Samoafahrten, p. 208 (1888), somewhat larger than the latter.

3. *Cacatua parvula* (Bonaparte).

Lesser Sunda

Ptyctolophus parvulus Bonaparte, Compt. Rend. Acad. Sc. Paris, Vol. 30, p. 139 (1850).

Island.

Cacatua parvula Gray, cf. Salvadori, Cat. Birds Brit. Mus. Vol. 20, p. 120 (1891).

Specimens from Lombok, Flores and Sumbawa have been separated as a distinct race (*Cacatua parvula occidentalis* Hartert, Novit. Zool. Vol. 5, p. 120, 1898) on account of the bill being larger and stronger.

4. *Cacatua sulphurea* (Gmelin).Celebes and Islands
in Celebean Sea.*Psittacus sulphureus* Gmelin, Syst. Nat. Vol. 1, p. 330, n. 94 (1788).*Cacatua sulphurea* Vieillot, cf. Salvadori, Cat. Birds Brit. Mus. Vol. 20, p. 121 (1891).

Specimens inhabiting Djampea Island in Celebean Sea have been separated (*Cacatua sulphurea djampeana* Hartert, Novit. Zool. Vol. 4, p. 164, 1897) having the bill somewhat smaller than the birds from Celebes.

5. **Cacatua citrinocristata** (Fraser). Sumba Island.
Ptyctolophus citrinocristatus Fraser, Proc. Zool. Soc. Lond. p. 38 (1844).
Cacatua citrinocristata Gray, cf. Salvadori, Cat. Birds Brit. Mus. Vol. 20, p. 122 (1891).
6. **Cacatua leadbeateri** (Vigors). S. Australia and S. W. Australia.
Ptyctolophus leadbeateri Vigors, Proc. Zool. Soc. Lond. p. 61 (1831).
Cacatua leadbeateri Wagler, cf. Salvadori, Cat. Birds Brit. Mus. Vol. 20, p. 123 (1891).
7. **Cacatua alba** (Müller). Halmahera Group (N. Moluccas).
Psittacus albus Müller, Syst. Nat. Suppl. p. 76, n. 50 (1776).
Cacatua alba Gray, cf. Salvadori, Cat. Birds Brit. Mus. Vol. 20, p. 124 (1891).
8. **Cacatua ophthalmica** Selater. New Britain.
Cacatua ophthalmica Selater, Proc. Zool. Soc. Lond. p. 188, 189 (1864); cf. Salvadori, Cat. Birds Brit. Mus. Vol. 20, p. 125 (1891).
9. **Cacatua moluccensis** (Gmelin). Ceram, Amboina.
Psittacus moluccensis Gmelin, Syst. Nat. Vol. 1, p. 331, n. 96 (1788).
Cacatua moluccensis Wagler, cf. Salvadori, Cat. Birds Brit. Mus. Vol. 20, p. 126 (1891).
10. **Cacatua gymnopsis** Selater. South Australia.
Cacatua gymnopsis Selater, Proc. Zool. Soc. Lond. p. 490, 493 (cum. fig. capitis) (1871);
cf. Salvadori, Cat. Birds Brit. Mus. Vol. 20, p. 127 (1891).
11. **Cacatua goffini** (Finsch) (**Plate 1, Fig. 1, 1a**). Tenimber Island Little Key.
Lophochroa goffini Finsch, Ned. Tijdschr. Dierk. Vol. 1, Berigt, p. 23 (1863).
Cacatua goffini Schlegel, cf. Salvadori, Cat. Birds Brit. Mus. Vol. 20, p. 129 (1891);
Hartert, Novit. Zool. Vol. 8, p. 5 (1901).
12. **Cacatua ducorpsi** Jacquinot & Pucheran (**Plate 1, Fig. 2**). Solomon Islands.
Cacatua ducorpsi Jacquinot & Pucheran, Voy. Pôle Sud, Zool. Vol. 1, p. 108, sp. 23 (1853);
cf. Salvadori, Cat. Birds Brit. Mus. Vol. 20, p. 129 (1891).
13. **Cacatua hæmaturopygia** (Müller). Philippines and Sulu Islands.
Psittacus hæmaturopygius Müller, Syst. Nat. Suppl. p. 77, n. 51 (1776).
Cacatua hæmaturopygia Gray, cf. Salvadori, Cat. Birds Brit. Mus. Vol. 20, p. 130 (1891).
14. **Cacatua roseicapilla** Vieillot (**Plate 2, Fig. 3**). Australia.
Cacatua roseicapilla Vieillot, Nouv. Dict. Vol. 17, p. 12 (1817); cf. Salvadori, Cat. Birds Brit. Mus. Vol. 20, p. 132 (1891).

5. GENUS LICMETIS WAGLER

Licmetis Wagler, Mon. Psitt. p. 505 (1832) (type of the genus *Psittacus nasicus* Temminck).

Characters. The characters of this genus are very similar to those of the genus *Cacatua*, differing only in the hook of the upper mandible which is very long, slender and projecting forward.

Geographical Distribution. Only two species are known both confined to Australia.

KEY OF THE SPECIES

- a. *Smaller; naked skin round the eyes narrower, light blue* **L. NASICA.**
 - b. *Larger; naked skin round the eyes broader and darker, of a blue lead-colour* **L. PASTINATOR.**
1. **Licmetis nasica** (Temminck) (**Plate 2, Fig. 4**). E. N. and S. Australia.
Psittacus nasicus Temminck, Trans. Linn. Soc. Lond. Vol. 13, p. 115 (1819).
Licmetis nasica Ramsay; cf. Salvadori, Cat. Birds Brit. Mus. Vol. 20, p. 133 (1891).
 2. **Licmetis pastinator** Gould. W. Australia.
Licmetis pastinator Gould, Proc. Zool. Soc. Lond. p. 175 (1840); cf. Salvadori, Cat. Birds Brit. Mus. Vol. 20, p. 134 (1891).

SUBFAM. B. CALOPSITTACINÆ

This subfamily contains a single genus with one species only.

6. GENUS CALOPSITTACUS LESSON

Calopsitta Lesson, Ill. Zool. pl. 49 (1832) (type of the genus *Psittacus novae hollandiae* Gmelin).

Synonyms : *Leptolophus* Swainson, Zool. Ill. pl. 112 (1832); *Calopsittacus* Ramsay, Proc. Linn. Soc. N. S. Wales, Vol. 2, p. 199 (1878);

Characters. The tail-feathers narrow and pointed easily define this genus from the other genera of the *Cacatuidæ*. Besides the bill is moderate, with the upper mandible compressed on the sides towards the culmen; the gonys is broad and angular; the cere is naked; the wings are very long; the tarsi are short and the toes long and slender.

Geographical Distribution. The only species of this genus occurs in Australia.

1. **Calopsittacus novae hollandiae** (Gmelin) (Plate 2, Fig. 1, 1a, 1b).

Australia

Psittacus novae hollandiae Gmelin, Syst. Nat. Vol. 1, p. 328, n. 84 (1788).

Calopsittacus novae hollandiae Ramsay, Proc. Linn. Soc. N. S. Wales, Vol. 2, p. 193 (1878); cf. Salvadori, Cat. Birds Brit. Mus. Vol. 20, p. 136 (1891).

EXPLANATION OF PLATES

PLATE 1

Fig. 1. *Cacatua goffini* (Finsch).

- 1^a. — — Foot.
- 2. *Cacatua ducorpsi* Jacquinet & Pucheran.
- 3. *Calyptorhynchus banksii* (Latham).
- 4. *Microglossus aterrimus* (Gmelin).
- 5. *Callocephalum galeatum* (Latham).

PLATE 2

Fig. 1. *Calopsittacus novae-hollandiae* (Gmelin).

- 1^a — — — Wing.
- 1^b — — — Foot.
- 2. *Cacatua triton* (Temminck).
- 3. *Cacatua roseicapilla* Vieillot.
- 4. *Liemetus nasica* (Temminck).

FAM. CACATUIDÆ

1. CACATUA GOFFINI. 1a, 1b. FOOT. 2. CACATUA DUCORPSI. 3. CALYPTORHYNCHUS BANKSI. 4. MICROGLOSSUS ATERRIMUS
5. ALLOCEPHALUM GALEATUM

FAM. CACATUIDE

1. CALOPSITTACUS NOVE HOLLANDIÆ. 1a. IB. WING. 1b. IB. FOOT. 2. CACATUA TRITON. 3. CACATUA ROSEICAPILLA.
4. LICMETIS NASICA.

GENERA AVIUM

CONDUCTED BY

P. WYTSMAN

WITH CONTRIBUTIONS BY MESSRS. P. L. SCLATER, R. BOWDLER SHARPE,
W. R. OGILVIE-GRANT, E. HARTERT, C. E. HELLMAYR, T. SALVADORI, &^o

PICARIÆ

FAM. COLIIDÆ

by P. L. SCLATER, Dr. Sc., F.R.S.

WITH 1 COLOURED PLATE

1906

PRICE 3/7 (FR. 4.50)

Genera Avium. Edited by P. WYTSMAN. 4to. Brussels, V. Verteneuil and L. Desmet. Part VI., Picariæ.—Fam. Coliidae. By P. L. SCLATER. 1906 (1907). Pp. 6; pl. I. Part VII., Steganopodes.—Fam. Pelecanidae. By ALPHONSE DUBOIS. 1907. Pp. 4; pl. I. Part VIII., Picariæ.—Fam. Musophagidae. By ALPHONSE DUBOIS. 1907. Pp. 9; pls. II.

Three more parts¹ of this useful work have recently been published, one of which (part VI.), though dated 1906, apparently was not issued until May, 1907. The general treatment is the same as that of preceding parts, and need not again be explained. "Genera Avium" is, of course, not an exhaustive treatise, but the editor, Mr. P. Wytsman, deserves the thanks of ornithologists for his efforts to bring out a work that shall present in convenient, succinct form, the most important points regarding genera and species, with due regard for the results of recent research.

The Coliidae, or colies (part VI.), a highly peculiar African family allied to the kingfishers, is considered by Dr. Sclater to con-

¹ For a notice of the five previous numbers, cf. SCIENCE, N. S., XXIV., 1906, pp. 438-439.

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sist of eight species. No subspecies are admitted, notwithstanding that all but two of the species have been subdivided, and we think rightly, by recent authors. The nomenclature is not fully up to date, for two of the species have older tenable names than those here used. A new name, *Colius hæmatonotus*, is given, apparently by inadvertence, in the key on page three, to *Colius castanonotus* Verreaux. Our author refers all the species of this family to a single genus, but, as we have elsewhere shown, *Urocolius* Bonaparte, containing *Urocolius macrourus* and *Urocolius indicus* (= *erythromelon* Auct.), has more than one claim to recognition. The single plate in this part represents *Colius leucocephalus* and details of two other species.

The cosmopolitan family Pelecanidae (pelicans) (part VII.) comprises, according to Doctor Dubois, the single genus, *Pelecanus*, with eleven forms, three of which he ranks as subspecies. In the case of *Pelecanus californicus*, which he considers a race of *Pelecanus fuscus* (or, as it should be called, *Pelecanus occidentalis* Linnaeus), he is probably right; but *Pelecanus thagus* Molina is apparently a distinct species. The plate shows a figure of the somewhat doubtful *Pelecanus sharpei*, together with the heads of four other forms.

The Musophagidae, or plantain eaters (part VIII.), another characteristic African family, are here referred to seven genera, without subfamilies. The largest genus, *Turacus*, contains twenty-one forms, including several subspecies; but all the other genera are small, none having more than four species. Two of them—*Corythæola* and the recently discovered *Ruwenzorornis*—are monotypic. We are glad to see that Doctor Dubois adopts the original form of the generic name *Chizarchis* Wagler, instead of the emendation *Schizorhis* so much in vogue. No new forms are described in this number. The two plates illustrate nine species.

HARRY C. OBERHOLSER.

tion of willful plagiarism. It is particularly noticeable on page 150, where, by the way, two references are given to the *American Chemical Journal* which can not be found in that journal. They are in the *Journal of the American Chemical Society*. There is no objection to reprinting journal articles bodily as is very frequently in this book, only a journal article presupposes knowledge of technical details which it is the function of such a book as this to impart. There must be explanatory statements to make the article really useful to the average reader; there must be some editing, in other words. Mr. Herrick has not done enough of such editing and the result is that despite the value of the numerous articles themselves, the whole is not so instructive as it should be.

Chapter V. (38 pp.) is on the cost of alcohol and of alcohol-distilling plants. We have here many extracts from Bulletins of the U. S. Department of Agriculture and a few selections from the author's private correspondence. A little over one page of text is inserted, quite out of place, for it belongs under the head of the manufacture of alcohol, upon "The Manufacture of Ethyl Alcohol from Sawdust." Considering the possibilities latent in methods for obtaining alcohol from wood,

WILSON.

"The Existence of *Rastelia pencillata* and its Teliosporic Phase in North America," by F. D. Kern.

"The Heterotype Chromosomes in *Pinus* and *Thuja*," by I. M. Lewis.

"Insect Galls of Indiana," by Mel T. Cook.

GEOLOGY

"A Probable Origin of the Small Mounds of the Mississippi and Texas Regions," by A. B. Reagan.

"Indiana Soil Types," by C. W. Shannon.

"Structures in the So-called 'Huron' Formation of Indiana, induced by the Solution of the Mississippian Limestone Beneath," by J. W. Beede.

"Stratigraphy of the Richmond Formation of Indiana," by E. R. Cummings.

"Some Peculiarities of the Valley Erosion of Big Creek and its Tributaries in Jefferson County," by Glen Culbertson.

PHYSICS

"The Cause of Surface Tension," by A. L. Foley.

"Loss of Weight in Chemical Reactions," by J. B. Dutcher.

CHEMISTRY

"The Electrolytic Production of Selenic Acid from Lead Selenate," by F. C. Mathers.

"Some Complex Ureids," by James Currie.

"Thiocarbonylsalicylamide and Derivatives," by R. E. Lyons.

"The Volumetric Determination of Selenic Acid," by R. E. Lyons.

The attendance at the meetings was about seventy-five and the interest shown in the work being done in the state was above the average. New members were elected and the treasurer's report showed a satisfactory condition of the finances. Professor Amos W. Butler, secretary of the state board of charities and one of the oldest members, called attention to the fact that two years hence would occur the quarter centennial anniversary of the organization of the state and suggested the desirability

FAM. COLIIDÆ

FAM. COLIIDÆ

BY P. L. SCLATER

THE Colies form one of the most sharply defined and characteristic groups of the Æthiopian Avifauna. They are distinguishable from all other birds at first sight by their cered beak, pamprodactylous feet, their ten long thin tail-feathers and their wiry plumage. It would in fact be easy to divide Birds into «Colies» and «Non-Colies».

Two species of this peculiar form were known to Linnæus, but he placed one of them with the Finches (*Loxia colius*) and the other with the Shrikes (*Lanius macrourus*). The acute observer Brisson first formed the Colies into a genus (*Colius*) in 1760, and since then their claims to stand apart as a separate group of Birds have been universally recognized, though it is not easy to say to what Family they are most closely allied, or to assign to them an exact place in the Picarian Order.

Dr. Murie, who wrote an essay on the structure of the Colies in «*The Ibis*» for 1872, made them an Order by themselves (*Coliomorphæ*), Garrod who read a paper on their anatomy before the Zoological Society of London in 1876 (see *Proc. Zool. Soc. Lond.* 1876, p. 416), placed them in a separate Family, «related on the one hand to the Piciidæ and on the other hand to the Alcedinidæ and Bucerotidæ». We shall not be far wrong in acquiescing in the views of the last distinguished anatomist, through we may agree with Mr. W. L. Sclater (*Birds of Africa*, Vol. 2, p. 94) that the Colies have also some distant affinities to the Plantain-eaters (*Musophagidæ*) and to the Parrots (*Psittaci*).

Characters. The most essential characters of the Coliine structure may be summed up as follows :

Palate desmognathous.

Basipterygoid proceses absent.

Cæca absent.

Ambiens muscle absent.

Sternum with four notches, forming deep clefts in the posterior margin.

Feet pamprodactylous, all four toes being directed forwards, but the first (hallux) reversible (see fig. 1a-5a). Flexor longus hallucis fused with the flexor perforans digitorum.

Spinal tract with a saddle-shaped space.

Rectrices ten, much graduated (see fig. 2).

Oil-gland tufted.

Sexes alike.

Bibliography. Murie, The Ibis, 1872. — Garrod, Proc. Zool. Soc. Lond., 1876. — Sharpe, Cat. Birds Brit. Mus. Vol. 17 (1892). — Sharpe, Hand-List, Vol. 2, p. 14 (1900). — Reichenow, Vögel Afr. Vol. 2 (1902). — W. L. Sclater, Birds of Afr. Vol. 3 (1903). — Dubois, Syn. Avium, p. 90 (1902). — Shelley, The Ibis, 1885, pp. 307-319.

Range. The Colies, as already stated, are entirely confined to the Æthiopian Region exclusive of Arabia and Madagascar, and are sparingly distributed over nearly the whole of it (with the exceptions above-mentioned) except in the utterly desert and densely wooded districts; where they appear to absent. They range from the Lower White Nile where two species occur (*C. leucotis* and *C. macrurus*) down to the Cape Peninsula where three species are found (*C. capensis*, *C. erythromelon* and *C. striatus*).

Habits and Reproduction. The Colies or « Mouse-birds », as they are often called, are almost invariably met with in small flocks of from six to twelve individuals. Even while the females are incubating the males are said to remain together. They resort mostly to thick bushes, in which they climb like Tits (*Parus*), crawling about and placing themselves in all sorts of different attitudes. When alarmed they fly off one after another with a short direct flight, compared by Le Vaillant to an arrow shot from a bow, and assemble again in a neighbouring bush or tree.

The Colies feed mostly on fruits and berries and in many places frequent the suburban gardens as soon as the figs and loquats are ripe, but they also eat young shoots of plants and insects. The nests are open cup-shaped structures, placed at some height on a tree or shrub, and formed of small sticks, bark and wild cotton, in the case of some species lined with green leaves. The eggs are chalky white, but often become more or less stained. The clutch is from 3 to 7 in number. There are eggs of five species of Colies in the British Museum which are described in the *Catalogue of Eggs*, Vol. 3, p. 95 as « typically of a regular oval shape, the shell » being somewhat rough to the touch and quite devoid of all gloss. »

Remarks on the Species. The Colies, as is now acknowledged by all our leading authorities, form but one single genus *Colius*, the terms *Urocolius* and *Rhabdocolius*, invented by Bonaparte for *C. macrurus* and *C. striatus* respectively, being of no scientific value whatever. The structure of these birds is so nearly uniform throughout that the species may be most conveniently arranged by their plumage, and fall primarily into two sections, those with no cross-striations on the feathers, and those with cross-striations. These sections I propose to call « *Colii simpliciplumes* » and « *Colii striatiplumes* » and to arrange the eight species which I recognize as valid under these two heads, as follows.

KEY TO THE GENUS COLIUS

A. *Colii simpliciplumes*.

a. Rump differently coloured from back	{	rump white, black and red.	1. CAPENSIS.
		rump wholly red	2. HÆMATONOTUS.
b. Rump uniform with back	{	nape uniform with back	3. ERYTHROMELON.
		nape blue	4. MACRURUS.

B. *Colii striatiplumes*.

c. Cap brown.			
c'. ear-coverts brown	{	throat brown	5. STRIATUS.
		throat black	6. NIGRICOLLIS.
d'. ear-coverts white or hoary			7. LEUCOTIS.
d. Cap white.			8. LEUCOCEPHALUS.

GENUS COLIUS BRISSON

Colius Brisson, Orn. Vol. 3, p. 304 (1760) (type of the genus *Colius capensis*); Sharpe, Cat. Birds Brit. Mus. Vol. 17, p. 338 (1892).

Synonyms : *Rhabdocolius* and *Urocolius*, Bonaparte, Consp. gen. Avium, p. 3 (1854).

Geographical Distribution. I will now offer a few remarks upon each of these eight species and its distribution, so far as it is at present known. I may state that these remarks are based mainly upon the large series of these birds in the British Museum, which contains 183 specimens and on the series in the Zoological Museum at Tring which has been most kindly lent to me for comparison by Mr. Walter Rothschild.

As the synonymy of the Colies has been in fully given by Dr. Sharpe in the Catalogue of Birds, Vol. 17, p. 338 (1892) and by Dr. Reichenow (*Vögel Afrikas*, Vol. 2, p. 201 [1902]) I shall only quote some of the most necessary references.

1. *Colius capensis*.

Loxia colius Linnæus, Syst. Nat. Vol. 1, p. 301 (1766).

Colius capensis Gmelin, Syst. Nat. Vol. 1, p. 842 (1788); W. L. Sclater, Birds of S. Afr. Vol. 3, p. 97.

Colius colius Sharpe, Cat. Birds Brit. Mus. Vol. 17, p. 343 (1892).

Colius colius damarensis Reichenow, *Vög. Afr.* Vol. 2, p. 207 (1902).

Western Half of the Cape Colony and through the western parts of the Orange-River Colony and Transvaal into Damara-land and German West Africa.

This Coly is at once recognizable by the peculiar colour of the lower back, which is black with a broad line of white in the middle, and a large rump-spot of deep chestnut.

I can see little reason for distinguishing the Damara-land birds (of which there are examples in the British and Tring Museums) as has been proposed by Dr. Reichenow (*Vög. Afr.* Vol. 2, p. 208). They are perhaps a little paler in the head and back, but in my opinion hardly recognizable even as a subspecies.

The Cape Coly is abundant in the neighbourhood of Cape Town, and I have myself seen flocks of it in the gardens in the suburbs of that city.

2. *Colius castanonotus*.

Benguela and Angola.

Colius castanonotus J. & E. Verreaux, Rev. Zool. p. 351 (1855); Sclater, Proc. Zool. Soc. Lond. 1876, p. 413, pl. 35; Monteiro, The Ibis, 1862, p. 333; Sharpe, Cat. Birds Brit. Mus. Vol. 17, p. 342 (1892); Reichenow, Vög. Afr. Vol. 2, p. 206 (1902).

This is a close ally of *C. capensis*, but at once distinguishable by its larger size and the uniform bright chestnut of the lower back. One of the types, received from the Maison Verreaux, is in the British Museum, and there is a fine series in the Tring Collection from Benguela and Angola, collected by Mocquerys, Ansorge and Pemberton.

I am quite doubtful about the occurrence of this species in Gaboon. The localities of the « Maison Verreaux » are notoriously unreliable.

Two living examples of the Chestnut-backed Coly were brought alive to England in 1876 and presented to the Zoological Society of London by Mr. H. C. Fait. Their characteristic attitudes in life are well shown by Mr. Keulemans's figures in the Society's Proceedings.

3. *Colius erythromelon*.

Whole of South Africa south of the Zambesi, extending on the West up to Angola and on the East northwards to Nyasaland.

Colius indicus Latham, Ind. Orn. Vol. 1, p. 375 (1790).
Colius erythromelon Vieillot, Nouv. Dict. Hist. Nat. Vol. 7, p. 378 (1817); Sharpe, Cat. Birds Brit. Mus. Vol. 17, p. 344 (1892); W. L. Sclater, Birds S. Afr. Vol. 3, p. 99 (1903).
Colius lacteifrons Sharpe, Cat. Birds Brit. Mus. Vol. 17, p. 345 (1892).
Colius erythromelon lacteifrons W. L. Sclater, Birds S. Afr. Vol. 3, p. 100 (1903).
Colius indicus, *Colius lacteifrons*, *Colius pallidus*, *Colius angolensis* and *Colius mossambicus* Reichenow, Vög. Afr. Vol. 2, pp. 208, 209 (1902).

This is a wide ranging species and has been divided into as many as five subspecies. But I cannot satisfy myself that the slight characters upon which these subspecies are founded are constant to the different localities assigned to them.

The specific term « *erythromelon* » is probably a misprint for « *erythromelas* », but has attained such a wide usage now-a-days, that it is, perhaps, better not to disturb it.

4. *Colius macrurus*. (Plate, Fig. 3 & 5.)

North-East Africa from Abyssinia and the Sudan south to British East Africa and Uganda, and westwards through Central Africa to Senegal.

Lanius macrourus Linnæus, Syst. Nat. Vol. 1, p. 134 (1766).
Colius senegalensis Gmelin, Syst. Nat. Vol. 1, p. 842 (1788).
Colius macrurus Shelley, Ibis, 1885, p. 308; Sharpe, Cat. Birds Brit. Mus. Vol. 17, p. 345 (1892); Reichenow, Vög. Afr. Vol. 2, p. 233 (1902); Erlanger, Journ. f. Orn. 1905, p. 486.
Colius macrurus pulcher Neumann, Journ. f. Orn. 1900, p. 190.
Colius macrurus senegalensis Neumann, ibidem.

The bright blue patch on the nape renders this species easily distinguishable. I have seen several specimens from Senegal, but have not found in them any recognizable points of difference from the eastern bird.

5. *Colius striatus*.

Cape Colony, Natal, Transvaal and north to the Zambesi.

Colius striatus Gmelin, Syst. Nat. Vol. 1, p. 843 (1788); Shelley, The Ibis, 1885, p. 311; Sharpe, Cat. Birds Brit. Mus. Vol. 17, p. 339 (1902); W. L. Sclater, Birds S. Afr. Vol. 3, p. 95 (1903); Reichenow, Vög. Afr. Vol. 3, p. 202 (1902).
Colius intermedius Shelley, Ibis, p. 311 (1885).
Colius minor Shelley, loc. cit.
Colius striatus minor Reichenow, Vög. Afr. Vol. 2, p. 203 (1902).

We now come to the second division of the genus, in which the plumage is more or less cross-banded with narrow striations. This form extends all over the area of the genus and

many species and subspecies have been established on the various local races. Of these I am able to recognize four only as worthy of specific rank, and even between some of these four there are intermediate forms.

The typical form of the Cape has the breast uniform brown, but specimens from Natal and the eastern district show a more or less well defined blackish patch on the breast, and may be recognized as a subspecies *Colius striatus minor*. But I do not find that the Natal bird is really much smaller in size.

6. *Colius nigricollis*.

Angola and Congoland

Colius nigricollis Vieillot, Nouv. Dict. Hist. Nat. Vol. 7. p. 378 (1817); Shelley, Ibis, 1885, p. 310; Sharpe, Cat. Birds Brit. Mus. Vol. 17, p. 341 (1892); Reichenow, Vög. Afr. Vol. 3, p. 203 (1902).
Colius nigricollis, var. *nigriscapalis* Reichenow, Vög. Afr. Vol. 3, p. 203 (1902).

This, the representative form of *C. striatus* in Angola and Congoland, is distinguished by its black throat, front and lores. It appears to extend far into the interior of the Congo Free State, as Bohndorf got it at Ndoruma in the Niam-Niam country and other collectors have met with it on the Upper Congo.

Dr. Reichenow has founded a subspecies (*Colius nigricollis nigriscapalis*) on the birds from the interior of Cameroon, but, so far as I can judge from the specimens obtained by Mr. Bates on the River Ja (which I believe is an affluent of the Congo) the difference is merely that of a slightly darker coloration in the Cameroon bird.

7. *Colius leucotis*. (Plate, Fig. 2 & 4.)

Eastern Africa from the
Egyptian Sudan and
Abyssinia to Nyasaland.

Colius leucotis Rüppell, Mus. Senkenb. Vol. 3, p. 42 (1845); Shelley, The Ibis, 1885, p. 311; Reichenow, Vög. Afr. Vol. 3, p. 204 (1902).
Colius leucotis affinis Shelley, Ibis, 1885, p. 312; Reichenow, Vög. Afr. Vol. 3, p. 205 (1902).
Colius affinis Sharpe, Cat. Birds Brit. Mus. Vol. 17, p. 342, pl. 12 (1892).
Colius berlepschi Hartert, Under Afr. Sun, p. 333 (1899).
Colius leucotis cinerascens Neumann, Journ. f. Orn. 1900, p. 190.

I have examined a large number of specimens of the representatives of the group of *C. striatus* from different parts of Eastern Africa. There are 64 skins of it in the British Museum from the White Nile, Abyssinia, Somaliland, British and German East Africa, Uganda and Nyasaland, besides 27 in the Tring Collection. I quite agree that there is much variation in this species but am unable to assure myself that these variations are connected with locality. I have found some specimens from Nyasaland practically indistinguishable from others from Abyssinia.

Capt. Shelley based his *C. affinis* on specimens from the White Nile and Dar-es-Salaam in German East Africa. But specimens from the White Nile must surely belong to the typical *C. leucotis*. I think it best therefore to leave all the white-eared forms from Eastern Africa under that name.

8. *Colius leucocephalus*. (Plate, Fig. 1.)

Southern Somaliland and
Northern British East
Africa.

Colius leucocephalus Reichenow, Orn. Centralbl. p. 144 (1879); id., Vög. Afr. Vol. 3, p. 207 (1902); Shelley, The Ibis, 1875, p. 123; Sharpe, Cat. Birds Brit. Mus. Vol. 17, p. 340 (1892).

The well-marked white head at once distinguishes this fine species. The first example of it was obtained by Fischer at Kinakomba in British East Africa in 1878, and long remained a

unicum. In 1902, von Erlanger obtained three specimens in Southern Somaliland on his way to Kis-mayu (*Journ. f. Orn.* 1905, p. 486). The figure is taken from an example in the British Museum which was procured by Lord Delamere on the River Guaso Nyiro (British East Africa), in January 1900. A second example in the British Museum received from the same donor, was obtained by Mr. A. E. Atkinson at Logh in Somaliland.

EXPLANATION OF PLATE

Fig. 1. *Colius leucocephalus*.

- 1a-5a. Feet of *Colius*, with the toes in various positions, from the specimens living in the Zoological Society's Gardens.
- 2. Tail of *C. leucotis* from beneath.
- 3. Wing of *C. macrurus* from beneath.
- 4. Head of *C. leucotis*.
- 5. Head of *C. macrurus*.

Odiham, Hants, 15th July 1906.

FAM. COLIIDÆ

1. COLIUS LEUCOCEPHALUS. 2. TAIL OF COLIUS LEUCOTIS. 3. WING OF COLIUS MACRURUS.
4. HEAD OF COLIUS LEUCOTIS. 5. HEAD OF COLIUS MACRURUS. 1a-5a. FEET OF COLIUS SHOWING TOES IN
DIFFERENT DIRECTIONS.

7TH PART

STEGANOPODES

GENERA AVIUM

CONDUCTED BY

P. WYTSMAN

WITH CONTRIBUTIONS BY MESSRS. A. DUBOIS, P. L. SCLATER, R. BOWDLER
SHARPE, W. R. OGILVIE-GRANT, E. HARTERT, C. E. HELLMAYR, T. SALVADORI, &c.

STEGANOPODES

FAM. PELECANIDÆ

by Dr ALPHONSE DUBOIS

WITH 1 COLOURED PLATE

1907

PRICE 3/2 FR. 4.

FAM. PELECANIDÆ

FAM. PELECANIDÆ

BY DR. ALPHONSE DUBOIS

THE *Pelecanidæ* form a very distinct family among the Steganopodes and the earliest authors have always distinguished them from any other family of Birds.

Characters. Bill very long, straight; the culmen rounded at the base, and flat towards the tip, which is armed with an acute, compressed, strong hook; lower mandible forming two branches attached at the point, and sustaining a very large distensible gular pouch; nostrils basal, elongated; wings very large, the second and third quills nearly equal and longest; tail short and rounded, composed of 22 or 24 feathers; tarsi short, compressed, and covered with reticulated scales; toes long, and all four united by a full web. Palatines fused in the middle line, and provided with a deep median keel; furculum fused with the carina sterni, which is about three quarters of the length of the corpus sterni.

Habits and Reproduction. These large birds are essentially aquatic in their habits, frequenting rivers, lakes, and sea. In the morning and evening they are seen in small flocks of six to fourteen individuals, engaged in fishing, until their pouch is sufficiently filled. It has been affirmed, that they occasionally capture their prey by uniting into large flocks, and encircling a piece of water, beating with their wings on the surface, until the affrighted fish are driven into a small space, and deprived of all means of escape. They swim with ease and great swiftness, and fly with facility and speed, though they take wing heavily. They breed in large lagoons or shallow lakes, constructing a large bulky nest of reeds and aquatic herbage, on small islands or on a platform of reeds and lay two to four rough chalky white eggs.

Range. The *Pelecanidae* are distributed over the tropical and temperate regions of both hemispheres.

Bibliography. Schlegel, Mus. Hist. Nat. Pays-Bas (*Pelecanus*) (1863); Sclater, Proc. Zool. Soc. Lond. p. 269 (1868), p. 631 (1871); Elliot, Proc. Zool. Soc. Lond. p. 579 (1869); Dubois, Bull. Mus. Hist. Nat. Belg. Vol. 2, p. 1 (1883); Ogilvie-Grant, Cat. Birds Brit. Mus. Vol. 26, p. 460 (1898); Dubois, Synopsis Avium, Vol. 2, p. 1005 (1903).

GENUS PELECANUS LINNAEUS

Pelecanus Linnaeus, Syst. Nat. p. 132 (1758) (type *P. onocrotalus*).

Synonyms : *Onocrotalus*, Brisson, Orn. Vol. 6, p. 519 (1760) (type *P. onocrotalus*). — *Cyrtopelicanus*, Reichenbach, Naturl. Syst. Vög. p. 7 (1853) (type *P. erythrorhynchus*). — *Leptopelicanus*, Reichenbach, ibidem (1853) (type *P. fuscus*). — *Catastropelicanus*, Reichenbach, ibidem (1853) (type *P. conspicillatus*).

Characters. The same as those of the family.

KEY OF THE SPECIES AND SUBSPECIES

1. Gular pouch extending less than halfway down the neck; general plumage white, occasionally more or less tinged with rosy pink.

A. Bare loreal space extending to the mandibles.

a. Feathers on the forehead extending to a point on the culmen (fig. 2).

a'. Size very large; tail with 24 feathers :

1. Breast-patch ochreous yellow	P. ONOCROTALUS.
2. Breast-patch rufous chesnut.	P. SHARPEI.
3. Size smaller; tail with 22 feathers	P. ROSEUS.

b. Feathers on the forehead forming a concave line at the base of the culmen (fig. 3).

b'. Lower mandible free of feathers at base; feathers with blackish shafts :

4. Size large, wings 0m71; a full crest of long, soft, curly feathers.	P. CRISPUS.

b''. Smaller, wings 0m57 — 0m59

5. Sides of the upper mandible with irregular blackish spots	P. PHILIPPENSIS.
6. Sides of the upper mandible without spots	P. RUFESCENS.

c. Lower mandible feathered at base :

7. Feathers with white shafts.	P. ERYTHORHYNCHUS.

B. Bare loreal space separated from the bill by a row of feathers.

8. Upper tail-coverts and tail black	P. CONSPICILLATUS.

2. Gular pouch large, extending about halfway down the neck; plumage coloured.

9. Size large, wings about 0m58	P. MOLINAE.
10. Smaller, wings 0m52; pouch dull greenish brown or olive-brown	P. FUSCUS.
11. Pouch red (in the breeding season)	P. CALIFORNICUS.

1. ***Pelecanus onocrotalus* Linnaeus (Plate, Fig. 2).**

- Pelecanus onocrotalus* Linnaeus, Syst. Nat. p. 132 (1758).
Onocrotalus albus Brisson, Ornith. Vol. 6, p. 519 (1760).
Onocrotalus brissonii Children, in Denham & Clapperton, Narrative of Travels and Discoveries in Northern and Central Africa. p. 205 (1826).
Onocrotalus phoenix Lesson, Man. d'Orn. Vol. 2, p. 371 (1828).
Pelecanus longirostris, Hume, Stray Feathers. Vol. 5, p. 491 (1877).

Southern Europe and Africa, ranging eastward into Northern India.

2. ***Pelecanus sharpei* Barboza du Bocage (Plate, Fig. 1).**

- Pelecanus sharpei* Barboza du Bocage, Pr. Zool. Soc. 1870, pp. 173, 409; Sclater, ibidem, 1871, pl. 51.
Pelecanus onocrotalus var. *sharpei* Dubois, Bull. Mus. Hist. Nat. Belg. Vol. 2, p. 8 (1883).
Pelecanus giganteus Brehm, Journ. f. Orn. p. 94 (1855).

Angola, Lower-Congo

3. ***Pelecanus roseus* Gmelin.**

- Pelecanus roseus* et *Pelecanus manillensis* Gmelin, Syst. Nat. Vol. 2, p. 570-71 (1788).
Pelecanus javanicus Horsfield, Trans. Linn. Soc. Lond. (Zool.) Vol. 13, p. 197 (1822).
Pelecanus minor Rüppell, Mus. Senck. Vol. 2, p. 185 (1837); id., Vög. N. O. Afr. p. 132, pl. 49 (1845).
Pelecanus mitratus Lichtenstein, Abh. Akad. Wiss. Berlin 1838, p. 436, pl. 3.
Pelecanus calirhynchus Hodgson, in Gray's Zool. Miscell. p. 86 (1844).
Pelecanus onocrotalus (part.) Gray, List of Birds, Vol. 3, p. 189 (1844) et auct. plur.
Pelecanus pygmaeus Brehm, Vogelf. p. 362 (1855).
Pelecanus megalophus Heuglin, Vög. N. O. Afr. p. 72 (1856).
Pelecanus onocrotalus var. *minor* Dubois, Consp. Syst. et Geogr. Avium Eur. p. 31, n° 499 (1871).

Africa, South-Eastern Europe, South Asia, Java, Borneo, Sumatra and the Philippine Islands.

4. ***Pelecanus crispus* Bruch.**

- Pelecanus crispus* Bruch, Isis, 1832, p. 1109; Gould, Birds Eur. Vol. 5, pl. 406.
Pelecanus patagiatus Brehm, Vogelf. p. 361 (1855).
Pelecanus orientalis Wright, Ibis, 1869, p. 255.

South Europe, North Africa, ranging eastward through Northern India, China to S.-E. Mongolia.

5. ***Pelecanus philippensis* Gmelin (Plate, Fig. 4).**

- Pelecanus philippensis* Gmelin, Syst. Nat. Vol. 1, 2, p. 571 (1788).
Pelecanus gangeticus Hodgson, in Gray's Zool. Misc. p. 86 (nomen nudum (1844)).
Pelecanus brevirostris Hodgson, in Bonap. Consp. Av. Vol. 2, p. 162 (1855).
Pelecanus philippinus Gould, Proc. Zool. Soc. Lond. 1859, p. 150.
Pelecanus philippinensis Blanford & Walden, Cat. Mam. & Birds Burmah, p. 164 (1875).
Pelecanus manillensis Oates (nec Gmelin), Birds Brit. Burmah. Vol. 2, p. 236 (1883).

South Asia, ranging southward to the Malay Peninsula, and eastward to Java, Hainan, Luzon and Mindanao.

6. ***Pelecanus philippensis* var. *rufescens* Gmelin (Plate, Fig. 3).**

- Pelecanus rufescens* Gmelin, Syst. Nat. Vol. 1 (2), p. 571 (1788).
Pelecanus cristatus Lesson, Traité d'Orn. p. 602 (1831).
Pelecanus phaeospilus Wagler, Isis, 1832, p. 1233.
Pelecanus philippensis (part.), auct. plur. nec Gmelin.
Pelecanus philippensis var. *rufescens* Dubois, Bull. Mus. Hist. Nat. Belg. Vol. 2, p. 9 (1883).

Africa, South of about 16° N. lat., Madagascar E.

7. ***Pelecanus erythrorhynchus* Gmelin.**

- Pelecanus onocrotalus* Forster (part.), Phil. Trans. Vol. 62, p. 419 (1772) et auct. plur. nec Lin.
Pelecanus erythrorhynchus Gmelin, Syst. Nat. Vol. 1 (2), p. 571 (1788).
Pelecanus trachyrhynchus Latham, Ind. Orn. Vol. 2, p. 884 (1790).
Onocrotalus hernandezii Wagler, Isis, 1832, p. 1233.
Pelecanus americanus Anderson, Orn. Biogr. Vol. 4, p. 88, pl. 311 (1838).

United States of North America, in winter to Central America.

8. ***Pelecanus conspicillatus* Temminck.**

- Pelecanus conspicillatus* Temminck, Pl. Col. d'Ois. Vol. 5, pl. 118 (1824).
Pelecanus australis Stephens, in Shaw's Gen. Zool. Vol. 13 (1), p. 113 (1825).

Australia, Tasmania, New Guinea.

✓ 9. ***Pelecanus fuscus* Gmelin (Plate, Fig. 5).**

- Pelecanus fuscus* Gmelin, Syst. Nat. Vol. 1 (2), p. 570 (1788).
Pelecanus carolinensis Gmelin, ibidem, Vol. 1 (2), p. 571 (1788).

Coasts and Islands of the Gulf of Mexico and Caribbean Sea.

10. *Pelecanus fuscus* var. *californica* (Ridgway).*Pelecanus fuscus* (part.) auct. plur.*Pelecanus californicus* Ridgway in Baird, Brewer & Ridgway Water-Birds N. Amer. Vol. 2, p. 143 (1884); idem The Auk. 1886, p. 267.

Pacific coasts of N. America, southward to Panama and the Galapagos Islands.

11. *Pelecanus fuscus* var. *molinae* Gray.*Pelecanus thagus*, auct. plur. nec Molina (11).*Pelecanus fuscus* (part.) auct. plur.*Pelecanus molinae* Gray, List of Birds. Vol. 3, p. 189 (1844); Elliot, P. Z. S., 1869, p. 588, pl. 44.*Pelecanus barbieri* Oustalet, Bull. Soc. Philom. Paris, 1878, p. 208.*Pelecanus fuscus* var. *molinae* Dubois, Bull. Mus. Hist. Nat. Belg. Vol. 2, p. 11 (1883).

Pacific coasts of south America to Central Chili.

(1) *Pelecanus thagus* of Molina is a bird existing only in imagination (see the extraordinary description given by Molina in the German translation, Leipzig. 1786, pp. 212, 213 and 305).

EXPLANATION OF PLATE

Fig. 1. *Pelecanus sharpei*, Barboza du Bocage.— 2. — *onocrotalus*, Linnæus (head).— 3. — *philippensis* var. *rufescens*, Gmelin (head).

— 4. — — Gmelin (head).

— 5. — *fuscus*, Gmelin (head).

(All figures are of 1/6 natural size except figs. 2 and 3 who are greater.)

Brussels, 15th April 1907.

FAM. PELECANIDÆ

1. PELECANUS SHARPEI. 2. P. ONOCROTALUS. 3. P. RUFESCENS. 4. P. PHILIPPENSIS. 5. P. FUSCUS.

8TH PART

PICARIÆ

GENERA AVIUM

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PRICE 6/3 (FR. 7.80)

FAM. MUSOPHAGIDÆ

FAM. MUSOPHAGIDÆ

BY DR. ALPHONSE DUBOIS

UTHORS do not quite agree as to the place which the *Musophagidæ* ought to occupy in the series of Birds. I see little use in quoting the opinions of ancient authors on this subject and it will suffice to mention the views of those who have made a study of this family during the last few years.

In 1860, Dr. Cabanis (1) placed the *Musophagidæ* after the *Caprimulgidæ*, adding the former to the *Coliidæ* and to the *Opisthocomidæ*, forming a tribe which he called the *Amphibolæ* (« Wendezeher »). Twelve years later, Sundevall (2) arranged the *Meliphagidæ* and the *Coliidæ* together with the *Coraciidæ* in his fourth Cohors (*Coenomorphæ*). In 1880, P. L. Sclater, in his *Systema Avium* (3), joins the *Musophagidæ* to the *Cuculidæ*, thus forming his group of *Coccyges*, which he placed after the *Zygodactylæ*, putting the *Coliidæ* at the top of the *Anisodactylæ*. Finally, Dr. R. Bowdler Sharpe admitted the *Coccyges* of Sclater, but placed them in succession to the *Trogonidæ*, while the last named are preceded by the *Coliidæ* (4).

In my *Synopsis Avium* (1899) I adopted the suborder *Amphibolæ* of Dr. Cabanis, with the exclusion of the *Opisthocomidæ* (which are not *Scansores*) and I placed the families in the following order : 1. *Heterodactylæ* : *Trogonidæ*; 2. *Amphibolæ* : *Musophagidæ*, *Coliidæ*; 3. *Anisodactylæ* : *Coraciidæ*, *Momotidæ*, etc. (5).

I think that in this arrangement the *Musophagidæ* occupy their right place.

(1) *Museum Heineanum*, Vol. 3, p. 96-102 (1860).

(2) *Methodi naturalis avium disponendarum tentamen*, p. 82 (1872).

(3) *Ibis*, 1880, p. 399-402.

(4) *Hand-list of the Genera and Species of Birds*, Vol. 2, p. 152-154 (1900).

(5) *Synopsis Avium*, Vol. 1, p. 88-91; Vol. 2, p. 1060 (1899-1904).

Characters. The *Musophagidæ* constitute a well-marked family of the Scansores, recognizable at first sight by the outer toe being capable of being turned either backwards or forwards. These birds have the bill moderate, broad at the base, the culmen much elevated, curved, and the sides more or less compressed towards the tip, which is strongly emarginated; the wings short and rounded; the tail elongated, broad, with ten feathers; the tarsi moderate, strong and covered in front with broad transverse scales. Palate desmognathous; basipterygoid processes absent; hallux present.

Habits. These birds live in trees, generally in the forest, and their food consist of fruit, berries, buds, seeds of various plants, and insects.

Range. This family is confined to the Ethiopian Region proper, and is not met with in Madagascar.

Bibliography. Gray. Gen. of Birds, Vol. 2, Musoph. (1845); Cabanis. Museum Heineanum, Vol. 3, Musoph. (1860); Schlegel & Westerman, De Toerako's afgebeeld en beschreven (1860); Schalow, Die Musophagidæ (Journ. f. Orn. 1886, p. 1); Shelley, Cat. Birds Brit. Mus. Vol. 19, p. 435-456 (1891); Dubois, Syn. Avium, p. 88-91, Suppl. p. 1060 (1899-1904); Sharpe, Hand-list of Birds, Vol. 2, p. 152-154 (1900); Reichenow, Die Vögel Afrikas, Vol. 2, p. 25-56 (1902-1903); Dubois, Rem. Orn. Etat Indép. du Congo [Ann. Mus. Congo, Zool. (4), Vol. 1 (1905)].

KEY OF THE GENERA OF THE MUSOPHAGIDÆ

A. With crimson on the quills :

1. Bill broad and elevated at the base, with the culmen much advanced on the forehead ;
general plumage glossy violet-blue Genus MUSOPHAGA.
2. Nostrils large, but covered by the recumbent feathers; plumage partly grass-green . Genus TURACUS.
3. Nostrils exposed; bill black, the sides a little compressed :
4. Nostrils rounded, back of upper neck metallic green Genus GALLIREX.
5. Nostrils longitudinal, back of upper neck crimson Genus RUWENZORORNIS.

B. With no crimson on the quills :

6. Bill yellow, flattened, culmen compressed throughout its length; general plumage
above verditer-blue Genus CORYTHÆOLA.

C. Nostrils linear, placed in a partially curved groove and nearer to the forehead than to the tip of the bill; general plumage ashy-grey :

7. Front half of the head feathered Genus CHIZÆRHIS.
8. Front half of the head bare Genus GYMNOCHIZORHIS.

1. GENUS TURACUS CUVIER

Turacus Cuvier, Leçons d'Anat. Comp. Vol. 1, pl. 2 (1800) (type *T. macrorhynchus*).

Synonyms : *Corythaix*, Illiger, Prodr. p. 202 (1811) (type *T. leucotis*). — *Opaethus*, Vieillot, Analyse, p. 29 (1816) (type *T. erythrolophus*). — *Corythrix*, Fleming, Philos. Zool. Vol. 2, p. 250 (1822). — *Spelectos*, Wagler, Syst. Av., Spelectos, fol. 8, p. 3 (1827) (type *T. corythaix*).

Characters. Bill short, with the culmen elevated and arched to the tip, the sides much compressed, and the lateral margins finely serrated; nostrils placed in the middle of the upper mandible, large and open, but more or less covered by the recumbent feathers. Plumage partly grass-green.

Geographical Distribution. The species of this genus are confined to Tropical and Southern Africa.

KEY OF THE SPECIES

A. Upper half of the head blackish-green or steel-blue :

1. *Crest blackish-green; a large white spot in front of the eye, behind the ear-coverts a white patch extending on each side of the throat.* T. LEUCOTIS.
2. *Entire upper half of head steel-blue, with a white patch in front of the eye.* T. HARTLAUBI.

B. Forehead and crown violet :

3. *Crest white.* T. LEUCOLOPHUS.

C. Head or crest with red :

4. *Upper part of head red, crest tipped with white; sides of head and chin white* T. ERYTHROLOPHUS.
5. *Forehead green, crest reddish behind; a large white patch behind the ear-coverts* T. DONALDSONI.
6. *Crest green and red, this red colour deepening almost into black, hind crest and nape tipped with white; no white patch behind the ear* T. FISCHERI.
7. *Crest uniform green, tipped with red* T. MERIANI.
8. *Crest greenish-white, the lowest part red or reddish* T. RUSPOLII.

D. No red on the head :

9. *Crest green, tipped with black and with a white subterminal bar* T. MACRORHYNCHUS.

E. Crest uniform green :

10. *With a partially defined black band and a strongly marked white one under the eye.* . . T. PERSA.
11. *With a strongly marked black band and only a slight streak of white under the eye.* . . T. BUFFONI.
12. *With a black streak under the eye and a white streak underneath the black one* T. ZENKERI.

F. Crest green, tipped with white :

a. Bill black :

13. *Back, wings and tail violet* T. SCHÜTTI.
14. *Back and wings brilliant bluish-green with violaceous reflections; tail dark blue shaded with green, and with violaceous reflections* T. SHARPEI.
15. *Back and wings of a beautiful bronzed green; tail green strongly shaded with blue* . . . T. EMINI.

b. Bill orange :

16. *Crest more developed than in the preceding, evenly rounded, largely tipped with white* . . T. CORYTHAIX.

G. Crest elongated green, tipped with white, the front (or anterior) feathers the longest :

17. *Back, wings and tail bronzed green* T. LIVINGSTONEI.
 18. *Back, wings and tail brilliant steel-blue with violaceous reflections* T. REICHENOWI.
 19. *Back, wings and tail brilliant blue-green, the last bluer.* T. HYBRIDUS.
 20. *Back and wings bronzed green, the tail violet-blue* T. SCHALOWI.
 21. *Similar to T. schalowi, but the crest-feathers before the white tips brilliant bluish-green.* T. CHALCOLOPHUS.
-
1. **Turacus leucotis** Rüppell. North-east Africa from
Corythaix leucotis Rüppell, Neue Wirb. Abyss. p. 8, pl. 3 (1835-40). Bogos throughout
Turacus leucotis Rüppell, Syst. Uebers. Vög. N.-O. Afr. p. 80 (1845). Abyssinia to Shoa.
 2. **Turacus hartlaubi** (Fischer & Reichenow). East Africa, South of the
Corythaix hartlaubi Fischer & Reichenow, Journ. f. Orn. 1884, p. 52; 1885, p. 123, pl. 5, f. 1. Equator, Masailand
Turacus hartlaubi Shelley, Proc. Zool. Soc. Lond. 1884, p. 224. and Kilimanjaro.
 3. **Turacus leucolophus** Heuglin (**Plate 1, Fig. 4**). Central Africa, West of
Turacus leucolophus Heuglin, Sitzber. Akad. Wien, 1856, p. 297 (nom. nud.); Journ. the Upper White Nile,
f. Orn. 1864, p. 268. from the Bar-el-Ghazal
Musophaga leucolopha Schlegel & Westerman, De Toerako's, p. 12, pl. 4 (1860). to the Albert Nyanza;
Niam-Niam, Uelle.
 4. **Turacus erythrolophus** (Vieillot). West Africa, from Sierra
Opæthus erythrolophus Vieillot, Nouv. Dict. Vol. 34, p. 306 (1819). Leone to Angola.
Musophaga paulina Temminck, Pls. Col. d'Ois. Vol. 1, p. 75, pl. 23 (1820).
Corythaix igniceps Lesson, Man. d'Orn. Vol. 2, p. 155 (1828).
Turacus erythrolophus Gray, Gen. of Birds, Vol. 2, p. 395 (1845).
 5. **Turacus donaldsoni** Sharpe (**Plate 1, Fig. 5**). Western Somali-land (to
Turacus donaldsoni Sharpe, Bull. Brit. Orn. Club. Vol. 4, p. 32 (1895); The Ibis, 1895, South Abyssinia?).
p. 381; Proc. Zool. Soc. Lond. 1895, p. 495, pl. 28.
 6. **Turacus fischeri** (Reichenow). East Africa, between
Corythaix fischeri Reichenow, Orn. Centralbl. 1878, p. 88; Journ. f. Orn. 1878, p. 252. Kilimanjaro and Zan-
pl. 4, f. 1. zibar.
Turacus fischeri Shelley, Proc. Zool. Soc. Lond. 1881, p. 590.
 7. **Turacus meriani** Rüppell. West Africa, from the
Turacus meriani Rüppell, Arch. f. Naturg. 1851, p. 319; Schlegel & Westerman, De Congo to the Came-
Toerako's, p. 10, pl. 8 (1860). roons and to Stanley
Musophaga verreauxii Schlegel, Journ. f. Orn. 1854, p. 462. Pool in the interior.
 8. **Turacus ruspolii** Salvadori. Somali-land.
Turacus ruspolii Salvadori, Ann. Mus. Stor. Nat. Genova (2), Vol. 16, p. 44 (1896).
 9. **Turacus macrorhynchus** (Fraser). Upper Guinea, from the
Corythaix macrorhyncha Fraser, Proc. Zool. Soc. Lond. 1839, p. 34. Gaboon and Fernando
Turacus macrorhynchus Gray, Gen. of Birds, Vol. 2, p. 395, pl. 95 (1845). Po to Senegambia.
 10. **Turacus persa** (Linnæus). West Africa, from Sene-
Cuculus persa Linnæus, Syst. Nat. Vol. 1, p. 171 (1766). gambia to the Congo.
Turacus persa Gray, Gen. of Birds, Vol. 2, p. 395 (1845); Schlegel & Westerman, De
Toerako's, p. 16, pl. 9 (1860).
Turacus persa büttneri Reichenow, Journ. f. Orn. 1891, p. 375.
Turacus persa var. *büttneri* Dubois, Syn. Avium, Vol. 1, p. 89 (1899).
 11. **Turacus buffoni** (Vieillot). Upper Guinea.
Opæthus buffoni Vieillot, Nouv. Dict. Vol. 34, p. 304 (1819).
Corythaix purpureus (Cuvier), Lesson, Traité d'Orn. p. 124 (1831).
Corythaix senegalensis Swainson, Birds W. Afr. Vol. 1, p. 225, pl. 21 (1837).
Turacus buffoni Rüppell, Arch. f. Naturg. Vol. 17, p. 320 (1851).
 12. **Turacus buffoni** var. **zenkeri** (Reichenow). From Cameroons to the
Turacus zenkeri Reichenow, Journ. f. Orn. 1896, p. 9. Congo.
Turacus buffoni var. *zenkeri* Dubois, Syn. Avium Vol. 1, p. 89 (1899).

13. **Turacus schüttoi** (Cabanis).
Corythaix schüttoi Cabanis, Orn. Centralbl. 1879, p. 180.
Corythaix schueti Cabanis, Journ. f. Orn. 1879, p. 445.
Turacus schueti Shelley (part.), Cat. Bird. Brit. Mus. Vol. 19, p. 441 (1891).
Turacus schüttoi Reichenow, Vög. Afr. Vol. 2, p. 49 (1902); Dubois, Ann. Mus. Congo, Zool. (4), t. I, p. 4, pl. 2 (1905).
 Angola, Congo - State.
 (to the Eastern province of the Congo).
14. **Turacus emini** Reichenow.
Turacus emini Reichenow, Orn. Monatsb. 1893, p. 30; Dubois, Ann. Mus. Congo, Zool. (4), t. I, p. 4, pl. 3, f. 1.
 Central Africa : Bundeko, Mumbo, Ukondju, Irumu, Ituri.
15. **Turacus emini var. sharpei** (Reichenow).
Turacus schueti (nec Cabanis.) Shelley, Cat. Birds. Brit. Mus. Vol. 19, p. 441 (part. 1891).
Turacus sharpei Reichenow, Orn. Monatsb. 1898, p. 182.
Turacus schueti var. *sharpei* Dubois, Syn. Avium Vol. 1, p. 89 (1899).
Turacus finschi Reichenow, Orn. Monatsb. 1899, p. 190.
Turacus emini var. *finschi* Dubois, Syn. Avium Vol. 2, p. 1060 (1903).
Turacus emini var. *sharpei* Dubois, Ann. Mus. Congo, Zool. (4), t. 1, pp. 5, 35, pl. 3, f. 2 (1905).
 Niam-Niam, Uelle, Bannalia.
16. **Turacus corythaix** (Wagler).
Spelectos corythaix Wagler, Syst. Avium, Spelectos, sp. 1 (1827).
Corythaix musophaga Ch. Dubois, Orn. Gal. p. 2, pl. 2 (1839).
Turacus albocristatus Strickland, Ann. Nat. Hist. Vol. 7, p. 33 (1841).
Turacus corythaix Rüppell, Arch. f. Naturg. Vol. 17, p. 320 (1851).
 South Africa, from the Zambesi into Natal and the Cape Colony.
17. **Turacus livingstonei** Gray.
Turacus livingstonii Gray, Proc. Zool. Soc. Lond. p. 44 (1864).
Corythaix livingstonei Finsch & Hartlaub, Vög. Ost Afr. p. 476 (part.) (1870).
Corythaix cabanisi Reichenow, Journ. f. Orn. 1883, p. 221; 1885, pl. 5, f. 4.
Turacus livingstonei Reichenow, Vög. Afr. Vol. 2, p. 51 (1902).
 South-East Africa, from Sululand to Lake Niassa.
18. **Turacus livingstonei var. schalowi** (Reichenow) (Plate 1, Fig. 1, 2, 3).
Turacus livingstonii Auct. plur. (nec Gray).
Corythaix schalowi Reichenow, Journ. f. Orn. 1891, pp. 147, 210.
Turacus schalowi Barboza du Bocage, Journ. Acad. Sc. Lisboa, Vol. 7, p. 163 (1892).
Turacus livingstoni var. *schalowi* Dubois, Syn. Avium Vol. 1, p. 89 (1899).
Turacus livingstonei var. *marungensis* Reichenow, Vög. Afr. Vol. 2, p. 52 (1902).
 Congo, from the Tanganyika to Lake Niassa, West to Benguela and Mossamedes.
19. **Turacus livingstonei var. reichenowi** (Fischer).
Corythaix reichenowi Fischer, Orn. Centralbl. 1880, p. 174; Journ. f. Orn. 1885, p. 123, pl. 5, f. 5.
Turacus reichenowi Reichenow, Vög. Deutsch-Ost-Afrikas, p. 104 (1894).
Turacus livingstoni var. *reichenowi* Dubois, Syn. Avium, Vol. 1, p. 89 (1899).
 German East Africa, from Pangani to Ruwidschi.
20. **Turacus livingstonei var. hybrida** (Reichenow).
Turacus livingstoni Auct. plur. (non Gray).
Turacus hybridus Reichenow, Journ. f. Orn. 1898, p. 314.
Turacus livingstoni var. *hybrida* Dubois, Syn. Avium, Vol. 2, p. 1060 (1903).
 German East Africa.
21. **Turacus livingstonei var. chalcophus** (Neumann).
Turacus chalcophus Neumann, Orn. Monatsb. 1895, p. 87; Hartert, Novit. Zool. 1900, p. 278, pl. 1.
Turacus livingstoni var. *chalcophus* Dubois, Syn. Avium, Vol. 1, p. 89 (1899).
 From Eastern Victoria Niansa, South to the Gurui.

2. GENUS GALLIREX LESSON

Gallirex Lesson, Echo du Monde sav. (1844) (type *G. porphyreolophus*).

Characters. Bill with the culmen elevated and arched, the sides a little compressed, the lateral margins finely serrated; nostrils exposed, rounded, placed in the middle of the upper mandible; the rest like the preceding.

Geographical Distribution. The two species are confined in North-East and East Africa, extending South to Natal and the Cape Colony.

KEY OF THE SPECIES

Crest and nape glossy violet-blue; upper neck metallic green :

1. *With a strong shade of pink in front of the mantle and chest* G. PORPHYREOLOPHUS.
2. *With no shade of pink* G. CHLOROCHLAMYS.

1. **Gallirex porphyreolophus** (Vigors).

Corythaix porphyreolopha Vigors, Proc. Zool. Soc. Lond. 1831, p. 93; Schlegel & Westerman, De Toerako's, p. 12, pl. 3.

Corythaix burchellii Smith, S. Afr. Qu. Journ., p. 13 (1831).

Gallirex anais Lesson, Echo du Monde sav., p. 110 (1844).

Gallirex porphyreolophus Lesson, Descr. Mamm. et Ois. p. 352 (1847).

South Africa, from the Zambesi through Natal to the Cape Colony.

2. **Gallirex chlorochlamys** Shelley (Plate 1, Fig. 6).

Corythaix porphyreolophus, Auct. plur. (non Vigors).

Gallirex chlorochlamys Shelley, The Ibis, 1881, p. 118.

Gallirex porphyreolophus var. *chlorochlamys* Dubois, Ann. Mus. Congo. Zool. (4), t. 1, p. 35 (1905).

The whole of Eastern Africa, from the North of the Zambesi to Abyssinia.

3. GENUS RUWENZORORNIS NEUMANN

Ruwenzorornis Neumann, Bull. Brit. Orn. Club, Vol. 14 (1903) (type *R. johnstoni*).

Characters. Bill high, with the culmen rounded, starting from above the eyes, very much compressed and showing a distinct ridge, far more pronounced than in any genus of *Musophagidae*; nostrils not rounded as in *Gallirex*, but longitudinal as in *Musophaga*.

Geographical Distribution. Equatorial Africa.

KEY OF THE SPECIES

1. *Back of upper neck crimson* R. JOHNSTONI.

Ruwenzorornis johnstoni (Sharpe) (Plate 1, Fig. 7).

Gallirex johnstoni Sharpe, Bull. Brit. Orn. Club, Vol. 11, p. 57 (1901); The Ibis, 1902, p. 112, pl. 5.

Ruwenzorornis johnstoni Neumann, Bull. Brit. Orn. Club, Vol. 14, p. 15 (1903).

Equatorial Africa : Mt.

Ruwenzori.

4. GENUS MUSOPHAGA ISERT

Musophaga Isert, Journ. Phys. Paris, Vol. 34, p. 458 (1789) (type *M. violacea*).

Synonym : *Phimus*, Wagler, Syst. Avium, Phimus, p. 114 (1827) (type *M. violacea*).

Characters. Bill large, broad and elevated at the base, with the culmen much advanced on the forehead, and curved to the tip; nostrils placed near the middle of the upper mandible, open, longitudinal, exposed. Only two species are known.

Geographical Distribution. West and Central Africa.

KEY OF THE SPECIES

1. *With no elongated crest-feathers; a white band on the side of the head* M. VIOLACEA.
 2. *With an elongated crest; no white on side of the head* M. ROSSÆ.

1. **Musophaga violacea** Isert (**Plate 2, Fig. 1, 2**).

Musophaga violacea Isert, Schrift. Ges. Naturf. Freunde Berlin, Vol. 3, p. 18, pl. 1 (1789);
 Schlegel & Westerman, De Toerako's, pl. 1 (1860).
Cuculus regius Shaw, Mus. Lever. p. 165, pl. 40 (1792).

West Africa, from the
 Cameroons to Senegambia.

2. **Musophaga rossæ** Gould.

Musophaga rossæ Gould, Proc. Zool. Soc. Lond. 1851, p. 93; Schlegel & Westerman,
 De Toerako's, pl. 2 (1860).
Musophaga böhmii Schalow, Zeitschr. ges. Orn. (1884), p. 103, pl. 6.

West Africa, from Angola to Cameroon and to Niam-Niam and Tanganika.

5. GENUS CORYTHÆOLA HAINE

Corythæola Haine, Journ. f. Orn. 1860, p. 190 (type *C. cristata*).

Characters. Bill flattened, culmen compressed throughout its length; nostrils oval, nearer to the tip of the bill than to the forehead; with no crimson on the quills; tail much more elongated than by the others genus of the family. Only one species.

Geographical Distribution. West and Central Africa.

KEY OF THE SPECIES

1. *General plumage above verditer-blue; tail with a broad black subterminal bar.* C. CRISTATA.

1. **Corythæola cristata** (Vieillot) (**Plate 2, Fig. 3**).

Musophaga cristata Vieillot, Analyse, p. 68 (1816).
Musophaga gigantea Vieillot, Enc. Méth. p. 1295 (1823); Schlegel & Westerman, De Toerako's, p. 20, pl. 12 (1860).
Corythaix gigas Stephens, Gen. Zool. Vol. 14, p. 222 (1826).
Crax cyaneus Gray, in Griffith's Anim. Kingd. Vol. 3, p. 117 (1829).
Corythæola cristata Haine, Journ. f. Orn. 1860, p. 190.

West and Central Africa,
 from Angola to Senegambia, and to the Eastern Congo-State and Niam-Niam.

6. GENUS CHIZÆRHIS WAGLER

Chizærhis Wagler, Syst. Avium, p. 111 (1827) (type *C. africana*).

Synonyms : *Schizorhis* Wagler, Isis, 1829, p. 656 (type *C. africana*). — *Corythaixoides* Smith, S. Afr. Qu. Journ. 1833, p. 48 (type *C. concolor*). — *Colophimus* Smart, Rep. Exp. Centr. Afr. p. 54 (1836) (type *C. concolor*). — *Ichthierax* Kaup, Classif. p. 111 (1844) (*C. africana*).

Characters. Bill with the sides slightly compressed, the culmen arched; nostrils linear, placed in a partially curved groove and nearer to the forehead than to the tip of the bill; front of the head feathered.

Geographical Distribution. The whole of the Ethiopian Region.

KEY OF THE SPECIES

A. Bill yellow; crest-feathers lanceolate :

1. Tail brown, uniform C. AFRICANA.
 2. Tail with a white bar. C. ZONURA.

B. Bill black or olive; crest-feathers not lanceolate :

3. Breast and a bar on the tail white C. LEUCOGASTRA.
 4. Entire plumage ashy grey C. CONCOLOR.

1. **Chizærhis africana** (Latham).

Phasianus africanus Latham, Ind. Orn. p. 631 (1790).
Musophaga senegalensis Lichtenstein, Verz. Doubl. p. 7 (1823).
Musophaga variegata Vieillot, Enc. Méth. p. 1296 (1823); Swainson, Birds W. Afr. Vol. 1,
 p. 223, pl. 20 (1837).
Chizærhis africana Reichenow, Vög. Afr. Vol. 2, p. 30 (1902).

West Africa, from the
 Congo to Senegambia,
 and inland to Katanga
 and Stanley Pool.

2. **Chizærhis zonura** Rüppell.

Chizærhis zonurus Rüppell, Neue Wirbelth. p. 9, pl. 4 (1835-40).
Schizorhis zonurius Gray, Gen. of Birds. Vol. 2, p. 395 (1845).

North-East Africa, from
 Bogosland through
 Abyssinia, the White
 Nile, Niam-Niam and
 Uelle.

3. **Chizærhis leucogastra** Rüppell. (Plate 2, Fig. 4, 5, 6).

Chizærhis leucogaster Rüppell, Mus. Senck. Vol. 3, p. 127 (1842); idem, Trans. Zool. Soc.
 Lond. Vol. 3, p. 232, pl. 17 (1842).
Colophimus fasciatus Harris, Highl. Aethiop. Vol. 2, p. 413 (1844).
Schizorhis leucogaster var. *pallidirostris* Hildebrand, Journ. f. Orn. 1878, p. 237.

East Africa, from Sou-
 thern Abyssinia to the
 Upper White Nile and
 Ugogo.

4. **Chizærhis concolor** (Smith).

Corythaix concolor Smith, S. Afr. Qu. Journ. p. 48 (1833).
Chizærhis concolor Smith, Ill. Zool. S. Afr. pl. 2 (1838).
Chizærhis feliciæ Lesson, Mag. Zool. p. 101 (1839).
Corythaixoides concolor pallidiceps Neumann, Journ. f. Orn. 1899, p. 66.
Schizorhis concolor var. *pallidiceps* Dubois, Syn. Avium Vol. 2, p. 1060 (1903).

South Africa to Katanga
 and Stanley Pool in
 Congo-State.

7. GENUS GYMNO SCHIZORHIS SCHALOW

Gymnoschizorhis Schalow, Journ. f. Orn. 1886, p. 72 (type *G. personata*).

Characters. This genus has the same characters as the *Chizærhis* with the exception that the front half of the head is bare.

Geographical Distribution. East Africa, from Abyssinia to the Tanganika.

KEY OF THE SPECIES

1. Under surface of tail and quills green G. PERSONATA.
 2. Under surface of tail and quills silver-grey. G. LEOPOLDI.

1. **Gymnoschizorhis personata** (Rüppell).

Chizærhis personata Rüppell, Mus. Senck. Vol. 3, p. 127 (1842); Trans. Zool. Soc. Lond.
 Vol. 3, p. 232, pl. 16 (1842).
Gymnoschizorhis personata Schalow, Journ. f. Orn. 1886, p. 75.

Abyssinia, Shoa.

2. **Gymnoschizorhis leopoldi** (Shelley) (Plate 2, Fig. 7).

Schizorhis leopoldi Shelley, The Ibis, 1881, p. 117, pl. 2.
Gymnoschizorhis leopoldi Schalow, Journ. f. Orn. 1886, p. 72.

East Africa, from Vic-
 toria Niansa to Ugogo
 and Tanganika.

EXPLANATION OF PLATES

PLATE I

- Fig. 1. *Turacus livingstonei* var. *schalowi* (Reichenow).
— 2, 3. *Turacus livingstonei* var. *schalowi* (Reichenow) (foot and wing).
— 4. *Turacus leucolophus* Heuglin (head).
— 5. *Turacus donaldsoni* Sharpe (head).
— 6. *Gallirex chlorochlamys* (Shelley) (head).
— 7. *Ruwenzorornis johnstoni* (Sharpe) (head).

PLATE 2

- Fig. 1, 2. *Musophaga violacea* Isert (head and foot).
— 3. *Corythæola cristata* (Vieillot) (head).
— 4, 5, 6. *Chizærhis leucogastra* Rüppell (head, wing and bill).
— 7. *Gymnoschizorhis leopoldi* (Shelley).
-

Brussels, 15th April 1907.

FAM. MUSOPHAGIDÆ

- 1, 2, 3. TURACUS SCHALOWI. 4. T. LEUCOLOPHUS. 5. T. DONALDSONI. 6. GALLIREX CHLOROCHLAMYS.
7. RURVENZORORNIS JOHNSTONI.

FAM. MUSOPHAGIDÆ

1, 2. MUSOPHAGA VIOLACEA. 3. CORYTHÆOLA CRISTATA. 4, 5, 6. CHIZÆRIHIS LEUCOGASTER.
7. GYMNOSCHIZORHIS LEOPOLDI.

9TH PART

PASSERES

GENERA AVIUM

CONDUCTED BY

P. WYTSMAN

WITH CONTRIBUTIONS BY MESSRS. Hon. W. ROTHSCHILD,
P. L. SCLATER, R. BOWDLER SHARPE, W. R. OGILVIE-GRANT, E. HARTERT,
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PASSERES

FAM. PIPRIDÆ

by C. E. HELLMAYR

WITH 3 COLOURED PLATES

1910

PRICE 13/0 FR. 15.20

FAM. PIPRIDÆ

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BY C. E. HELLMAYR

THE *Pipridæ* form one of the families of the subdivision *Oligomyodæ* of the Mesomyodian Passeres.

Characters. The *Pipridæ* are dentirostral Oligomyodæ, mostly of small size and generally of bright plumage in the male sex. The intrinsic muscles of the voice organ are affixed at or near the middle of the bronchial semi-rings. The lower end of the trachea is not modified; the syrinx is as in the *Oscines*, but with a lesser number of singing-muscles. The tarsus is exaspidean. In this respect the *Pipridæ* agree with the *Tyrannidæ* and *Oxyrhamphidæ* from which they may be distinguished by having the toes more or less united.

The bill is proportionately short, thick and shows a more or less distinct notch near the end of the upper mandible. The culmen, in the majority of species, is either rounded or slightly ridged, only in one genus (*Xenopipo*) is the mesorhinium broad and flattened. The nostrils are either circular or oval, but always quite exposed. The metatarsus is mostly covered in front with some large, distinctly separated scutellæ while in other forms (e. g. *Masius*) the scutes are fused, thus forming a long lamina, divided only on the lower end, near the toes. Toes connected at the base, the outer and middle toes especially so. The moderately long wings have ten primaries, the tip is formed by the third, fourth and fifth primaries. The outer primaries are often of abnormal shape: short and pointed, attenuated or curved, this being particularly the case in the male sex. The tail, composed of twelve feathers, is variable in length and shape. In some genera (*Chiroxiphia*, *Ilicura*) the middle tail feathers are elongated, in others (*Cirrhopitra*) the outer rectrices greatly modified. In the majority of the species the sexes are dissimilar, though in some genera they are nearly alike.

Range. The *Pipridæ* are one of the characteristic groups of the neotropical avifauna. They range from Southern Mexico to Paraguay and the Argentine province Misiones, but are entirely absent from the Antillean and Patagonian subregions. The zenith of their distribution is reached in the Amazonian forest-region where they are especially numerous, both in individuals and in species.

Habits and Reproduction. Little is known about their habits. According to Prince Wied-Neuwied, they live in pairs or small flocks, and frequent the under-growth of primeval forests. They mostly feed on berries, but some species are said to eat also small insects. Their notes are short, soft whistles which, however, are only seldom uttered.

The *Pipridæ* build a slight shallow nest of grasses, which is suspended from the fork of a branch in low shrubs. The eggs are white or cream-coloured, spotted with brown or reddish, these blotches being often more or less confluent round the larger end. According to Euler, who observed *Chiromachaeris manacus gutturosus* in Southeast Brazil, the clutch consists of two eggs only.

Bibliography. Selater, Cat. Birds Brit. Mus. Vol. 14, 1888, p. 282-325.

KEY TO THE GENERA OF THE PIPRIDÆ.

1. Bill shorter. Subterminal notch slight 2.
- Bill more elongated and more compressed. Subterminal notch very distinct 13.
2. Tail shorter, about half the length of the wing or less (1) 3.
- Tail longer, two-thirds of the wing or more 7.
3. Throat feathers more or less elongated. Outer primaries of abnormal shape. 4.
- Throat feathers not elongated 5.
4. Throat feathers much elongated. Outer primaries attenuated and curved inwards. 13. Genus *CHIROMACHÆRIS*.
- Throat feathers but slightly elongated. First primary attenuated or shortened, but not curved 12. Genus *CORAPIPO*.
5. Four outer primaries attenuated. Male with the mantle pale blue, and a distinct vertical crest of red or yellow. 10. Genus *CHIROXIPHIA*
- Only the first primary attenuated. Male with the mantle black, forehead dark red, no vertical crest 11. Genus *ILICURA*.
- None of the primaries attenuated. 6.
6. Shafts of the secondaries normal 1. Genus *PIPRA*.
- Shafts of the secondaries thickened 3. Genus *MACHÆROPTERUS*.
7. Outer tail feathers much produced, terminating in a long hair-like filament 2. Genus *CIRRHIPIPRA*.
- Outer tail feathers normal 8.
8. Mesorhinium broad and flattened. Plumage of the males glossy black 7. Genus *XENOPIPO*.
- Mesorhinium but slightly rounded 9.
9. Frontal feathers erect 10.
- Frontal feathers not erect 11.
10. Tarsal scutes divided 9. Genus *ANTILOPHIA*.
- Tarsal scutes fused 8. Genus *MASIUS*.

(1) The elongated central tail feathers in some species of the genera *Chiroxiphia* and *Ilicura* not being taken in account.

11. *Wing considerably less than 60 mm. Rump, tail and under parts deep ochreous-cinnamon. With a half-concealed vertical spot of yellow or cinnamon* . . . 14. Genus NEOPIPO.
 — *Wing always more than 60 mm. No cinnamomeous colour whatever in the plumage.* . . . 12.
 12. *Tail square. General plumage of males black with a long red occipital crest. Tarsus strong* . . . 6. Genus CERATOPIPA.
 — *Tail square. No occipital crest. Tarsus short and slender* . . . 4. Genus CHLOROPIPO.
 — *Tail strongly rounded* . . . 5. Genus PIPRITES.
 13. *Upper half of tarsus feathered. Bill much expanded at the base, broader than high.* . . . 18. Genus SAPAYOA.
 — *Upper half of tarsus not feathered. Bill much narrower and more compressed.* . . . 14.
 14. *Tail strongly graduated, the outer rectrices being much shortened, narrowed and pointed. No rictal bristles* . . . 20. Genus HETEROCERCUS.
 — *Tail slightly emarginate. Distinct rictal bristles* . . . 15.
 15. *General colour rufous.* . . . 15. Genus SCHIFFORNIS.
 — *General colour green* . . . 16.
 16. *Under tail coverts very long, covering more than two-thirds of the length of the tail.*
 Fourth remex in the male attenuated . . . 19. Genus LANISOMA.
 — *Under tail coverts much shorter, less than half the length of the tail. Fourth remex never attenuated* . . . 17.
 17. *Bill longer. Tarsus and feet strong.* . . . 16. Genus SCOTOHORUS.
 — *Bill shorter. Tarsus and feet weak.* . . . 17. Genus NEOPELMA.

1. GENUS PIPRA LINNÆUS

Pipra Linnæus, Mus. Adolph Frid. Vol. 2, Prodr. p. 32 (1764) (type by elimination : *Parus auricola* Linnæus); cfr Hellmayr, The Ibis, 1906, p. 1-46.

Synonyms : *Dixiphia* Reichenbach, Av. Syst. Nat. tab. 63 (1850) (type : *P. leucocilla*). — *Lepidothrix* Bonaparte, Consp. Volucr. Anisod. p. 6 (Sep. ex Ateneo Italiano n° 11, August 1854; species : *L. cyaneocapilla*, *L. isidorii*). — *Dasyncetopa*, Bonaparte, ibidem, p. 6 (type : *D. serena*). — *Tyrannetes* Sclater & Salvin, The Ibis, 1881, p. 269 (type : *T. brachyurus*).

Characters. This is a rather numerous group of small birds the males of which have always some bright colour in the plumage. In structure, the various species are fairly uniform, the most aberrant members being *Pipra virescens* and *P. stolzmanni* with relatively long wings and short tails. The bill is relatively strong, broad at the base; the culmen curved and with a more or less distinct notch near the tip of the upper mandible. In *P. aureola* and allies it is decidedly ridged, in the majority of the other species slightly rounded. Nostrils oval and open. Rictal bristles numerous, though rather soft. In the wing, the third and fourth primaries are the longest, the first is equal to or slightly shorter than the sixth. Tail short, about one-half of the length of the wing, and almost square, the central rectrices being very slightly shorter than the remaining ones. Exceptions are *P. virescens* in which the outermost rectrix is extremely short and narrow with the shaft thickened and stiff, and *P. chloromeros* in which the tail is strongly rounded, the outer rectrices being decidedly shorter than the inner ones. Tarsus short, the outer toe united to the inner one for the two basal phalangæ.

Sexes dissimilar, except in *P. virescens* and *P. stolzmanni*.

PASSERES

Geographical Distribution. Central America from Mexico southwards, and South America down to Southeastern Brazil, but absent in Paraguay, Argentina and Chili.

KEY TO THE SPECIES AND SUBSPECIES (1)

1. Back (except the rump in some species) black.	2.
— No black whatever in the plumage. Back always green	20.
2. Rump black like the back or washed with dull bluish or violet	3.
— Rump and upper tail coverts bright azure blue or whitish blue	16.
3. A white band across the inner web of the quills	4.
— No white band across the quills	7.
4. Whole abdomen bright yellow, under tail coverts yellow, tipped with black. Lateral tail feathers with a broad yellowish white cross band.	5.
— Sides of the abdomen and under tail coverts black, no white band across the tail.	6.
5. Central tail feathers like the lateral ones with a yellowish white cross-band	3. <i>P. FASCHICAUDA FASCHICAUDA</i> ♂.
— Central tail feathers uniform black.	4. <i>P. FASCHICAUDA PURUSIANA</i> ♂.
6. A narrow frontal band, cheeks and anterior portion of throat orange yellow.	1. <i>P. AUREOLA AUREOLA</i> ♂.
— Anterior part of the head as far as the eyes, sides of the head and neck, and the whole throat bright yellow	2. <i>P. AUREOLA FLAVICOLLIS</i> ♂.
7. Head bright yellow	5. <i>P. ERYTHROCEPHALA</i> ♂.
— Head above white	8.
— Head above blue	12.
— Head red.	13.
8. Feathers of the occiput but slightly elongated, blackish at the base. Tail not exceeding 34 mm. in length	9.
— Feathers of the occiput snow white to the base and so much elongated as to form a long, full crest. Tail 36 mm.	15. <i>P. LEUCOCILLA COMATA</i> ♂.
9. Plumage above and below strongly glossed with metallic blue. Wing 60-67; Tail 25-30 mm.	11. <i>P. LEUCOCILLA LEUCOCILLA</i> ♂.
— Plumage opaque velvety black.	10.
10. Size larger. Wing 68-70; tail 30-32 mm. Black of upper and under surface more intense and more bluish	14. <i>P. LEUCOCILLA CORACINA</i> ♂.
— Size smaller. Wing 60-64; tail 24-28 mm. Black of plumage duller and less bluish	11.
11. Abdomen and under tail coverts dull slaty blackish	12. <i>P. LEUCOCILLA BAHIE</i> ♂.
— Abdomen slightly glossy like the rest of the body. Longer under tail coverts tipped with greyish or yellowish	13. <i>P. LEUCOCILLA ANTHRACINA</i> ♂.
12. Back, sides of the head and throat deep black, rump washed with dull bluish; middle of the belly and under tail coverts dull olive yellow.	21. <i>P. HOFFMANNSI</i> ♂.
— All the under surface uniform black.	19. <i>P. CORONATA VELUTINA</i> ♂.

(1) The females of *Pipra isidorei leucopygia* & *P. leucocilla anthracina*, unknown to the author, are not included in the key.

- General colour dull brownish black with a slight violet hue on the rump and breast. No black frontlet* 20. *P. CORONATA CORONATA* ♂.
13. *Tail strongly rounded, the outer rectrices being about 5 mm. shorter than the inner ones. Axillaries black* 10. *P. CHLOROMEROS* ♂.
- *Tail square. Axillaries never black* 14.
14. *Thighs and axillaries yellow* 15.
- *Thighs white, tipped with red* 6. *P. RUBROCAPILLA* ♂.
15. *Forehead and crown decidedly paler, more orange red than the occiput. Thighs and a large chin-spot pale yellow. Distinct yellowish edges to the inner web of remiges* 7. *P. MENTALIS MENTALIS* ♂.
- *Forehead nearly as dark red as the occiput. Large chin-spot yellowish, thighs deep gamboge-yellow. Distinct yellowish edges to the inner web of remiges* 8. *P. MENTALIS IGNIFERA* ♂.
- *Head and thighs as in P. mentalis ignifera. Chin-angle but narrowly bordered with yellow; no yellowish edges to the inner web of remiges.* 9. *P. MENTALIS MINOR* ♂.
16. *Whole body beneath black* 17.
- *Abdomen yellow or orange* 19.
17. *Cap light blue* 18. *P. CÆRULEOCAPILLA* ♂.
- *Cap milky white* 18
18. *Rump pale azure-blue* 16. *P. ISIDOREI ISIDOREI* ♂.
- *Rump whitish blue* 17. *P. ISIDOREI LEUCOPYGIA* ♂.
19. *Abdomen and a large spot on the foreneck clear yellow; forehead as far as the anterior angle of the eye white* 25. *P. SERENA SERENA* ♂.
- *Abdomen orange. No yellow spot on the foreneck; forehead and anterior portion of the crown white* 24. *P. SERENA SUAVISSIMA* ♂.
20. *Top of the head covered with rather flattened feathers, forming a well-defined sky-blue, white or opalizing cap* 21.
- *Feathers of the pileum not different in shape from those of the back, either without any bright colour or with a half-concealed, yellow patch in the centre of the crown* 24.
21. *Cap blue; feet dark horn brown* 22.
- *Cap not blue; feet flesh colour* 23.
22. *Cap turquoise or Nile blue* 23. *P. EXQUISITA* ♂.
- *Cap intense azure-blue* 22. *P. CÆLESTI-PILEATA* ♂.
23. *Cap and rump glossy milky white* 26. *P. NATTERERI* ♂.
- *Cap beautifully opalizing, rump green like the back.* 27. *P. OPALIZANS* ♂.
24. *Back pure grass green (no yellow vertical spot)* 25.
- *Back olivaceous or brownish green* 29.
25. *Feet flesh colour* 26.
- *Feet dark horn brown* 27.
26. *Bill larger. Wing 53-54 mm.* 27. *P. OPALIZANS* ♀.
- *Bill smaller. Wing 50-52 mm.* 26. *P. NATTERERI* ♀.
27. *Forehead and crown yellowish olive, decidedly different from the dark green back* 16. *P. ISIDOREI ISIDOREI* ♀.
- *Forehead and crown dull bluish* 24. *P. SERENA SUAVISSIMA* ♀.

- *Pileum green like the back* 28.
28. *Throat and foreneck dull greenish olive passing into clear yellow in the middle of the abdomen. Wing 53 mm.* 25. *P. SERENA SERENA* ♀.
- *Throat yellowish, separated from the bright yellow abdomen by a distinct jugular band of dark green. Wing 57 mm.* { 23. *P. EXQUISITA* ♀.
22. *P. CALESTI-PILEATA* ♀.
- *Under surface dull greenish, middle of the abdomen pale yellow* . . . 21. *P. HOFFMANNI* ♀.
- *Under surface dull greenish, middle line of abdomen dirty yellowish.* . . . { 19. *P. CORONATA VELUTINA* ♀.
20. *P. CORONATA CORONATA* ♀.
18. *P. CERULEOCAPILLA* ♀.
29. *Wing never exceeding 53 mm.* 30.
- *Wing always more than 55 mm.* 31.
30. *Outermost rectrix much narrowed and shortened, at least 10 millimetres less than the longest. A large bright yellow vertical patch* . . . 28. *P. VIRESCENS* ♂ ♀.
- *Outermost rectrix quite as long as the middle pair and not abnormally shaped. No yellow vertical spot.* 29. *P. STOLZMANNI* ♂ ♀.
31. *Throat dull yellow* { 1. *P. AUREOLA AUREOLA* ♀.
2. *P. AUREOLA FLAVICOLLIS* ♀.
3. *P. FASCIICAUDA FASCIICAUDA* ♀.
4. *P. FASCIICAUDA PURUSIANA* ♀.
- *Throat greenish or greyish* 32.
32. *Axillaries and under wing coverts dull grey. Head above slate-grey or mixed with grey* 33.
- *Axillaries and under wing coverts pale yellowish or whitish. Head above green like the back, without any greyish admixture* 34.
33. *Tail shorter, 25-30 mm.* { 11. *P. LEUCOCILLA LEUCOCILLA* ♀.
12. *P. LEUCOCILLA BAHIAE* ♀.
- *Tail longer, 30-36 mm.* { 14. *P. LEUCOCILLA CORACINA* ♀.
15. *P. LEUCOCILLA COMATA* ♀.
34. *Tail strongly rounded, the outermost rectrix being about 5 mm. shorter than the longest* 10. *P. CHLOROMEROS* ♀.
- *Tail square* 35.
35. *Tail very short, 21-24 mm.* 5. *P. ERYTHROCEPHALA* ♀.
- *Tail always more than 25 mm.* 36.
36. *Axillaries and under wing coverts pale yellow. Under parts strongly washed with olive-green* { 7. *P. MENTALIS MENTALIS* ♀.
8. *P. MENTALIS IGNIFERA* ♀.
9. *P. MENTALIS MINOR* ♀.
- *Axillaries and under wing coverts dirty whitish; under parts greyish green* 6. *P. RUBROCAPILLA* ♀.

1. ***Pipra aureola aureola* (Linnæus). (Plate 2, Fig. 7.)**

Parus Aureola Linnæus, Syst. Nat. edit. 10, p. 191 (1758) (ex Edwards, Nat. Hist. Birds, Vol. 2, p. 83, t. 83, f. 2.— « From some part of South America, near the equinoctial line, » — Surinam selected as typical locality).

Pipra rubra P. L. S. Müller, Natursyst. Suppl. p. 177 (1776) (ex Daubenton, Pl. enl. 302, f. 2 : Cayenne).

Pipra aurantia Wagler, Isis 1830, p. 932 (1830) (ex Edwards, Nat. Hist. Birds, Vol. 2, p. 83, t. 83, f. 2).

Pipra dubia Madarász, Zeitschr. Ges. Ornith. Vol. 3, p. 270, t. 9 (1886) (spec. decol.)

Hab. Cayenne, Surinam, Brit. Guiana to N. E. Venezuela (Orinocodelta and state of Cumana), and south to the Lower Amazons (Pará, Santarem, Barra do Rio Negro).

2. **Pipra aureola flavicollis** Sclater.
Pipra flavicollis Sclater, Contrib. Ornith. for 1851, p. 143 (1852) (Barra do Rio Negro, but locality evidently erroneous).
 Hab. West bank of the Rio Madeira (Humaytha, Marmellos), Brazil.
3. **Pipra fasciicauda fasciicauda** Hellmayr.
Pipra fasciata (nec Thunberg 1822) Lafresnaye & D'Orbigny, Syn. Av. 1, in Mag. Zool. 1837, Cl. 2, p. 38 (Yuracares, East Bolivia).
Pipra fasciicauda Hellmayr, The Ibis, 1906, p. 9 (nom. emend.).
 Hab. Bolivia east of the Andes, Central Brazil (Mattogrosso, Goiaz, northern parts of S. Paulo, Minas Geraës) and Lower Amazonia (Itaituba, Tapajóz and Rio Tocantins).
4. **Pipra fasciicauda purusiana** Snethlage.
Pipra fasciicauda purusiana Snethlage, Ornith. Monatsber. 15, 1907, p. 160 (Ponto Alegre on the Rio Purús, W. Brazil).
 Hab. Western Brazil (Rio Purús). Eastern Peru (Ucayali, Chuchurras).
5. **Pipra erythrocephala** (Linnæus).
Parus erythrocephalus Linnæus, Syst. Nat. edit. 10, p. 191 (1758) (ex Edwards, Nat. Hist. Birds. Vol. 1, p. 21, tab. 21, f. inf. : Surinam).
Pipra aurocapilla Lichtenstein, Verz. Dubl. Berl. Mus. p. 29 (1823) (« Brazil »).
Pipra chrysocephala Descourtilz, Ornith. Brésil. p. 36, t. 41, f. 3 (1852) (« au Maranhão et Pará »).
Pipra erythrocephala berlepschi Ridgway, Proc. Biolog. Soc. Wash. 19, p. 117 (1906) (Nauta, Peru).
 Hab. South America north of the Amazons, including Trinidad, in Ecuador and Peru only east of the Andes; but reoccurring in the Cauca valley and on the Rio Dagua, S. W. Colombia, as well as in Panama (near Chepo).
6. **Pipra rubrocapilla** Temminck.
Pipra rubrocapilla Temminck, Rec. Pl. col. 54, f. 3 (1821). (Brésil; Bahia accepted as typical locality).
 Hab. Brazil. in the eastern states southwards to Rio and Espiritu Santo; west through Mattogrosso to Eastern Peru (Ucayali) and along the south bank of the Amazons to Pará, N. E. Brazil.
7. **Pipra mentalis mentalis** Sclater.
Pipra mentalis Sclater, Proc. Zool. Soc. Lond. 1856, p. 299, tab. 121 (Cordova, Vera Cruz, East Mexico).
 Hab. Eastern Mexico, Guatemala, British Honduras, Honduras and Nicaragua as far south as the Escondido River.
8. **Pipra mentalis ignifera** Bangs.
Pipra mentalis ignifera O. Bangs, The Auk, Vol. 18, p. 363 (1901) (Divala, Chiriqui).
 Hab. Panama, Chiriqui and Costa Rica.
9. **Pipra mentalis minor** Hartert.
Pipra mentalis minor Hartert, Novit. Zool. Vol. 5, p. 489 (1898) (Cachabi, N. Ecuador).
 Hab. Western Ecuador.
10. **Pipra chloromeros** Tschudi.
Pipra chloromeros Tschudi, Arch. f. Naturg. Vol. 10, 1, p. 271 (1844) (Peru).
 Hab. Mountains of Peru and northern Bolivia.
11. **Pipra leucocilla leucocilla** (1) Linnæus.
Pipra leucocilla Linnæus, Mus. Ad. Fridr. Vol. 2, Prodr. p. 33 (1764) (loc. ign. — We fix Surinam as the typical locality).
Pipra leucocapilla Gmelin, Syst. Nat. Vol. 1, 2, p. 1002 (1789) (ex Linnæus).
Pipra cephaloleucos Thunberg, 1822, according to Lönnberg, The Ibis, 1903, p. 241.
 Hab. Cayenne, Brit. Guiana. Surinam, Venezuela, N. W. Brazil (Rio Negro, R. Solimoëns, R. Juruá), Northeastern Peru.
12. **Pipra leucocilla bahiæ** Ridgway.
Pipra pipra bahiæ Ridgway, Proc. Biolog. Soc. Wash. 19, p. 117 (1906) (Bahia, East Brazil).
 Hab. Eastern Brazil (Pará to Espiritu Santo and Rio de Janeiro).

(1) The name *Parus pipra* applied to the above species by Mr. Ridgway cannot stand, as pointed out by Berlepsch & Hartert, Novit. Zoolog. 9, p. 53 (1902).

13. **Pipra leucocilla anthracina** Ridgway.
Pipra pipra anthracina Ridgway, Proc. Biolog. Soc. Wash. 19, p. 117 (1906) (Moravia, Costa Rica).
 Hab. S. W. Costa Rica (Moravia) and Veragua.
14. **Pipra leucocilla coracina** Sclater.
Pipra coracina Sclater, Proc. Zool. Soc. Lond. 1856, p. 29 (Bogotá-collections).
 Hab. Elevated districts of Colombia and Ecuador (on the eastern slope of the Andes).
15. **Pipra leucocilla comata** Berlepsch & Stolzmann.
Pipra comata Berlepsch & Stolzmann, The Ibis, 1894, p. 392 (La Gloria and Garita del Sol, Central Peru).
 Hab. Chanchamayo district in Central Peru.
16. **Pipra isidorei isidorei** Sclater.
Pipra isidorei Sclater, Rev. Zool. 1852, p. 9 (Bogotá-collections).
 Hab. Colombia (Bogotá-coll.) and Eastern Ecuador.
17. **Pipra isidorei leucopygia** Hellmayr.
Pipra isidorei leucopygia Hellmayr, Verh. Zool.-bot. Ges. Wien, 1903, p. 200 (Huambo, North Peru).
 Hab. Huayabamba valley in North Peru.
18. **Pipra cæruleocapilla** Tschudi.
Pipra cæruleocapilla Tschudi, Arch. f. Naturg. Vol. 10, 1, p. 271 (1844) (Peru).
 Hab. Central and Southeast Peru, at elevations of from 2400 to 3100 feet.
19. **Pipra coronata velutina** Berlepsch.
Pipra velutina Berlepsch, The Ibis, 1883, p. 492 (Veragua).
 Hab. Costa Rica, Chiriqui, Veragua, Panama, Western Colombia and N. W. Ecuador.
20. **Pipra coronata coronata** Spix.
Pipra coronata Spix, Av. Bras. Vol. 2, p. 5, t. 7, f. 1 (1825) (S. Paulo d'Oliveira, Amazons).
P. herbacea Spix, ibidem, p. 6, t. 8a, f. 1, ♀ (1825) (Amazons).
P. cyanocapilla Hahn, Vögel aus Asien, etc. Lief. 15, t. 3, f. 2 (1826) (« Brasilien »).
 Hab. Eastern Ecuador, Northeastern Peru and N. W. Brazil (Rio Negro, R. Solimões, Rio Juruá).
21. **Pipra hoffmannsi** Hellmayr.
Pipra hoffmannsi Hellmayr, Novit. Zool. Vol. 14, p. 49 (1907) (Teffé).
 Hab. Only known from Teffé on the Rio Solimões, North Brazil.
22. **Pipra cælesti-pileata** Goeldi.
Pipra cælesti-pileata Goeldi, C. R. 6ème Congr. Zool. Berne, p. 549 (May 1905) (Upper Purus, W. Brazil).
 Hab. From the upper Rio Madeira (Humaytha), West Brazil to the Ucayali in Eastern Peru.
23. **Pipra exquisita** Hellmayr.
Pipra exquisita, Hellmayr, Bull. Brit. Orn. Club, Vol. 15, p. 56 (March 1905.) (Chuchurras, Peru).
 Hab. Only known from Chuchurras, province of Huanuco, Central Peru.
24. **Pipra serena suavissima** Salvin & Godman. (Plate 3, Fig. 6.)
Pipra suavissima Salvin & Godman, The Ibis, 1882, p. 79, t. 1 (Merume Mount. and Bartica Grove, Brit. Guiana).
 Hab. British Guyana.
25. **Pipra serena serena** Linnæus.
Pipra serena Linnæus, Syst. Nat. edit. 12, Vol. 1, p. 340 (1766) (ex Brisson, Ornith. Vol. 4, p. 457 — Cayenne).
 Hab. Cayenne.
26. **Pipra nattereri** Sclater.
Pipra nattereri Sclater, Proc. Zool. Soc. Lond. 1864, p. 611, t. 39 (Borba, Rio Madeira).
Pipra gracilis Hellmayr, Verh. Zool.-bot. Ges. Wien, p. 202 (1903) (Mattogrosso).
 Hab. Central Brazil : from the right bank of the Rio Madeira (Borba, Allianca, Calama, etc.) east to the Tapajóz ; south to Engenho do Gama, Rio Guaporé in northern Mattogrosso.
27. **Pipra opalizans** Pelzel.
Pipra opalizans, Pelzel, Zur Ornith. Brasil. Abt. 2, p. 186 (1868) (Para).
 Hab. Environs of Para, N. E. Brazil.

28. *Pipra virescens* Pelzeln.

Pipra virescens Pelzeln, Zur Ornith. Brasil, Abt. 2, p. 187 (1868) (part. ♂ ad. — Barra do Rio Negro).

Tyrannetes brachyurus Sclater & Salvin, The Ibis 1881, p. 269 (Bartica Grove, Brit. Guyana).

Hab. British Guyana, and North Brazil near Manáos (= Barra do Rio Negro).

29. *Pipra stolzmanni* Hellmayr.

Pipra stolzmanni Hellmayr, The Ibis, 1906, p. 44 (Marabitanas, Rio Negro).

Hab. North Brazil: Upper Rio Negro (Marabitanas) and on the Rio Madeira; Eastern Peru; Eastern Ecuador; Venezuela: on the Orinoco and its southern tributary, the Caura River; East Colombia: Bogotá-collections.

2. GENUS *CIRRHIPIRA* BONAPARTE

Cirrhipipra Bonaparte, Consp. Av. vol. 1, 1850, p. 172 (type: *Pipra filicauda* Spix).

Synonym: *Teleonema* Reichenbach, Av. Syst. Nat. t. 63 (1850) (same type).

Characters. The typical species of this genus, in structural details agrees very closely with the members of the genus *Pipra*, but differs by the peculiar shape of the rectrices. The three outer pairs are much elongated and terminate in a long hair-like filament; the second and third in a less degree than the first; the three median pairs are of ordinary length, but pointed at the end, particularly the fourth (instead of being broad and rounded as in *Pipra*). This peculiarity in the formation of the tail is common to both sexes. Mr. P. L. Sclater described a second species in which the three outer tail feathers are said to be acuminate and produced. This may be an individual character, but he also states that in *C. heterocerca* the breast is suffused with scarlet, and that the crimson colour of the nape descends lower down the back. In all the many ♂♂ of *C. filicauda* I have examined, the lower surface was clear yellow, rather deeper on the throat and foreneck than on the abdomen, but without any admixture of red. Unfortunately the type of *C. heterocerca* is lost, and no second specimen has come to hand since.

In *C. filicauda* the sexes are widely different in coloration. The adult ♂ is beautiful crimson on the top of the head and nape; back, wings and tail are black; a distinct frontal band, sides of the head and lower parts bright yellow. A broad band across the inner webs of the quills is white. In the female the upper parts are dull olive greenish, the lower ones pale yellow, shaded with greenish on throat and chest. No white band on the wings.

Geographical Distribution. North Brazil, Venezuela, East Ecuador, Peru and Eastern Colombia.

1. *Cirrhipipra filicauda* (Spix). (Plate 2, Fig. 3.)

Pipra filicauda Spix, Avium Brasil, Vol. 2, p. 6, pl. 8, f. 2 (1825) (S. Paulo d'Oliveira, Rio Solimões).

Pipra filifera Lesson, Rev. Zool. 1839, p. 40 (« Perua »).

Pipra setifera Descourtilz, Ornith. Brésil. p. 35, pl. 40, f. 3 (1852) (Brésil).

Hab. N. W. Brazil: Rio Solimões, Rio Negro; North Peru; East Ecuador; East Colombia (found in Bogotá-coll.); Venezuela: on the Orinoco, and on Mount Bucarito, state of Tucuyo (Mocquers-coll. in Mus. Tring.).

2. *Cirrhipipra heterocerca* (Sclater).

Pipra heterocerca Sclater, Proc. Zool. Soc. Lond. 1860, p. 313 (« in ripis fl. Amazonum sup. »).

Hab. Upper Amazonia, exact locality unknown.

3. GENUS MACHÆROPTERUS BONAPARTE

Machæropterus Bonaparte, Consp. Volucr. Anisod. p. 6 ([Sep ex. : Ateneo italiano, n° 11, August 1854]. — No type indicated. Species mentioned : *M. strigilatus*, *M. striolatus* and *M. pyrocephalus*. We may, therefore, regard *M. strigilatus* as the type species).

Synonym : *Allocotoplerus* Ridgway, Proc. Biol. Soc. Washington, 18, p. 209 (1905). (Type : *Pipra deliciosa* Sclater.)

Characters. The members of this brilliant little group are very nearly allied to the typical *Piprae*, and the females, in form, scarcely differ from some of the smaller species. The males, however, present striking peculiarities in the structure of the inner secondaries, and of the tail feathers. The shafts of the rectrices are stiff, and thickened at the base, this character being equally well developed in all four species. Still more remarkable is the curious structure of the wing as exhibited by the male of *M. deliciosus* and which is described by Mr. P. L. Sclater as follows : « The ten primaries are of the ordinary formation of birds of this family, the first being shorter than the second, third and fourth, which are nearly equal and longest, and of about the same length as the sixth. The first three secondaries are thick-stemmed and curved towards the body at a distance of about two-thirds of their length from the base. The fourth and fifth show this structure to a greater degree, with some corresponding alteration in the barbs on each side. In the sixth and seventh secondaries the terminal half of the *rhachis* is thickened to an extraordinary degree, forming a solid horny lump. The external and internal barbs are also much modified in shape and generally curtailed in size. In the eighth and ninth secondaries the *rhachis* is still rather thickened, but the barbs, instead of being reduced in size are highly developed, particularly on the inner side. »

The three other species show a similar structure of the sixth, seventh and eighth secondaries, although the abnormal growth is not carried to such an excess of development. The male of *M. regulus* differs from the others members of the genus by having the inner web of the two first primaries distinctly emarginated, and much narrowed on the tip. The shafts of the rectrices in the males of the four species are pure white, when seen from below.

Sexes dissimilar, the males being clad in bright colours, while the females are inconspicuous green birds.

Geographical Distribution. Ecuador, Colombia, the whole Amazonian region from the Caura valley in Venezuela down to Peru and Mattogrosso; as well as the woodregion of Southeastern Brazil from Bahia to Rio de Janeiro.

KEY TO THE SPECIES

1. Top of the head (at least forehead and vertex) bright red or yellow (♂♂)	2.
— Top of the head green like the back (♀♀)	4.
2. Crown golden yellow with a longitudinal stripe of scarlet in the middle;	
back brownish rose colour; under parts pale rosy with darker flammulations	3. <i>M. PYROCEPHALUS</i> ♂.
— General colour chestnut brown, belly darker, forehead and crown bright red	4. <i>M. DELICIOSUS</i> ♂.

- Crown and nape bright red; back green; under parts yellowish white, foreneck, breast and abdomen with narrow longitudinal streaks of chestnut brown 3
3. First and second primaries distinctly emarginated and much narrowed on the tip of the inner web. No red on the foreneck; chestnut stripes on the under parts less numerous. 1. *M. REGULUS REGULUS* ♂.
- First and second primaries normal. Foreneck stained with crimson; chestnut brown stripes on lower parts brighter and much more numerous 2. *M. REGULUS STRIOLATUS* ♂.
4. Sides of the belly more or less striped with pale chestnut brown 5.
- Sides of the belly not striped with chestnut brown. 6.
5. First primary emarginated near the tip of the inner web 1. *M. REGULUS REGULUS* ♀.
- First primary not emarginated 2. *M. REGULUS STRIOLATUS* ♀.
6. Smaller: wing about 50 mm. Under parts grayish white, indistinctly flammulated with pale yellowish, chest and sides washed with greenish 3. *M. PYROCEPHALUS* ♀.
- Larger: wing about 58 mm. Breast and sides dark olive green; middle of abdomen and under tail coverts pale yellow 4. *M. DELICIOSA* ♀.

1. ***Machæropterus regulus regulus* (Hahn).**

Pipra regulus Hahn, Vögel aus Afrika, Asien, etc. Lief. 4, pl. 4, f. 1, 2 (1819) (« Brasilien »).

Pipra strigilata Wied, Reise Brasil. Vol. 1, p. 187 (1820) (Barra de Jucú, Espiritu Santo).

Pipra lineata (1) Thunberg, Mém. Acad. St-Petersb. 1822, p. 284, t. 8, f. 1.

Hab. Woodregion of Southeastern Brazil from Bahia to Espiritu Santo and Rio de Janeiro.

2. ***Machæropterus regulus striolatus* (Bonaparte).**

Pipra striolata Bonaparte, Proc. Zool. Soc. Lond. Part 5, 1837, p. 122 (1838. — « from that portion of Brazil bordering on Peru »).

Hab. Upper Amazonia from Northern Peru to Eastern Columbia, occurring also in the Cauca Valley, Colombia.

3. ***Machæropterus pyrocephalus* (Sclater). (Plate 3, Fig. 5.)**

Pipra pyrocephala Sclater, Rev. Mag. Zool. 1852, p. 9 (hab. ign.).

Hab. Only known from Peru (Ucayali, Huallaga, Rioja, Moyobamba), the head quarters of the Rio Madeira, in the Brazilian state of Matto Grosso; and from the Caura River, Venezuela (2).

4. ***Machæropterus deliciosus* (Sclater). (Plate 3, Fig. 1.)**

Pipra deliciosa Sclater, Proc. Zool. Soc. Lond. 1860, p. 90 (Nanegal, Western Ecuador).

Hab. Western Ecuador.

4. GENUS *CHLOROPIPO* CABANIS & HEINE

Chloropipo Cabanis & Heine, Mus. Heinean. Vol. 2, p. 90, note 2 (1859) (type of the genus: *C. flavicollis* Cabanis & Heine).

Characters. This genus is closely allied to *Pipra*, with which it agrees in the shape of the bill and tail, but the tail as well as the wings are very much longer, the metatarsus relatively short, the feet feeble, and the rictal bristles rather stronger. The bill is perhaps somewhat longer, yet strongly ridged as in *Pipra*. The tail is nearly square, the median rectrices being

(1) Not verified by the author.

(2) Specimens from this locality are perhaps somewhat different.

but little shorter than the longest (outermost). Its length is about three-fifths of that of the wing. In the wing, the third and fourth primaries form the tip, the second and fifth are rather shorter, while the first falls between the sixth and seventh. Sexes similar except in *C. unicolor* where the male is glossy black, the female dull green. Nothing is known about habits and nidification.

Geographical Distribution. Colombia, Ecuador, Peru and British Guiana.

KEY TO THE SPECIES AND SUBSPECIES

1. Plumage glossy black, axillaries and a large tuft of silky feathers on the sides of the breast snow white 5. *C. UNICOLOR* ♂.
- No black whatever in the plumage 2.
2. Top of the head more or less bright yellow, breast and abdomen light yellow 1. *C. FLAVICAPILLA* ♂ ♀.
- Head green like the back 3.
3. Axillaries and a large tuft of silky white feathers on the sides of the breast pure white 5. *C. UNICOLOR* ♀.
- Axillaries not white. No white tuft on the sides of the breast 4.
4. Larger (wing 78-80, tail 55-58 mm.). Axillaries pale yellowish, greyish in the middle 2. *C. UNIFORMIS* ♂ ♀.
- Smaller (wing 65-72, tail 42-49 mm.). Axillaries greyish green 5.
5. Upper parts bright grass green 3. *C. HOLOCHLORA HOLOCHLORA* ♂ ♀.
- Upper parts dull olive green 4. *C. HOLOCHLORA LITÆ* ♂ ♀.

1. **Chloropipo flavicapilla** (Sclater). (Plate 1, Fig. 4.)

Pipra flavicapilla Sclater, Rev. Mag. Zool. 1852, p. 9 (Colombia).

Chloropipo flavicollis Cabanis & Heine, Mus. Heinean. Vol. 2, p. 91 (1859).

Hab. Colombia : Cauca valley, and in Bogotá-collections.

2. **Chloropipo uniformis** Salvin & Godman.

Chloropipo uniformis Salvin & Godman, The Ibis, 1884, p. 447 (Roraima, British Guiana).

Hab. Mountains of the interior of British Guiana (Roraima, Merumé, Twék-quey).

3. **Chloropipo holochlora holochlora** Sclater.

Chloropipo holochlora Sclater, Cat. Birds Brit. Mus. Vol. 15, p. 287 (1888) (Bogotá-collections).

Hab. Eastern Colombia (Bogotá-coll.), Eastern Ecuador and Northern Peru (Chyavetas).

4. **Chloropipo holochlora litæ** Hellmayr.

Chloropipo holochlora litæ Hellmayr, Novit. Zool. Vol. 13, p. 325 (1906) (Lita, N. W. Ecuador).

Hab. N. W. Ecuador (Cachavi, Ventana, Lita, Paramba) and S. W. Colombia (Pasto in the Cauca valley).

5. **Chloropipo unicolor** Taczanowski.

Chloropipo unicolor Taczanowski, Orn. Pérou, Vol. 2, p. 335 (1884) (Amable Maria, Central Peru, descr. ♀).

Xenopipo subalaris Godman, Bull. Brit. Orn. Club. Vol. 10, p. 27 (1899) (Guayabamba, North Peru, descr. ♂ ♀);

cfr. Hellmayr, Novit. Zool. Vol. 13, p. 324 (1906).

Hab. Mountains of Central and North Peru.

5. GENUS PIPRITES CABANIS

Piprites Cabanis, Arch. f. Naturg. Vol. 13, 1, 1847, p. 234 (species unica : *Pipra pileata* Temminck).

Synonym : *Hemipipo* Cabanis, ibidem, p. 234 (species : *Pipra chloris* Temminck and *Hemipipo chlorion* Cabanis.)

Characters. The members of this genus differ at once from the typical *Piprae* by their long, rounded tail and by their short, thick bills with the culmen more rounded.

The bill is strong, wide at the base, and has a very distinct notch near the end of the tomium of the upper mandible. Nostrils large, open and overhung by the setose nasal feathers. Rictal bristles numerous, but rather short and soft. In the wing, the third primary is the longest, the second and fourth are somewhat shorter, the first equal to or rather longer than the sixth. Tail distinctly rounded, and at the same time slightly emarginate, for the middle pair of rectrices is somewhat shorter than the two following ones which are the longest. Outermost rectrix about 6 to 8 mm. shorter than the submedian. Length of the tail about four-fifths of the wing. Feet rather stronger than in *Pipra*, toes less united. In the first species, the type of the genus, the sexes are different, the male being chestnut, the female olive green on the mantle and upper wing coverts. In the four remaining forms, which have been separated as *Hemipipo*, the sexes are alike.

Geographical Distribution. Southern Central America (Nicaragua and Costa Rica) and South America down to Southeastern Brazil.

KEY TO THE SPECIES AND SUBSPECIES

1. Cap black, tail chestnut rufous except the middle pair which is mainly black 2.
- Cap not black, tail feathers dusky with green edges 3.
2. Whole back and upper wing coverts chestnut 1. *P. PILEATUS* ♂.
- Nape, upper back and wing coverts olive green 1. *P. PILEATUS* ♀.
3. No white tips to the upper wing coverts; top of the head dark gray 5. *P. CHLORIS* GRISEICEPS.
- Greater upper wing coverts with large white tips; forehead yellow, pileum olive green 4.
4. Throat and under tail coverts only yellow, rest of the under surface pale cinereous 4. *P. CHLORIS* CHLORION.
- Whole under surface yellow, chest tinged with olivaceous 5.
5. Median upper wing coverts with broad white tips. Tail longer : 58-60 mm. 2. *P. CHLORIS* CHLORIS.
- Median upper wing coverts not tipped with white. Tail shorter : 48-54 mm. 3. *P. CHLORIS* TSCHUDII.

1. *Piprites pileatus* (Temminck).

Pipra pileata (Natterer M. S.) Temminck, Rec. Pl. Col. t. 172, f. 1 (1822) (« Brésil », sc. Curitiba, Paraná).

Hab. The only known exact locality is Curitiba, state of Paraná, S. E. Brazil. I have also seen several skins of « Rio » make, and the Vienna Museum possesses a specimen said to have been collected by Beske near Novo Friburgo, Rio.

2. *Piprites chloris chloris* (Temminck). (Plate 2, Fig. 8.)

Pipra chloris (Natterer M. S.) Temminck, Rec. Pl. Col. t. 172, f. 2 (1822) (« Brésil », sc. Ypanema, S. Paulo).

Hab. S. E. Brazil : S. Paulo (Ypanema, Piracicaba, Iguaçu, Victoria, Rio Paranapanema); Espiritu Santo (Victoria, Mus. Berlepsch).

3. *Piprites chloris tschudii* (Cabanis).

Hemipipo tschudii Cabanis, Journ. f. Ornith. 1874, p. 99 (Ninabamba, Central Peru).

Hab. Central-, East- and North Peru; Eastern Ecuador and Colombia east to the Upper Rio Negro (Marabitanas, Rio Içanna) in N.-W. Brazil.

4. *Piprites chloris chlorion* (Cabanis).

Hemipipo chlorion Cabanis, Arch. f. Naturg. Vol. 13, 1, p. 234 (1847) (Cayenne).

Hab. Cayenne, Brit. Guiana and North Brazil (Borba on the Rio Madeira, Cussary on the Lower Amazons; Manaos (Barra do Rio Negro), and Marabitanas on the Upper Rio Negro (1).

(1) Specimens from Salto Girao (Upper Rio Madeira) and Engenho do Gama (on the Rio Guaporé) are exactly intermediate between *P. chloris tschudii* and *P. chloris chlorion*, differing from both by their decidedly smaller bill. Perhaps they form a distinct race.

5. **Piprites chloris griseiceps** Salvin.*Piprites griseiceps* Salvin, Proc. Zool. Soc. Lond. 1864, p. 583 (Tucurriquê, Costa Rica).

Hab. Costa Rica (Tucurriquê, Jiménez, La Vijagua, etc.) and Nicaragua (San Carlos).

6. GENUS **CERATOPIPRA** BONAPARTE**Ceratopipra** Bonaparte, Consp. Volucr. Anisod. p. 6 (Sep. ex : Ateneo italiano n° 11, August 1854)
(type of the genus : *Pipra cornuta* Spix).

Characters. This genus comes very near typical *Pipra*, but is distinguishable by its larger bill, much longer tail, longer and more robust tarsus, and by the adult male having the feathers of the occiput much elongated so as to form a full nuchal crest. The bill is of the same shape as in *Pipra*, but stronger and perhaps more rounded along the culminal ridge. Wing as in *Pipra*, with the third primary longest, and the first about equal to the fifth. Tail nearly square, the median rectrix being scarcely shorter than the others, and about two-thirds of the length of the wing. Tarsus robust and covered with a single, long lamina, the scutellæ being fused except on the lower end, near the toes. Feet flesh colour. Sexes different. The adult ♂ is glossy black; top and sides of the head as well as the elongated nuchal crest and the thighs bright scarlet; axillaries and under wing coverts blackish brown, the latter with slight, pale yellowish edges. In *C. cornuta* the whole throat is scarlet, the bases of the feathers being whitish, while in the other supposed « species », *C. iracunda*, the throat is black like the rest of the under parts except a very small, red chin spot. As the only known specimen of *C. iracunda* was obtained on the Roraima Mountains where Withely also collected a number of specimens which do not differ in any way from ordinary *C. cornuta* of Brazil, it is more than probable that *C. iracunda* is merely an individual aberration.

The female of *C. cornuta* is of a dull olive green, paler on the under surface than on the back, like the ♀♀ of some *Pipra*-species, from which, however, it can easily be distinguished by its much longer tail, tarsus, etc., etc.

Geographical Distribution. British Guiana and Lower Amazonia (Obidos, Barra do Rio Negro).

KEY TO THE SPECIES

1. Whole throat scarlet	1. <i>C. CORNUTA</i> .
Throat black with the exception of a small red chin spot	2. <i>C. IRACUNDA</i> .

1. **Ceratopipra cornuta** (Spix). (Plate 3, Fig. 3.)*Pipra cornuta* Spix, Avium Brasil. Vol. 2, p. 5, t. 7, f. 2 (1825) (« in sylvis flum. Amazonum »).

Hab. British Guiana and Lower Amazonia (Obidos, Manáos).

2. **Ceratopipra iracunda** Salvin & Godman.*Pipra iracunda* Salvin & Godman, The Ibis, 1884, p. 447 (Roraima).

Hab. Roraima Mountains (British Guiana).

7. GENUS XENOPIPO CABANIS

Xenopipo Cabanis, Arch. f. Naturg. Vol. 13, 1, p. 235 (1847) (type of the genus : *Xenopipo atronitens* Cabanis).

Characters. This remarkable form is at once recognizable by the broad, flattened mesorhinium. The bill reminds one rather of *Pachyramphus*, but is not so broad, more strongly curved and distinctly compressed towards the tip. Nostrils large, oval and exposed. Rictal bristles rather soft, as in *Pipra*. Length and shape of the tail as in *Chloropipo*, about two-thirds of the wing and nearly square, the innermost rectrix being but 2 to 3 mm. shorter than the longest (outermost). Wing exactly as in *Chloropipo*, metatarsus equally short and weak. Sexes different. The male is glossy black except the axillaries, under wing coverts and inner webs of the quills which are dull brownish black. Bill bluish gray, blackish at the tip of the upper mandible. Female uniform olive green, paler on the under parts and more greyish on the throat; axillaries and under wing coverts yellowish white. Bill blackish, more brownish below. Wing: ♂ 70-72, ♀ 65-70, tail 46-50, bill 13 mm.

Geographical Distribution. Cayenne, British Guiana, and North Brazil (south to Borba on the Rio Madeira, west to the upper Rio Negro : Rio Içanna). *Monotypic*.

1. **Xenopipo atronitens** Cabanis. (Plate 3, Fig. 2.)

Xenopipo atronitens Cabanis, Arch. f. Naturg. Vol. 13, 1, p. 235 (1847) (British Guiana).

Hab. The same as that of the genus.

8. GENUS MASIUS BONAPARTE

Masius Bonaparte, Consp. Av. vol. 1, 1850, p. 175 (Type: *Pipra chrysoptera* Lafresnaye); Hartert & Hellmayr, Orn. Monatsb. Vol. 11, 1903, p. 33-35 (Monogr.).

Synonym : *Anticorys* Cabanis & Heine, Mus. Heinean. Vol. 2, p. 90 (1859) (type : *Pipra chrysoptera* Lafresnaye).

Characters. Bill of the same shape as in *Pipra*, the culmen distinctly ridged. Nostrils round, exposed. Wing with the third and fourth primaries equal and longest, the fifth slightly shorter; the first primary equal to the secondaries. Tail about two-thirds of the wing and strongly rounded, the rectrices decreasing in length from the innermost pair which is the longest to the outer ones. Difference between the median and outermost tail feathers about 6 to 7 mm. Tarsus slender and smooth, the scutes being completely fused. Feet dark red in dried skins. The males of the three known forms are ornamented with a beautiful crest. The feathers of the forehead are somewhat curly, erect and directed forward; those of the occiput are much elongated as to form a pendent crest. In *M. chrysopterus coronulatus* and *M. chrysopterus bellus* these feathers are « thickened and flattened at the extremity into a horny substance, something like that on the wings of the Wax-wing Chatterer » (Sclater, *Proc. Zool. Soc. Lond.* 1860, p. 91). Sexes different. General colour of the males velvety black; middle of the throat, and foreneck pale yellow; greater part of the inner webs of the remiges bright clear yellow. Base of the inner web of the four outer pairs of rectrices pale yellow. Axillaries and under wing

coverts rather brighter yellow. Erect frontal crest and crown bright lemon yellow, the elongated feathers on the occiput pale yellow with long orange red, dark red or tobacco brown tips. Bill pale brownish red. Females dull olive green, dirty yellowish on middle of throat, foreneck and middle of the abdomen. Axillaries, under wing coverts and narrow edges to inner webs of quills bright yellow. Feathers of the forehead but slightly erect.

Geographical distribution. Colombia and Ecuador.

KEY TO THE SPECIES AND SUBSPECIES (♂ ♂) (1).

1. *Elongated occiput-feathers slightly constricted and bright reddish orange at the tips* 1. *M. CHRYSOPTERUS CHRYSOPTERUS*.
2. *Elongated occiput-feathers thickened and flattened at the extremity into a horny substance of a dark red colour* 2. *M. CHRYSOPTERUS BELLUS*.
3. *Shape of the occiput-feathers as in M. chrysopterus bellus, but the tips clear tobacco brown with a faint metallic gloss* 3. *M. CHRYSOPTERUS CORONULATUS*.

1. **Masius chrysopterus chrysopterus** (Lafresnaye).

Pipra chrysoptera Lafresnaye, Rev. Zool. 1843, p. 97 (Bogotá-collections).

Hab. Colombia (Bogotá-collections) and Eastern Ecuador (Mapoto, Baeza).

2. **Masius chrysopterus bellus** Hartert & Hellmayr.

Masius chrysopterus bellus Hartert & Hellmayr, Ornith. Monatsber. Vol. 11, p. 35 (1903) (Rio Lima, Cauca valley).

Hab. Western Colombia (Cauca valley and Antioquia).

3. **Masius chrysopterus coronulatus** Sclater. (Plate 3, Fig. 4.)

Masius coronulatus Sclater, Proc. Zool. Soc. Lond. 1860, p. 91 (Nanegal, Western Ecuador).

Hab. Western Ecuador (Nanegal, Gualaes, Intag, etc.).

9. GENUS ANTILOPHIA REICHENBACH

Antilophia Reichenbach, Av. Syst. Nat. t. 63 (1850) (type : *Pipra galeata* Lichtenstein).

Synonym : *Metopia* (nec Meigen 1803) Swainson in Richardson's Fauna Bor.-Amer. Vol. 2, p. 491 (1832) (same type).

Characters. This remarkable type agrees very nearly with *Masius*, but differs by its much greater size and relatively much longer tail. The erect frontal plumes are much longer and nearly straight, not curly. In the wing, the fourth primary is the longest, the third and fifth are very little shorter, the first is equal to the eighth. The rectrices are broad and almost square at the end. The tail is strongly rounded, the outermost pair of rectrices being about 8 to 10 mm. shorter than the innermost. The bill is of the same shape as in *Masius*, perhaps somewhat more curved at the tip. In both genera, there is a distinct notch near the end of the upper mandible. Feet dark brownish red in the skins. Metatarsus distinctly scutellate. Sexes different in coloration. The general plumage of the male is velvety black. Erect frontal plumes, pileum, nape and upper back beautiful scarlet, the feathers of these parts being

(1) The ♀♀ are not distinguishable.

white on their basal portion. Bill pale brown. Females uniform pale green, duller and lighter underneath. The frontal feathers are but slightly elongated. Wings 75-80, tail 65-70 mm.

According to Natterer, this charming species frequents marshy places, keeping near to the ground, and has a loud, whistling song. Nothing is known of its nidification, but the eggs are described by Mr. J. A. Allen (*Bull. Amer. Mus. Nat. Hist.* 1893, Vol. 4, p. 154) as being of a buffy white colour and thickly covered with fine streaks and blotches of pale amber which become massed in a broad zone around the larger end, nearly concealing the ground colour.

Geographical Distribution. Interior of Brazil (states of Bahia, Goiás, Minas Geraës, San Paulo and Mattogrosso). *Monotypic*.

1. ***Antilophia galeata*** (Lichtenstein). (Plate 2, Figs. 5, 6.)

Pipra galeata Lichtenstein, Verz. Dubl. Berliner Mus. p. 28 (1823) (San Paulo).

Pipra Wiedii Lesson, Traité d'Orn. p. 258 (1830) (no locality).

Hab. Interior of Brazil : Bahia, Goiás, Minas Geraës, San Paulo and Mattogrosso (1).

10. GENUS CHIROXIPHIA CABANIS

Chiroxiphia Cabanis, Arch. f. Naturg. Vol. 13, 1, p. 235 (1847) (Species : *Ch. caudata*, *Ch. ignicapilla*, *Ch. pareola*, *Ch. militaris* and *Ch. oxyura*; the two last named afterwards separated as *Ilicura*); cfr. De Witt Miller, Bull. Amer. Mus. Nat. Hist. Vol. 24, p. 331-343 (1908) (Monogr.).

Synonyms : *Chiroprion* Bonaparte, Consp. Volucr. Anisod, p. 5 (1854) (type : *C. pareola*). — *Cerco-phaena* Bonaparte, ibidem, p. 6 (1854) (type : *C. linearis*).

Characters. In general form, the members of this genus come very close to some of the typical species of *Pipra*, e. g. *P. aureola*, but differ by their comparatively longer wings, shorter and broader bill and by the peculiar shape of the outer primaries in the male sex. Bill relatively small, rather broad at the base and abruptly attenuated towards the tip. Rictal bristles numerous, though rather soft. Nostrils open, though hidden by the supra-nasal feathers. In the wing, the third and fourth primaries form the tip, the second is somewhat shorter, the first equal to or a little less than the fifth. In the males, the three outer primaries are pointed, the shafts stiff and thickened, and the barbs reduced, especially near the tip of the outer web. The fourth and fifth primaries are also pointed, but to a lesser degree than the three outermost. The tail is short as in *Pipra*, but more rounded, the outermost rectrix being decidedly shorter than the inner ones. In one species (*C. linearis*) the middle pair of tail feathers is excessively elongated and lineiform. In two others (*C. lanceolata* and *C. caudata*) it is slightly lengthened and pointed. These peculiarities are common to both sexes of those species. Feet rather stronger than in *Pipra*, orange or red in life.

Sexes dissimilar. The males are black and blue with the whole pileum or a large vertical crest bright yellow or red, while the females are clad in inconspicuous green colours.

According to Euler (*Journ. f. Ornith.* 1867, p. 223) *C. caudata* builds its nest on the branches of low trees and lays two eggs which are of a buffy white ground colour and thickly

(1) Buckley obtained a female near Simacu, Eastern Bolivia. Adult males are required to show if Bolivian birds are really identical with the Brazilian ones.

covered with brown and greyish spots and streaks round the larger end. The curious dances performed by the males in the breeding season have been described by various observers (cfr. Nutting, *Proc. U. S. Mus.* Vol. 5, p. 396; Ihering, *Zeitschr. Ges. Ornith.* Vol. 2, p. 138-139, etc.).

Geographical Distribution. Central America from Guatemala southwards and South America down to S. E. Brazil, Paraguay and the Argentine province Misiones.

KEY TO THE SPECIES AND SUBSPECIES

1. General colour black and blue. Crown wholly or partly red or yellow (♂♂) 2.
- General colour green. No black, red or yellow in the plumage (♀♀) 6.
2. All the under surface from the chin to the under tail coverts black 3.
- Only the throat and under tail coverts black, remainder of under parts pale blue 8. *C. CAUDATA*.
3. Middle pair of tail feathers excessively elongated, lineiform and exceeding the other rectrices by more than 100 mm. 7. *C. LINEARIS*.
- Middle pair of tail feathers elongated, pointed and exceeding the other rectrices by about 15 mm. 6. *C. LANCEOLATA*.
- None of the tail feathers elongated 4.
4. Vertical crest lemon yellow 5. *C. REGINA*.
- Vertical crest red 5.
5. Back pale blue, crest long and full, dark scarlet. Wing 78-82 mm. 2. *C. PAREOLA ATLANTICA*.
- Back pale blue, crest also dark scarlet, but much shorter. Wing 70-73 mm. 1. *C. PAREOLA PAREOLA*.
- Back azure blue, crest short, light scarlet. Wing 70-72 mm. 3. *C. PAREOLA NAPENSIS*.
- Back a shade darker blue than in nos 1 and 2; crest much smaller than in nos 1-3, and considerably darker, crimson. Wing 72-73 mm. 4. *C. PAREOLA BOLIVIANA*.
6. Plumage bright oil green, under parts very slightly paler than the upper ones 8. *C. CAUDATA*.
- Upper parts light oil green, lower parts dull greyish green, sometimes pale yellowish in the middle of the abdomen 7.
7. Middle pair of tail feathers much elongated, lineiform, exceeding the other rectrices by at least 60 mm. 7. *C. LINEARIS*.
- Middle pair of tail feathers slightly elongated, pointed, exceeding the other rectrices by about 10-15 mm. 6. *C. LANCEOLATA*.
- None of the tail feathers elongated 8.
8. All the lower surface dark greyish green 5. *C. REGINA*.
- Throat, chest and sides pale greenish, middle of breast and abdomen pale yellowish 9.
9. Smaller : wing 68-70 mm. 1. *C. PAREOLA PAREOLA*.
- Larger : wing 73-77 mm. 2. *C. PAREOLA ATLANTICA* (1).

1. *Chiroxiphia pareola pareola* (Linnæus).

Pipra pareola Linnæus, Syst. Nat. ed. 12. Vol. 1, p. 339 (1766) (ex Brisson, Edwards and Marcgrave : « Brasilia, Cayana »).

Manacus superbus Pallas, Spicil. Zool. Fasc. 6, p. 8, t. 3, f. 1 (1769) (Surinam).

Pipra plumata P. L. S. Müller, Natursyst. Suppl. p. 177 (1776) (ex Daubenton, Pl. enl. 303, f. 2 [= ♂ juv.] Cayenne).

Hab. Cayenne, Surinam, Brit. Guiana, Brazil : on the Amazons to the west as far as Santarem and Obidos, in the eastern states south to Espiritu Santo.

(1) The females of *C. pareola napensis* and *C. pareola boliviana* are unknown to the author.

2. **Chiroxiphia pareola atlantica** Dalmas.*Chiroxiphia pareola atlantica* Dalmas, Mém. Soc. Zool. Fr. Vol. 13, p. 139 (1900) (Tobago).

Hab. Island of Tobago.

3. **Chiroxiphia pareola napensis** De Witt Miller.*Chiroxiphia napensis* De Witt Miller, Bull. Amer. Mus. Nat. Hist. Vol. 24, p. 338, t. 25 (1908) (Napo, East Ecuador).Easily distinguishable from the other forms of *C. pareola* by the much darker, azure blue mantle, and paler, light scarlet crest.

Hab. Eastern Ecuador : Rio Napo, Sarayaçu.

4. **Chiroxiphia pareola boliviana** Allen.*Chiroxiphia pareola boliviana* Allen, Bull. Amer. Mus. Nat. Hist. Vol. 2, p. 87 (1889) (Yungas of Bolivia).

Hab. Southeast Peru, Northern and Eastern Bolivia.

5. **Chiroxiphia regina** Sclater.*Chiroxiphia regina* (Natterer MS.) Sclater, Ann. Mag. Nat. Hist. (2), Vol. 17, p. 469 (1856) (Borba, Rio Madeira).

Hab. N. W. Brazil : Rio Javarri, Manaqueri, Rio Solimões, and Rio Madeira.

6. **Chiroxiphia lanceolata** (Wagler). (Plate 2, Fig. 2; Plate 3, Fig. 7.)*Pipra lanceolata* Wagler, Isis, 1830, p. 931 (« Guiana sive Cajenna » — errore!).*P. pareolides* D'Orbigny & Lafresnaye, Rev. Zool. 1838, p. 165 (Carthagenae).Hab. Chiriqui, Veragua, Panama, Northern Colombia (Carthagenae, Santa Marta, also found in Bogotá-collections) and Northern Venezuela eastwards to Cumana (but *not* on the island of Trinidad).7. **Chiroxiphia linearis** (Bonaparte). (Plate 2, Fig. 9.)*Pipra linearis* Bonaparte, Proc. Zool. Soc. Lond. Part 5, 1837, p. 113 (1838. — « Mexico »).*P. fastuosa* Lesson, Rev. Zool. 1842, p. 174 (« Realejo, in provincia Nicaragua »).

Hab. Central America from Southern Mexico to Costa Rica.

8. **Chiroxiphia caudata** (Shaw & Nodder). (Plate 2, Fig. 1.)*Pipra caudata* Shaw & Nodder, Natur. Misc. Vol. 5, t. 153 (1793) (« in the warmer parts of South America »).*P. longicauda*, Vieillot, Nouv. Dict. Vol. 19, p. 163 (1818) (ex Azara : Paraguay).

Hab. Paraguay, the Argentine province of Misiones, and Southeast Brazil from Rio Grande do Sul to Rio de Janeiro.

9. **Chiroxiphia ignicapilla** (Wagler). (Doubtful form.)*Pipra ignicapilla* Wagler, Isis, 1830, p. 931 (« Brasilien »).

Hab. Brazil (exact locality not known).

Said to differ from *C. caudata* by its longer tarsus, broader and more elongated median rectrices and by having the pileum golden yellow instead of scarlet. A single adult ♂ in the Berlin Museum.

11. GENUS ILICURA REICHENBACH

Ilicura Reichenbach, Av. Syst. Nat. t. 63 (1850) (type : *P. militaris* Shaw & Nodder).Synonyms : *Hicura* Bonaparte, Consp. Volucr. Anisod. p. 6 (Sep. ex Ateneo italiano n° 11, August 1854) (same type). — *Heilicura* Salvin, Cat. Strickl. Coll. p. 320 (1882) (same type). — *Helicura* Sclater, Cat. Birds Brit. Mus. Vol. 14, p. 311 (1888) (same type).

Characters. The only known species of this genus is certainly very nearly allied to *Chiroxiphia*, but has a smaller bill, proportionately longer tail and shorter first primary. Adult ♂ : the feathers of the forehead are slightly erect; the first primary is narrow, somewhat pointed and falls between the sixth and seventh. The third primary is the longest, the second and fourth are equal and about 3 mm. shorter. The stems of the outer primaries are stiffer and much more thickened than in *Chiroxiphia*. Tail rounded, the middle pair of rectrices, which is much narrowed on the apical half, elongated and pointed, exceeds the following one by 20 to 25 mm. The adult ♀ has the first primary fully as short as the ♂, but of normal width and

shape; the middle pair of rectrices is but slightly lengthened and less narrowed at the tip. The tarsi are more slender and weaker than in *Chiroxiphia*; like the members of this genus, the scutes are sometimes almost fused.

Sexes dissimilar. Adult ♂ : erect frontal plumes, rump and upper tail coverts dark crimson; vertex, occiput, back, tail and upper wing coverts velvety black. Quills blackish, tertials and outer webs of secondaries bright olive green. Lores black; sides of the head smoky grey; throat, and sides of the neck pale cinereous, breast and abdomen white, sides blackish, under tail coverts pale greenish yellow. Axillaries, under wing coverts and quill lining white. Adult ♀ : upper parts bright oil green, sides of the head and lower surface cinereous, washed with greenish on the chest and sides. Bill and feet pale brown.

Geographical Distribution. Wood region of Southeastern Brazil from Minas Geraes to S. Paulo. *Monotypic*.

1. *Ilicura militaris* (Shaw & Nodder). (Plate 2, Fig. 4.)

Pipra militaris Shaw & Nodder, Natur. Misc. Vol. 20, t. 840 (1808) (« South America »).

Pipra rubrifrons Vieillot, Nouv. Dict. Vol. 19, p. 161 (1818) (« l'Amérique méridionale »).

Pipra oxvura Nordmann, in : Erman's Reise. Naturhist. Atl. p. 12, pl. 9, f. 1, 2 (1835) (« Brasilien »).

Hab. S. E. Brazil - Minas Geraes, Rio de Janeiro, S. Paulo).

12. GENUS CORAPIPO BONAPARTE

Corapipo Bonaparte, Consp. Volucr. Anisod. p. 6 (Sep. ex : Ateneo italiano n° 11, August 1854). (Species unica : *Pipra gutturalis* Linnæus).

Characters. This genus leads from *Pipra* to *Chiromachaeris*. The bill is small as in the members of the former genus, but rather broader at the base, thus more like *Chiromachaeris*. The feathers of the upper throat are distinctly elongated, though less so than in the latter genus. The tail is relatively longer than in *Pipra*, the metatarsus slender and short, the toes very small and feeble. The best character to recognize the species of *Corapipo* consists of the shape of the outermost primary which is either narrowed (*C. gutturalis*) or much shortened (*C. leucorrhœa*). The first and the succeeding primaries are, however, never curved inwards as in the species of *Chiromachaeris*. Sexes different. Males glossy black with the throat white, females green.

Geographical Distribution. Cayenne, British Guiana, Colombia and Central America as far north as Nicaragua. Only three forms are known.

KEY TO THE SPECIES AND SUBSPECIES

1. Glossy black with the throat white (♂♂) 2.
 - Above olive green, below paler, more yellowish in the middle of abdomen 4.
2. A white patch on the wing, under tail coverts and ear coverts black. First primary narrowed, pointed, about 6-7 mm. shorter than the next 1. *C. GUTTURALIS*.
- No white patch on the wing. Under tail coverts with long white tips. Ear coverts elongated, white 3.
3. First primary reduced to a very small, lanceolate feather of about 10 mm.

- length, the two next ones much longer, rather narrow and pointed. Fifth and sixth primaries longest 2. *C. LEUCORRHOA LEUCORRHOA*.
- First primary much longer, obtuse, about 15 mm. shorter than the second. Fourth primary longest, distinctly longer than the fifth 3. *C. LEUCORRHOA ALTERA*.
4. First primary pointed, about 6 mm. shorter than the next 1. *C. GUTTURALIS*.
- First primary obtuse, about 15 mm. shorter than the next 3. *C. LEUCORRHOA ALTERA*.
- First primary reduced to a very small, lanceolate feather of about 10 mm. length 2. *C. LEUCORRHOA LEUCORRHOA*.

1. **Corapipo gutturalis** (Linnæus).

Pipra gutturalis Linnæus, Syst. Nat. ed. 12, Vol. 1, p. 340 (1766) (ex Brisson, Orn., Vol. 4, p. 444, pl. 36, f. 1; « Manakin à gorge blanche »; loc. ign., as terra typica accepted Cayenne).

Pipra perspicillata Wagler, Isis, 1830, p. 935, descr. ♀ (ex Desmarest, « Manakin à gorge blanche femelle »; Hist. Nat. Tang. t. 65. — Cayenne).

Hab. Cayenne and British Guiana.

2. **Corapipo leucorrhoea leucorrhoea** (Sclater).

Pipra leucorrhoea Sclater, Proc. Zool. Soc. Lond. 1863, p. 63, pl. 10 (Bogota-collections).

Hab. Colombia (Bogotá-coll.; Bucaramanga; Primavera in the Cauca valley).

3. **Corapipo leucorrhoea altera** Hellmayr. (Plate 1, Fig. 2.)

Corapipo leucorrhoea altera Hellmayr, Bull. Brit. Orn. Club, Vol. 16, p. 84 (1906) (Carrillo, Costa Rica).

Hab. Panama, Veragua, Chiriqui, Costa Rica and Southern Nicaragua (Chontales).

13. GENUS CHIROMACHÆRIS CABANIS

Chiromachæris Cabanis, Arch. f. Naturg. Vol. 13, 1, p. 235 (1847) (Species unica : *Pipra manacus* Linnæus).

Synonym : *Manacus* G. R. Gray, Cat. Gen. and Subg. Birds, p. 55 (1855) (type : *P. manacus* Linnæus).

Characters. Bill rather wider at the base and more distinctly ridged than in the genus *Pipra*, though otherwise very similar in shape. Feathers of the middle of throat much elongated. Wings short and rounded, the second, third, fourth, fifth and sometimes the sixth primaries being nearly of equal length. The outer primaries are of a very peculiar shape, especially in the males. They are much attenuated in the webs, and strongly curved inwards. The stems of the inner primaries and of the secondaries thickened and rather stiff. Tail nearly square. Metatarsus and toes much stronger and longer than in *Pipra*, and always of a yellowish flesh colour.

Sexes widely different in coloration, the males being black and white, yellow or orange, while the females are clad in olive green garments, the abdomen alone being sometimes dull yellow. In the female sex, the outer primaries are less attenuated and less curved, though always much narrower than the inner ones. The throat-feathers are likewise less elongated.

Little is known about the habits and nidification of the species of this genus. Salmon (*Proc. Zool. Soc. Lond.* 1879, p. 517) tells us that *C. manacus abditivus* builds a slight shallow nest of grasses, which is suspended from the fork of a branch in low shrubs, and Euler (*Journ. f. Ornith.* 1867, p. 223) made the same observations on *C. manacus gutturosus*. The eggs are white, thickly blotched with brown or chocolate red, the blotches being more or less confluent in a zone round the larger end. Those of *C. manacus abditivus* and *C. vitellina* are figured by Sclater & Salvin (*Proc. Zool. Soc. Lond.* 1879, tab. 42). According to Euler (loc. cit.), in *C. manacus gutturosus* the clutch consists of two eggs only.

Geographical Distribution. From Eastern Mexico (state of Vera Cruz) all over Central- and South America to Southeast Brazil.

KEY TO THE SPECIES AND SUBSPECIES

1. *Cap and upper back black, hind neck white, yellow or orange* (♂♂) 2.
- *No black whatever in the plumage* (♀♀) 8.
2. *With a black patch on the throat* 9. *C. CORONATA*.
- *No black on the throat* 3.
3. *Rump cinereous* 4.
- *Rump olive green or yellowish olive* 7.
4. *Throat, foreneck and nape faintly tinged with pale yellowish* 5. *C. FLAVEOLA*.
- *Throat, foreneck and nape pure white* 5.
5. *Under tail coverts and middle of the abdomen white* 2. *C. MANACUS PURUS*.
- *Only the middle of the abdomen white, under tail coverts cinereous like the flanks* 1. *C. MANACUS MANACUS*.
- *Whole breast and abdomen, including under tail coverts, dark cinereous* 6.
6. *Tail longer : 32-35 mm.* 4. *C. MANACUS GUTTUROSUS*.
- *Tail shorter : 26-30 mm.* 3. *C. MANACUS ABDITIVUS*.
7. *Throat, foreneck and nape pure white* 6. *C. CANDEI*.
- *Throat, foreneck and nape chrome yellow; rump, breast and abdomen olive green* 7. *C. VITELLINA*.
- *Throat, foreneck and nape cadmium orange; rump yellowish oil green, abdomen light yellow* 8. *C. AURANTIACA*.
8. *Under parts nearly uniform dull green, middle line of the abdomen scarcely paler* 4. *C. MANACUS GUTTUROSUS*.
- *Throat pale greenish grey, foreneck and sides of the belly dull green, middle of abdomen more or less straw yellow* { 1. *C. MANACUS MANACUS*.
2. *C. MANACUS PURUS*.
3. *C. MANACUS ABDITIVUS*.
- *Throat and foreneck intense olive green, breast and abdomen bright gamboge yellow. Tail long : 37-40 mm.* 6. *C. CANDEI*.
- *Throat and foreneck light yellowish olive, breast and abdomen dull olive yellow, more greenish on the sides. Tail short : 30-32 mm.* 7. *C. VITELLINA*.
- *Under parts mainly intense saffron yellow, tinged with yellowish olive on throat, foreneck and sides of chest. Tail short : 30-33 mm.* 8. *C. AURANTIACA* (1).

1. *Chiromachæris manacus manacus* (Linnæus).

Pipra manacus Linnæus, Syst. Nat. ed. 12, Vol. 1, p. 340 (1766) (ex Edwards, Glean. Nat. Hist. Vol. 1, p. 107, t. 260, f. sup. — Surinam; and ex Brisson; Ornith. Vol. 4, p. 442 [excl. Syn. Marcgrave and hab. «Brasilia»]. — Cayenne).

P. melanocephala, P. L. S. Müller, Natursyst. Suppl. p. 177 (1776) (ex Daubenton, Pl. enl. 303, f. 1. — Cayenne).
Manacus edwardsi, Bonaparte, Consp. Av. Vol. 1, p. 171 (1850) (ex Edwards, Glean. Nat. Hist. Vol. 1, t. 260 f. sup.; and Daubenton, Pl. enl. t. 302, f. 1 (= figure copied from Edwards, but habitat wrongly assigned to «Brésil»)).

Hab. Cayenne, Surinam, British Guiana, Trinidad; west through the Orinoco region to the eastern slopes of the Andes in Ecuador, south to Pebas on the Peruvian Amazons, and along the Rio Negro to Manaus in Northern Brazil.

(1) The females of *C. flaveola* and *C. coronata* are not known to the author.

2. **Chiromachæris manacus purus** (Bangs). (Plate 1, Fig. 1.)

Manacus manacus purus Bangs, Proc. New Engl. Zool. Club, Vol. 1, p. 36 (1899) (Santarem).

Hab. North Brazil : from Maranhão and Pará along the south bank of the Amazons and the east bank of the Rio Madeira to northern Mattogrosso (Engenho do Gama, S. Vincente on the Rio Guaporé).

3. **Chiromachæris manacus abditivus** (Bangs).

Manacus manacus abditivus Bangs, Proc. New Engl. Zool. Club, Vol. 1, p. 35 (1899) (Santa Marta, Colombia).

Hab. Colombia (Santa Marta and Bogotá-collections) and Western Ecuador.

4. **Chiromachæris manacus gutturosus** (Desmarest).

Pipra gutturosa Desmarest, Hist. Nat. Tang, etc. t. 58 (1805) (no locality).

Hab. Eastern Brazil from Bahia to S. Paulo.

5. **Chiromachæris flaveola** (Cassin).

Manacus flaveolus Cassin, Proc. Acad. Natur. Sc. Philad. 1851, p. 349 (Bogotá, New Granada).

Pipra flavo-tincta Sclater, Proc. Zool. Soc. Lond. Part 20, 1852, p. 34, t. 48 (1853. — Santa Fé de Bogotá).

Hab. Only known from Colombia (Bucaramanga, and Bogota-collections).

6. **Chiromachæris candei** (Parzudaki).

Pipra candei Parzudaki, Rev. Zool. 1841, p. 306 (« Truxillo, dans la baie de Honduras »).

Manacus candei electilis O. Bangs, Proc. New Engl. Zool. Club, Vol. 3, p. 106 (1903) (Vera Cruz, Mexico).

Hab. Eastern Mexico, Guatemala, Honduras, Nicaragua and Costa Rica.

7. **Chiromachæris vitellina** (Gould).

Pipra vitellina Gould, Proc. Zool. Soc. Lond. Part 11, 1843, p. 103 (Panama).

Hab. Panama and Western Colombia.

8. **Chiromachæris aurantiaca** Salvin.

Chiromachæris aurantiaca Salvin, Proc. Zool. Soc. Lond. 1870, p. 200 (Mina de Chorchá und Bugaba, Chiriquí).

Hab. Chiriquí und Costa Rica.

9. **Chiromachæris coronata** Boucard.

Chiromachæris coronata Boucard, Proc. Zool. Soc. Lond. 1879, p. 178, t. 17 (Colombia).

Hab. Only known from a single Bogotá-skin in Boucards collection, now in the Paris Museum.

14. GENUS NEOPIPO SCLATER & SALVIN

Neopipo Sclater & Salvin, Proc. Zool. Soc. Lond. 1869, p. 438 (type of the genus : *Neopipo rubicunda* Sclater & Salvin).

Characters. The single species of this genus is of the size of a small *Pipra*, e. g. *P. coronata*, but differs widely in structural details. The bill is smaller and not so high, the tail relatively much longer, the wing more pointed, the third remex being the longest, the second and fourth distinctly, though little shorter, the first about 3 mm. shorter than the fourth and scarcely longer than the fifth. The tail is nearly square, the outermost rectrix being but 2 mm. less than the median one. The feet are small and slender, as in *Corapipo*; the tarsus divided in front into five or six scutes and covered behind with minute reticulations. The three anterior toes are closely connected together, the cohesion between them extending up to, if not beyond, the commencement of the terminal digits. The toes are not covered with scutes, as is the case in the other genera of the *Pipridae*, but with minute, rough warts. The rufous coloration recalls the genus *Schiffornis*; there is, however, a half-concealed bright vertical spot as in *Heterocercus*. Top of the head and nape olive gray, vertical spot golden yellow in the male, cinnamonaceous in the female, rump and upper tail coverts light cinnamon red, on the mantle passing into the colour of the crown. Tail cinnamon red. Upper wing coverts and quills dusky with dark

cinnamon brown edges; tertials cinnamomeous red. Sides of the head olive gray, on the ear coverts a patch of pale buff. Under surface light cinnamon red, throat rather paler than the rest. Bill horn brown, base of lower mandible whitish. Wing 50 1/2, tail 36 1/2, tarsus 14 1/2, bill 9 mm.

Geographical Distribution. British Guiana, Cayenne, Eastern Ecuador, Eastern Peru, and Western Brazil. *Monotypic*.

1. **Neopipo cinnamomea** (Lawrence).

Pipra? cinnamomea Lawrence, Proc. Acad. Natur. Sc. Philad. 1868, p. 429 (« Upper Amazon »).

Neopipo rubicunda Sclater & Salvin, Proc. Zool. Soc. Lond. 1869, p. 438, t. 30, f. 3 (Chamicuros, Eastern Peru).

Hab. Cayenne; British Guiana (Camacusa); Eastern Ecuador (Sarayaçu); Eastern Peru (Chamicuros); Western Brazil (Humayta on the Rio Madeira).

15. GENUS SCHIFFORNIS DES MURS

Schiffornis [Bonaparte M. S. (1)], Des Murs in : Castelnau's Voyage, Oiseaux, Livr. 18 (June 1856), p. 66 (type : *Schiffornis major* Des Murs).

Characters. The only member of this genus differs from *Scotothorus* only by its decidedly shorter tarsus, and rather shorter, wider and more curved bill. The uniform rufous coloration is another point of distinction. The two so-called species, *S. major* and *S. rufa*, recognized in the Catalogue of Birds, Vol. 14, p. 323, are merely phases of a single form, as I have ascertained by examining a good series of skins in the Paris and Vienna Museums. In the type of *S. major* from Sarayacu and in a female from Fonteboa, Rio Solimoëns (both in the Paris Museum) the forehead, crown and nape are cinereous, intermixed with numerous ferruginous feathers, only the sides of the head being pure cinereous. A quite similar specimen (♂) from the Rio Amajau (a tributary of the Rio Negro) is in the Vienna Museum. A female, collected by the Castelnau expedition, has the forehead and the ear coverts ferruginous, while the crown and nape are cinereous mixed with ferruginous. Another female from the same source has the forehead and sides of the head cinereous, the crown and nape pure ferruginous (without any gray). Two ♂♂ from the Rio Amajau and one female from Borba, Rio Madeira, — the types of *H. rufum* Pelzeln — in the Vienna Museum have the top and sides of the head ferruginous, there being but a slight cinereous admixture round the eye. Since the two extremes occur at the same locality (Rio Amajau) and as there is every gradation between them, their identity is established beyond doubt, though I am unable to explain the difference, which is certainly not sexual. In the series examined by me, the length of the wing varies from 78 to 85, that of the tail from 56 to 63 mm.

Geographical Distribution. Cayenne (Oyapoc) and Amazonia : Rio Amajau (Rio Negro), Borba (Rio Madeira), Fonteboa (R. Solimoëns), Rio Juruá; Nauta, Samiria, Sarayaçu (Eastern Peru). *Monotypic*.

(1) This name generally attributed to Bonaparte, was first published in the *Consp. Voluc. Anisod.* p. 4, 1854, where, however, it is a *nomen nudum*, for two of the three species mentioned (*S. major* and *S. minor*) were undescribed at that time, while the third (*S. turdina*) belongs to *Scotothorus*.

1. **Schiffornis major** Des Murs.

Schiffornis major (Bonaparte M. S.) Des Murs in : Voyage Castelnau, Oiseaux, livr. 18, p. 66, t. 18, f. 2 (1856) (Sarayacu, Pérou).

Heteropelma rufum Pelzeln, Zur Ornith. Brasil. Abt. 2, p. 124, 185 (1868) (Rio Amajau and Borba on the Rio Madeira).

Hab. The same as that of the genus.

16. GENUS **SCOTOTHORUS** OBERHOLSER

Scotothorus Oberholser, Proc. Acad. Natur. Sc. Philad. 1899, p. 208 (type : *Muscicapa turdina* Wied).

Synonym : *Heteropelma* Bonaparte (nec Wesmaël 1849), Consp. Volucr. Anisod. p. 4 (Sep. ex : Ateneo italiano n° 11, August 1854).

Characters. Bill rather large, compressed, especially towards the tip. Culmen distinctly ridged and strongly curved in the apical portion. Subterminal notch very distinct. Nostrils elliptical and open, situated near the lower edge of the nasal fossa. Rictal bristles well developed, particularly in the species with a bright occipital crest. In the wing, the fourth primary is the longest, the third and fifth are a little shorter, the first equals the tenth. Tail emarginate and at the same time slightly rounded, the outermost rectrix being shorter than the four succeeding ones which are of equal length while the innermost is again somewhat shortened, though still a little longer than the outermost pair. Tarsus short, but robust, the outer toe united to the middle one for its basal half. In the species of the first section (without bright vertical crest) the tarsus is distinctly scutellate, and the under surface of the toes covered with small, protruding, wart-like scutes. In *S. pallescens*, *S. chrysocephalus* and *S. sulphureiventer* the under surface of the toes is almost smooth, and the scutes of the metatarsus are sometimes fused. Sexes alike or very little different, the females of the three crested species having a smaller and paler crest than the males.

Habits. Little is known of their habits. Prince Wied says that *S. turdinus turdinus* and *S. unicolor* are found in dense forests.

Geographical Distribution. Central America from Eastern Mexico southwards and South America down to Southeast Brazil.

KEY TO THE SPECIES AND SUBSPECIES

1. With a bright yellow vertical crest.	2.
— Without a bright vertical crest	3.
2. Vertical crest orange; breast and abdomen pale sulphur yellow. Wing 70-72, tail 52-54 mm. 12. <i>S. CHRYSOCEPHALUS</i> .	
— Vertical crest lemon yellow; breast and abdomen pale sulphur yellow. Wing 72-74, tail 60 mm. 11. <i>S. SULPHUREIVENTER</i> .	
— Vertical crest lemon yellow; breast dull grayish, most of the feathers narrowly edged with pale yellowish; abdomen very pale yellowish, shaded with grayish on flanks. Wing 75-80, tail 65-68 mm. 10. <i>S. PALLESCENS</i> .	
3. Bill small and slender. General plumage uniform, bright olive green except the rectrices and the edges to the quills which are russet brown	9. <i>S. UNICOLOR</i> .

- Bill large and strong. Plumage not bright olive green, but more or less brownish olive above and brownish or grayish olive below 4.
4. Wing 96 to 100 mm., tail 76 mm. and more 1. *S. TURDINUS TURDINUS*.
- Wing never more than 92 mm., tail not exceeding 72 mm. 5.
5. Upper parts rufescent olive brown; throat and foreneck strongly tinged with rufescent brown, remainder of lower surface pale greenish olive 7. *S. TURDINUS VERÆ-PACIS*.
- Upper parts deep olive brown, head rather more rufescent; under surface deep brownish olive, throat scarcely darker. 6. *S. TURDINUS FURVUS*.
- Back dark, dull greenish olive, head somewhat more rufescent; under surface dark greenish olive, throat slightly washed with brownish 5. *S. TURDINUS ROSENBERGI*.
- Upper parts rufescent olive brown; throat and foreneck strongly tinged with rufescent brown, abdomen dull greyish olive 8. *S. TURDINUS STENORHYNCHUS*.
- Back dull brownish olive, top of the head in marked contrast rufescent brown; throat and foreneck strongly tinged with rufescent; remainder of lower parts dull greyish olive. 4. *S. TURDINUS AMAZONUM*.
- Back intermediate in colour between *S. t. amazonum* and *S. t. wallacii*. Throat and foreneck distinctly, though slightly, shaded with brownish; remainder of lower parts dull greyish olive. 3. *S. TURDINUS OLIVACEUS*.
- Upper parts dull olive, cab scarcely brownish; under surface pale greyish olive, throat but faintly shaded with brownish 2. *S. TURDINUS WALLACII*.

1. **Scotothorus turdinus turdinus** (Wied).

Muscicapa turdina Wied, Beitr. Naturg. Brasil, Vol. 3, Abt. 2, p. 817 (1831) (E. Brazil).

Muscicapa rufo-olivacea Lafresnaye, Mag. Zool. 1833, Cl. 2, text to pl. 13, p. 3 (no locality).

Hab. Only known from Bahia, East Brazil.

2. **Scotothorus turdinus wallacii** (Sclater & Salvin.)

Heteropelma wallacii Sclater & Salvin, Proc. Zool. Soc. Lond. 1867, p. 579, 595 (Para).

Hab. N. E. Brazil : Para.

3. **Scotothorus turdinus olivaceus** Ridgway.

Scotothorus olivaceus Ridgway, Proc. Biol. Soc. Wash. Vol. 19, p. 118 (1906) (Rio Mato, tributary of the Caura, Venezuela).

Hab. East Venezuela : Caura River and its affluents ; British Guiana, Cayenne.

4. **Scotothorus turdinus amazonum** (Sclater).

Heteropelma amazonum Sclater, Proc. Zool. Soc. Lond. 1860, p. 466 (Chamicurros, Eastern Peru).

Hab. Upper Amazonia from Colombia (Bogotá-collect.) and the upper Orinoco (Nericagua, Munduapou south through Eastern Ecuador and the Rio Negro district (Marabitanas, Rio Xié) to Southeast Peru (Marcapata) and western Mattogrosso (Villa Maria and Engenho do Gama on the Rio Guaporé).

N. B. Specimens from Borba, Rio Madeira, are intermediate between this form and n° 2.

5. **Scotothorus turdinus rosenbergi** (Hartert).

Heteropelma rosenbergi Hartert, Novit. Zool. Vol. 5, p. 489 (1898) (Cachavi, N. W. Ecuador).

Hab. Western Ecuador.

6. **Scotothorus turdinus furvus** Ridgway.

Scotothorus furvus Ridgway, Proc. Biol. Soc. Wash. Vol. 19, p. 118 (1907) (Boquete de Chitra, Veragua).

Hab. Veragua (Boquete de Chitra, Chitra, Calevevora).

7. **Scotothorus turdinus veræ-pacis** (Sclater & Salvin).

Heteropelma veræ-pacis Sclater & Salvin, Proc. Zool. Soc. Lond. 1860, p. 500 (Vera Paz, Guatemala).

Scotothorus veræpacis dunicola O. Bangs, Proc. New Engl. Zool. Club, Vol. 3, p. 103 (1903) (Chiriqui).

Hab. Central America from Guatemala (Vera Paz) south to Chiriqui.

N. B. I could not find any constant differences between specimens from various localities.

8. *Scotothorus turdinus stenorhynchus* (Sclater & Salvin).

Heteropelma stenorhynchum Sclater & Salvin, Proc. Zool. Soc. Lond. 1868, p. 628, 632 (San Esteban near Puerto Cabello, North Venezuela).

Hab. From N. W. Venezuela (S. Esteban) ranging through northern Colombia (Santa Marta) to Panama. N. B. Two skins from Panama differ from the types only by their stronger, broader bills.

9. *Scotothorus unicolor* (Bonaparte). (Plate 1, Fig. 7.)

Muscicapa virescens (nec Temminck, 1824), Wied, Beitr. Naturg. Brasil, Vol. 3, Abt. 2, p. 802 (1831) (Arrayal da Conquista, interior of Bahia).

Ptilochloris virescens Lafresnaye, Rev. Zool. 1838, p. 238 (Brésil).

Heteropelma unicolor Bonaparte, Consp. Volucr. Anisod. in : Ateneo Italiano n° 11, 1854 (sep. p. 4, n° 78) (based on *P. virescens* Lafresnaye).

Muscicapa viridis, Pucheran, Arch. Mus. Hist. Nat. Paris, Vol. 7, p. 370 (1855) (« Brésil »).

Hab. Woodregion of Eastern Brazil from Bahia to Rio grande do Sul.

10. *Scotothorus pallescens* (Lafresnaye).

Tyrannula pallescens Lafresnaye, Rev. Mag. Zool. 1853, p. 57 (Bahia).

Heteropelma flavicapillum, Sclater, Proc. Zool. Soc. Lond. 1860, p. 466 (S. E. Brazil).

Hab. Campos of Brazil : Bahia, Goiaz, Piauh, Minas Geraës, Mattogrosso and Northern S. Paulo.

11. *Scotothorus sulphureiventer* Hellmayr.

Scotothorus sulphureiventer Hellmayr, Verh. Zool.-bot. Ges. Wien, 1903, p. 202 (Mattogrosso).

Heteropelma chrysocephalum (nec Pelzelin), Pelzelin, Zur Ornith. Bras. Abt. 2, p. 185 (1868) (part. : ♂ juv. — Mattogrosso); Sclater, Cat. Birds Brit. Mus. Vol. 14, p. 322 (1888. — Mattogrosso).

Hab. Only known from Villa Bella de Mattogrosso on the Rio Guaporé, western Mattogrosso, Brazil; and San Mateo, Northern Bolivia.

12. *Scotothorus chrysocephalus* (Pelzelin). (Plate 1, Fig. 3.)

Heteropelma chrysocephalum Pelzelin, Zur Ornith. Bras. Abt. 2, p. 185 (1868) (part. : ♂ ad. — Marabitanas, Rio Içanna, S. Carlos).

Heteropelma igniceps, Sclater, Proc. Zool. Soc. Lond. 1871, p. 750 (Oyapoc, Cayenne).

Hab. Cayenne (Oyapoc), British Guiana, and on the upper Rio Negro (Marabitanas, Rio Içanna and S. Carlos).

17. GENUS NEOPELMA SCLATER

Neopelma Sclater, Proc. Zool. Soc. Lond. 1860, p. 467 (species unica : *Muscicapa aurifrons* Wied).

Characters. The only species belonging to this genus bears a great likeness to *Scotothorus pallescens*, *S. chrysocephalus*, etc., with which it shares the possession of a large, bright yellow vertical patch. It differs, however, by its considerably smaller and narrower bill, shorter and more slender tarsus, and much smaller, weaker feet. In other structural details it agrees pretty well with the species of *Scotothorus*, mentioned above.

The bill shows a distinct ridge, and there are numerous, rather stiff rictal bristles. In the wing, the fourth and fifth primaries are the longest, the third scarcely shorter. Tail of the same shape as in *Scotothorus*, the innermost and the outermost rectrix being shortened so that the tail is slightly emarginate and at the same time distinctly rounded. Tarsi short, slender and covered with distinct scutes; toes and claws short and weak. Sexes alike, the female differing only by having the vertical patch smaller and lighter in colour. Upper parts bright olive green, feathers of the middle of the crown bright golden yellow, narrowly tipped with green. Lores greyish white, earcoverts dull greenish. Throat greyish mixed with whitish; rest of under parts pale yellow, chest underlaid with greyish and sides washed with greenish.

Geographical Distribution. Forest region of Southeastern Brazil from Bahia to S. Paulo. *Monotypic*.

1. **Neopelma aurifrons** (Wied). (Plate 1, Fig. 9.)*Muscicapa aurifrons* Wied, Beitr. Naturg. Brasil, Vol. 3, Abt. 2, p. 829 (1831) (Camamu in southern Bahia).*Muscicapa luteocephala* (nec Lesson 1830) Lafresnaye, Mag. Zool. 1833, Cl. 2, pl. 13 (no locality given, the type examined by me in the Paris Museum was obtained in Minas Geraës by Auguste de St Hilaire).

Hab. Forest region of Southeast Brazil (southern parts of Bahia, Minas Geraës, Rio de Janeiro and S. Paulo).

18. GENUS SAPAYOA HARTERT

Sapayoa Hartert, Novit. Zool. Vol. 10, p. 117 (1903) (type of the genus : *Sapayoa aenigma* Hartert).

Characters. This rather aberrant genus of the *Pipridae* undoubtedly finds its nearest ally in *Scotothorus* from which it differs by its much broader and wider bill, more distinctly emarginate tail, and by the upper half of the much weaker and shorter tarsus being feathered. Bill short and stout, at the base broader than high, and abruptly attenuated towards the tip. Culmen strongly ridged as in *Scotothorus*. The hook of the upper mandible preceded by a slight, but distinct notch. Nostrils quite round. Rictal bristles more numerous as well as much stronger and stiffer than in *Scotothorus*. Fourth primary longest, third about 1/2 mm. shorter, fifth again 1/2 mm. shorter than the third; first primary of the length of the secondaries. Tail distinctly emarginate and at the same time slightly rounded; the outermost rectrix is shorter than the four following ones (which are equal in length), though still a little longer than the innermost. Feet very small and weak. Tarsus feeble, very short, and ocreate, the scales being so fused as to show hardly any division. Upper half of the tarsus feathered. Toes connected at the base, the outer and middle toe for their basal half. Under surface of the toes rough, being covered with small, roundish scutes, as in the species of *Scotothorus*. Feathers of the crown somewhat elongated, forming a slight crest. Structure of plumage and style of coloration as in *Scotothorus*. Upper parts uniform dull olive green. Quills dark brown, exteriorly margined with the colour of the back. Tail feathers dark brown with olive green edges. Lower surface much lighter and more yellowish green than the back. Inner webs of the remiges indistinctly edged with dull greenish buff.

A single specimen, marked ♀, in the Tring Museum. Nothing is known of its habits and nidification.

Geographical Distribution. Rio Sapayo in Northwestern Ecuador. *Monotypic*.

1. **Sapayoa aenigma** Hartert. (Plate 1, Figs. 5, 8.)*Sapayoa aenigma* Hartert, Novit. Zool. Vol. 10 p. 117 (1903) (N. W. Ecuador).

19. GENUS LANIISOMA SWAINSON

Laniisoma Swainson, Fauna Bor. Amer. Vol. 2, Birds, p. 492 (1831) (type : « *L. arcuatum*, Paris Museum »).

Synonym : *Ptilochloris* Swainson, Classif. Birds, Vol. 2, p. 250 (1837) (type : « *P. lunatus* North Zool. Vol. 2, p. 492, Braz. B. pl. 95 »).

Characters. Bill shaped as in *Scotothorus*, but rather larger. Subterminal notch very distinct. Nostrils round, open and exposed. Rictal bristles numerous, but rather soft. In the wing, the fourth primary is the longest; the third scarcely, the second and fifth

decidedly (about 3 mm.) shorter; the first primary falls between the sixth and seventh. In the adult male, the fourth remex is attenuated at the apex and slightly bent outwards. The tail is rounded and slightly emarginate, the median rectrix being a little shorter than the following ones. Tarsus short, strong as in *Scotothorus*, and distinctly scutellate. The outer toe united to the middle toe for its basal half. Under tail coverts remarkably long, covering more than two-thirds of the length of the tail.

I have not been able to ascertain whether there is any sexual difference in the species of this genus. Adult ♂♂ with the apex of the fourth primary attenuated have the top of the head and nape black, the remaining upper parts uniform light green; lower surface pale yellow with broad black lunulations on the chest, under tail coverts and sides of the body, the lower throat sparingly spotted with black.

Specimens with the fourth primary of normal shape are more densely lunulated or banded with black underneath, and the upper wing coverts show large, cinnamon-rufous apical spots. I suppose these to be young birds, but am not sure of this. The upper mandible is always blackish, the lower one whitish.

The plumage of the nestling of *L. buckleyi* is most remarkable. It is described by Sclater & Salvin (*Proc. Zool. Soc. Lond.* 1880, p. 158), as follows: the upper surface, including the whole of the head, is of a cinnamon colour spotted with black, each black spot on the head being tipped with white; the under surface is black, banded with narrow white bars. From the top of the head proceed fine black filaments more than 25 mm. long, each tipped with white.

Geographical Distribution. Wood region of Southeastern Brazil (Rio de Janeiro and S. Paulo) and Eastern Ecuador. Two species are known, one of which is somewhat doubtful.

KEY TO THE SPECIES

1. *Top of the head and nape black.* 1. *L. SQUAMATUM.*
2. *Top of the head and nape olive green like the back* 2. *L. BUCKLEYI.*

1. *Laniisoma squamatum* (Wied). (Plate 1, Fig. 10.)

Muscicapa squamata Wied, Beitr. Naturg. Brasil, Vol. 3, Abt. 2, p. 814 (1831) (S. E. Brazil).

Lanius arcuatus Lafresnaye, Mag. Zool. 1833, Cl. 2, pl. 12 (« du Brésil, rapporté par M. Lalande »).

Ptilochloris lunatus (err. typ.) Swainson, Classif. Birds, Vol. 2, p. 250 (1837).

Hab. Wood region of Southeast Brazil (Rio de Janeiro, S. Paulo).

N. B. *Ptilochloris remigialis* Lafresnaye, Rev. Zool. 1838, p. 237 (locality unknown)

I have not seen. It seems to be of the same coloration as the ♂ adult of *L. squamatum*, described above, but is said to be much smaller.

2. *Laniisoma buckleyi* (Sclater & Salvin).

Ptilochloris buckleyi Sclater and Salvin, Proc. Zool. Soc. Lond. 1880, p. 158, pl. 16 (Pindo, Eastern Ecuador).

Hab. Eastern Ecuador.

20. GENUS *HETEROCERCUS* SCLATER

Heterocercus Sclater, Cat. Amer. Birds, 1862, p. 245 (type: *Elaenia lineata*, Strickland).

Characters. The members of this genus are at once recognizable by the peculiar shape of the tail. The bill, not unlike that of *Neopelma*, but much larger, is rather broad at the base

and abruptly attenuated towards the tip. The culmen is strongly ridged, but less hooked than in *Scotothorus* and *Neopelma*. The notch near the tip of the upper mandible is barely indicated. There are scarcely any rictal bristles, always more or less developed in the two allied genera. Nostrils situated in a groove, oval and open. In the wing, the fourth primary is the longest, the third and fifth are about 1 1/2 mm shorter and equal in length; first remex equal to the seventh. The tail is strongly graduated, the outermost rectrix being much shortened and at the same time narrowed and pointed. The middle pair, on the other hand, is very broad and rounded on the tip. Metatarsus rather short, covered in front with about five scutes. Sexes dissimilar. Males with a bright vertical patch.

Geographical Distribution. Amazonia, the upper Orinoco valley and in southern French Guiana. Only four species are known.

KEY TO THE SPECIES

1. With a bright vertical patch (♂♂) 2.
- No bright vertical patch (♀♀) 5.
2. Forehead and sides of crown very different from the olive green colour of the back 3.
- Forehead and sides of crown olive green like the back 4.
3. Crown-patch fiery red, forehead and sides of crown black; throat silky white, breast chestnut 1. *H. LINTEATUS*.
- Crown-patch lemon yellow, forehead and sides of crown ashy gray; throat dirty white, breast and abdomen pale sulphur yellow. 4. *H. LUTEOCEPHALUS* (1).
4. Crown-patch golden yellow; breast chestnut brown, considerably darker than the abdomen 2. *H. FLAVIVERTEX*.
- Crown-patch orange; breast and abdomen uniform pale reddish ochreous 3. *H. AURANTIIVERTEX* (1).
5. Upper parts dull brownish green 1. *H. LINTEATUS*.
- Upper parts bright oil green. 2. *H. FLAVIVERTEX* (2).

1. *Heterocercus linteatus* (Strickland).

Elaenia linteata Strickland, Contr. Orn. 1850, p. 121-15, t. 63 (part. ♂) («upper branches of the Rio Amozons »).

Hab. North Brazil : Rio Madeira; Monte Alegre on the Lower Amazons; Rio Tapajóz.

2. *Heterocercus flavivertex* Pelzeln. (Plate 1, Fig. 6.)

Heterocercus flavivertex Pelzeln, Zur Ornith. Bras. Abt. 2, p. 186 (1868) (Rio Negro).

H. angosturæ Berlepsch & Leverkühn, Ornith. Vol. 6, p. 19 (1890) (Orinoco).

Hab. N. W. Brazil : Rio Negro from the mouth of the Rio Branco upwards; Venezuela : on the upper Orinoco near Maipures and Perico; South Cayenne : Oyapoc (2).

3. *Heterocercus aurantiivertex* Sclater & Salvin.

Heterocercus aurantiivertex Sclater & Salvin, Proc. Zool. Soc. Lond. 1880, p. 157 (Sarayaçu).

Hab. Only known from Sarayaçu, Eastern Ecuador.

4. *Heterocercus luteocephalus* (Lesson).

Muscicapa luteocephala Lesson, Traité d'Orn. p. 392 (1830) (no locality); Pucheran, Arch. Mus. Hist. Nat. Paris, Vol. 7, p. 374 (1855) («l'Amérique méridionale »); Hellmayr, Novit. Zool. Vol. 13, 1906, p. 326.

Hab. unknown.

(1) The females of *H. aurantiivertex* and *H. luteocephalus* are unknown.

(2) The record from Chamicuros, N. Peru, cannot be located with certainty since only young males were obtained. These may belong either to *H. flavivertex* or to *H. aurantiivertex*.

EXPLANATION OF PLATES

PLATE I

- Fig. 1. Head of *Chiromachæris manacus purus*, ♂.
— 2. Head of *Corapipo leucorrhœa altera*, ♂.
— 3. Head of *Scotothorus chrysocephalus*.
— 4. Head of *Chloropipo flavicapilla*.
— 5. *Sapayoa ænigma*.
— 6. Head of *Heterocercus flavivertex*, ♂.
— 7. Head of *Scotothorus unicolor*.
— 8. Foot of *Sapayoa ænigma*.
— 9. Head of *Neopelma aurifrons*.
— 10. Head of *Laniisoma squamatum*.

PLATE 2

- Fig. 1. Tail of *Chiroxiphia caudata*, ♂.
— 2. Tail of *Chiroxiphia lanceolata*, ♂.
— 3. Tail of *Cirrhpipra filicauda*, ♂.
— 4. Tail of *Ilicura militaris*, ♂.
— 5. Foot of *Antilophia galeata*, ♂.
— 6. *Antilophia galeata*, ♂.
— 7. Head of *Pipra aureola aureola*, ♂.
— 8. Head of *Piprites chloris chloris*.
— 9. Tail of *Chiroxiphia linearis*.

PLATE 3

- Fig. 1. Head of *Machæropterus deliciosus*, ♂.
— 2. Head of *Xenopipo atronitens*, ♂.
— 3. Head of *Ceratopipra cornuta*, ♂.
— 4. Head of *Masius chrysopterus coronulatus*, ♂.
— 5. *Machæropterus pyrocephalus*, ♂.
— 6. *Pipra serena suavissima*, ♂.
— 7. Head of *Chiroxiphia lanceolata*.
-

FAM. PIPRIDÆ

1. CHIROMACHÆRIS MANACUS PURUS ♂. 2. CORAPIPO LEUCORRHOEA ALTERA ♂. 3. SCOTOHORUS CHIRYSOCEPHALUS.
 4. CHLOROPIPO FLAVICAPILLA. 5. SAPAYOA ÆNIGMA. 6. HETEROERCUS FLAVIVERTEN ♂.
 7. SCOTOHORUS UNICOLOR. 8. FOOT OF SAPAYOA ÆNIGMA. 9. NEOPELMA AURIFRONS. 10. LANISOMA SQUAMATUM.

FAM. PIPRIDÆ

1. TAIL OF CHIROXIPHIA CAUDATA ♂. 2. TAIL OF CHIROXIPHIA LANCEOLATA ♂. 3. TAIL OF CIRRHIPYRA FILICAUDA ♂.
 4. TAIL OF ILICURA MILITARIS ♂. 5. FOOT OF ANTILOPHIA GALEATA. 6. ANTILOPHIA GALEATA ♂.
 7. PIPRA AUREOLA AUREOLA ♂. 8. PIPRITES CHLORIS CHLORIS. 9. TAIL OF CHIROXIPHIA LINEARIS.

FAM. PIPRIDÆ

1. MACHÆROPTERUS DELICIOSUS ♂. 2. XENOPIPO ATRONITANS ♂. 3. CERATOPIPRA CORNUTA ♂.
 4. MASIUS CHRYSOPTERUS CORONULATUS ♂. 5. MACHÆROPTERUS PYROCEPHALUS ♂. 6. PIPRA SERENA SUAVISSIMA ♂.
 7. CHIROXIPHA LANCEOLATA.

GENERA AVIUM

CONDUCTED BY

P. WYTSMAN

WITH CONTRIBUTIONS BY MESSRS. Hon. W. de ROTHSCHILD,
P. L. SCLATER, R. BOWDLER SHARPE, W. R. OGILVIE-GRANT, E. HARTERT,
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PICARIÆ

FAM. GALBULIDÆ

by P. L. SCLATER

WITH 1 COLOURED PLATE

1909

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FAM. GALBULIDÆ

BY P. L. SCLATER

THE *Galbulidæ* or Jacamars constitute a small but distinct Family of Zygodactylous Picariæ, confined to the Neotropical Region. Here they extend from Southern Mexico to Paraguay, but are not met with in the Patagonian Subregion or in the Antilles. The Jacamars are nearly allied to the Puffbirds (*Bucconidæ*), and are placed by some systematists in the same Family, but are distinguishable from the latter in structure by their long pointed bill, by the presence of a slight aftershaft on the feathers, by having a gular branch to the pectoral tract on the lower plumage and by other characters.

The feet of the Jacamars are weak, the metatarsi being scutellated in front and smooth behind, and in one genus (*Jacamaralcyon*) the hallux is absent. The wings are rounded : the tail has normally twelve feathers, but the external pair of rectrices are mostly very much reduced in size, and in *Brachygalba* and *Jacamaralcyon* are altogether absent. The furcula is U-shaped, the tongue is long, tapering and membranous, the oil-gland is naked, and two carotids are present.

The plumage of the Jacamars is mostly green above with more or less golden and coppery reflexions, while below it is in most cases more or less rufous.

Habits and Reproduction. The Jacamars are exclusively arboreal and forest-loving birds and purely insectivorous as regards their diet. The typical Jacamars keep more or less to the outskirts of the forest, resorting to the summits and outer branches of the trees, while *Jacamarops* is more often found in the gloom of the interior. « They sit on the branches in motionless

expectation, and as soon as a fly, butterfly or moth passes by capture it and return to the post they have just left ».

Although little is yet known about the nesting of the Jacamars, it is certain that they lay their eggs in holes bored in the earth, like kingfishers, or in hollow trees. The eggs are white, and spheroidal in shape. There are no specimens of them in the British Museum, but in the great collection of Nehr Korn, now in the Berlin Museum, are examples of the eggs of *Galbula ruficanda* and *G. melanogenia* (1).

History of the Literature. Linnaeus was acquainted with only two species of Jacamars (*Urogalba paradisca* and *Galbula viridis*) and placed both of them in the genus *Alcedo*. But Brisson, in 1760, took a more accurate view of their distinctive characters, and founded the genus *Galbula* for these two birds. This name was subsequently adopted by Latham, who added two more species to the List.

In 1806 the French Naturalist Le Vaillant included the Jacamars in his « Histoire Naturelle des Oiseaux de Paradis » recognizing in this work and its supplement altogether seven species. Other species were subsequently discovered, and in 1851 Cabanis gave an excellent summary of the then existing knowledge of these birds in an article published in Ersch and Gruber's « Encyclopedie ». Cabanis recognized 16 species of Jacamars.

In 1851 I commenced a study of the birds of this group and published a synopsis of the species known to me in Jardine's « Contributions to Ornithology ». In 1855 I read a paper on the same subject before the Zoological Society of London and raised the number of the known species to 20. George Gray's « Handlist », issued in 1857, contained the names of 22 species of Galbulidæ, divided into three genera.

The subject continued to attract my attention, and in 1882 I prepared a complete monograph of the Jacamars, with coloured figures (2) of all the species (drawn by Keulemans), uniting the Jacamars in one volume with the allied family of Puff-birds. Nineteen species of Galbulidæ were figured in this work. The nomenclature and arrangement used in it were closely followed in the nineteenth volume of the « Catalogue of Birds » of the British Museum, to which in 1891 I contributed an article on the members of this Family.

In the present memoir I have not found it necessary to deviate much from the last-named work, very slight additions having been made to our knowledge of the Jacamars of late years. But I have again gone through the specimens of this family in the National Collection (which are now 271 in number, belonging to 21 species) and have examined the fine series in the Zoological Museum, Tring, which comprizes 264 specimens referable to 18 species, and in so doing have obtained a more accurate knowledge of the distribution of some of the species. I offer my best thanks to Mr. Walter Rothschild for the facilities he has given me as regards the latter collection.

Systematic Arrangement. The *Galbulidæ* are naturally divisible into two subfamilies: the *Galbulinæ* and the *Jacameropinae*. The former of these contains five genera and the latter only one, as shown in the subjoined table, in which the chief characters are pointed out.

(1) Cf. Nehr Korn, « Katalog d. Eier-Sammlung », p. 170.

(2) « A Monograph of the Jacamars and Puff-birds ». — By P. L. Sclater. — London. Porter, 1882, 1 Vol. 4^{to}.

1. SUBFAM. GALBULINÆ

Characters. Bill straight, lengthened, compressed, sharp-pointed; nostrils, rounded, naked except for a few covering bristles, external rectrix abnormally small, or sometimes altogether absent.

KEY OF THE GENERA OF THE GALBULINÆ

- A. Tail elongated, more or less graduated.
- a. Middle rectrices much elongated 1. Genus UROGALBA.
- b. Middle rectrices slightly elongated 2. Genus GALBULA.
- B. Tail short, squared.
- c. External rectrix absent.
- a'. Hind-toe present 3. Genus BRACHYGALBA.
- b'. Hind-toe absent 4. Genus JACAMARALCYON.
- d. External rectrix present 5. Genus GALBALCYRHYNCHUS.

2. SUBFAM. JACAMEROPINÆ

Characters. Bill slightly incurved, much widened at the base; nostrils with an internal membrane; outer rectrices of medium size, not quite half so long as the central pair 6. Genus JACAMEROPS.

1. SUBFAM. GALBULINÆ

1. GENUS UROGALBA BONAPARTE

Urogalba Bonaparte, *Consp. Gen. Av.* Zygod. p. 13 (1854).

Urocex Cabanis & Heine, *Mus. Hein.* vol. 4, p. 216 (1863).

KEY OF THE SPECIES

- A. Smaller; cap uniform dark brown U. PARADISEA.
- B. Larger; cap whitely brown U. AMAZONUM.

1. **Urogalba paradisea** Linnæus (Plate, Figs. 3, 4).

Guiana.

Alcedo paradisea Linnæus, *Syst. Nat.* Vol. 1, p. 181 (1759).

Urogalba paradisea Sclater, *Mon. Jacam.* p. 1, pl. 1, f. 1 (1882); *id.* *Cat. Birds*, Vol. 19, p. 162 (1891).

2. **Urogalba amazonum** Sclater.

Lower Amazonia.

Urogalba amazonum Sclater, *Proc. Zool. Soc. Lond.* 1855, p. 14; *id.* *Mon. Jacam.* p. 5, pl. 1, f. 2 (1882).

2. GENUS GALBULA BRISSON

Galbula Brisson, Orn. Vol. 4, p. 85 (1780).

Caucalias Cabanis & Heine, Mus. Hein. Vol. 4, pt. 1, p. 218 (1863).

KEY OF THE SPECIES

A. *Belly dark rufous in both sexes.*

a. *Bill black, breast bronzy green.*

a'. *Throat white in male, rufous in female.*

a''. *Outer rectrices blackish* G. VIRIDIS.

b''. *Outer rectrices rufous.*

a'''. *With black tips.* G. RUFO-VIRIDIS.

b'''. *Without black tips.*

Chin white G. RUFICAUDA.

Chin black G. MELANOGENIA.

b'. *Throat bronzy green, like the breast.*

Outer rectrices rufous, with black tips. G. TOMBACEA.

Outer rectrices uniform rufous. G. PASTAZÆ.

b. *Bill yellow, breast rufous.*

Cheeks green; throat in male white G. ALBIROSTRIS.

Cheeks blue; throat rufous G. CYANEICOLLIS.

B. *Belly white in male, cinnamomeous in female.*

smaller; back and breast coppery G. LEUCOGASTRA.

larger; back and breast purplish G. CHALCOTHORAX.

1. **Galbula viridis** (Linnæus) (Plate, Fig. 5).

Guiana, Venezuela and

Alcedo galbula Linnæus, Syst. Nat. Vol. 1, p. 182 (1760).

Brazil n. of Amazons.

Galbula viridis Latham, Ind. Orn. Vol. 1, p. 244 (1790); Sclater, Mon. Jacam. p. 7,
pl. 11 (1882); id, Cat. Birds Brit. Mus. Vol. 19, p. 164 (1891).

2. **Galbula rufo-viridis** Cabanis.

Brazil s. of Amazons

Galbula rufo-viridis Cabanis, in Ersch & Gruber, Enc. Sect. 1, 72, p. 308; Sclater,
Mon. Jacam. p. 11, pl. 111 (1882); id, Cat. Birds Brit. Mus. Vol. 19, p. 165 (1891).

and E. Bolivia.

3. **Galbula ruficauda** Cuvier.

Colombia, Venezuela,

Galbula ruficauda Cuvier, Règne Anim. Vol. 1, p. 420; Sclater, Mon. Jacam. p. 15,
pl. 4 (1882); id, Cat. Birds Brit. Mus. Vol. 19, p. 166 (1891).

Trinidad and Tobago.

4. **Galbula melanogenia** Sclater.

S. Mexico, Centr. Ame-

Galbula melanogenia Sclater, Contr. Orn. 1852, p. 61, pl. 90; id, Mon. Jacam. p. 10,
pl. 5 (1882); Cat. Birds Brit. Mus. Vol. 19, p. 166 (1891).

rica and W. Ecuador.

5. **Galbula tombacea** Spix.

Peru, Ecuador and Co-

Galbula tombacea Spix, Aves Brasil. Vol. 1, p. 55, t. 58 (1824); Sclater, Mon. Jacam.
p. 23, pl. 6 (1882); id, Cat. Birds Brit. Mus. Vol. 19, p. 165 (1891).

lombia.

Galbula cyanescens Deville, Rev. Zool. 1849, p. 56.

Galbula fuscicapilla Sclater, Proc. Zool. Soc. Lond. 1865, p. 13.

Galbula tombacea cyanescens Hellmayer, Novit. Zool. Vol. 14, p. 402.

The specimens at my command do not enable me to decide whether there are or are not two species included under this head. Mr. Hellmayer (l. c.) promises us further information on this subject.

6. *Galbula pastazæ* Taczanowski & Berlepsch (Plate, Figs. 1, 2).

Eastern Ecuador.

Galbula pastazæ Taczanowski & Berlepsch, Proc. Zool. Soc. Lond. 1885, p. 107; Sclater, Cat. Birds Brit. Mus. Vol. XIX, p. 168 (1891).

There is also an insufficient supply of specimens of this species available. But Graf von Berlepsch has kindly sent me for examination what he considers to be a pair of it, from which the accompanying illustrations (Plate, Figs. 1, 2) have been taken. If this view be correct, as I am inclined to believe, the species comes nearest to *G. tombacea*, from which it is distinguishable by its wholly rufous outer rectrices. The male has the throat shining green like the back, the female has the throat rufous like the belly. In the male the rufous belly is darker than in the female.

7. *Galbula albirostris* Latham.

Guiana, Amazonia and Eastern Ecuador.

Galbula albirostris Latham, Ind. Orn. Vol. 1, p. 113 (1790); Sclater, Mon. Jacam. p. 27, pl. 7 (1882); id. Cat. Birds Brit. Mus. Vol. 19, p. 168 (1891).

8. *Galbula cyaneicollis* Cassin.

Lower Amazonia.

Galbula cyaneicollis Cassin, Proc. Acad. Natur. Sc. Philad. Vol. 5, p. 154, t. 7; Sclater, Mon. Jacam. p. 31, pl. 8 (1882); id. Cat. Birds Brit. Mus. Vol. 19, p. 169 (1891).

9. *Galbula leucogastra* Vieillot.

Guiana and Lower Amazonia.

Galbula leucogastra Vieillot, Nouv. Dict. Vol. 16, p. 144 (1817); Sclater, Mon. Jacam. p. 33, pl. 9 (1882); id. Cat. Birds Brit. Mus. Vol. 19, p. 170 (1891).

10. *Galbula chalcothorax* Sclater.

Eastern Ecuador and E. Peru.

Galbula chalcothorax Sclater, Proc. Zool. Soc. Lond. 1854, p. 110; id. Mon. Jacam. p. 37, pl. 10 (1882); id. Cat. Birds Brit. Mus. Vol. 19, p. 171 (1891).

3. GENUS BRACHYGALBA BONAPARTE

Brachygalba Bonaparte, Consp. Gen. Av. Zygod. p. 13 (1854).

Brachycex Cabanis & Heine, Mus. Hein. Vol. 4, pt. 1, p. 214 (1863).

KEY OF THE SPECIES

A. Bill black.

a. Throat brown.

Belly white B. LUGUBRIS.

Belly fulvous B. FULVIVENTRIS.

b. Throat white.

Cap and breast-band brown. B. GOERINGI.

Cap and breast-band green. B. SALMONI.

B. Bill white.

Cheeks white, like the throat B. ALBIGULARIS.

Cheeks brown, like the cap. B. MELANOSTERNA.

1. *Brachygalba lugubris* (Swainson) (Plate, Fig. 6).

British Guiana, Orinoco, and Amazonia.

Galbula lugubris Swainson, Anim. in Menag. p. 229 (1838).

Brachygalba lugubris Sclater, Mon. Jacam. p. 39, pl. 11 (1891); id. Cat. Birds Brit. Mus. Vol. 19, p. 171 (1882).

2. *Brachygalba fulviventr* Sclater.

Colombia and Ecuador.

Brachygalba fulviventr Sclater, Cat. Birds Brit. Mus. Vol. 19, p. 172 (1891).

3. **Brachygalba goeringi** Sclater & Salvin. Venezuela.
Brachygalba goeringi Sclater & Salvin, Proc. Zool. Soc. Lond. 1869, p. 253, pl. 18; Sclater, Mon. Jacam. p. 41, pl. 12 (1882); id. Cat. Birds Brit. Mus. Vol. 19, p. 172 (1891).
4. **Brachygalba salmoni** Sclater & Salvin. Columbia, State of Antioquia.
Brachygalba salmoni Sclater & Salvin, Proc. Zool. Soc. Lond. 1879, p. 535; Sclater, Mon. Jacam. p. 43, pl. 13 (1882); id. Cat. Birds Brit. Mus. Vol. 19, p. 173 (1891).
5. **Brachygalba albigularis** (Spix.) Upper Amazonia.
Galbula albigularis Spix, Aves Brasil. Vol. 1, p. 54, t. 57, f. 1 (1824).
Brachygalba albigularis Sclater, Mon. Jacam. p. 45, pl. 14 (1882); id. Cat. Birds Brit. Mus. Vol. 19, p. 173 (1891).
6. **Brachygalba melanosterna** Sclater. Western Brazil and Bolivia.
Brachygalba melanosterna Sclater, Proc. Zool. Soc. Lond. 1855, p. 15; id. Mon. Jacam. p. 47, pl. 15 (1882); id. Cat. Birds Brit. Mus. Vol. 19, p. 174 (1891).

4. GENUS JACAMARALCYON LESSON

Jacamaralcyon Lesson, Traité d'Ornith. p. 235 (1831).

Cauax Cabanis, in Wiegmann, Arch. f. Naturg. Vol. 1, p. 347 (1847).

1. **Jacamaralcyon tridactyla** Vieillot. S. E. Brazil.
Galbula tridactyla Vieillot, Nouv. Dict. Vol. 16, p. 445 (1817).
Jacamaralcyon tridactyla Sclater, Mon. Jacam. p. 40, pl. 16 (1882); id. Cat. Birds Brit. Mus. p. 174 (1891).

5. GENUS GALBALCYRHYNCHUS DES MURS

Galbalcyrhynchus Des Murs, Rev. Zool. 1845, p. 207.

Jacamaralcyonides Des Murs, Icon. Orn. Tab. 17 (1845).

Cauecias Cabanis, in Ersch & Gruber, Enc. Sect. 1, Vol. 3, p. 310 (1851).

Alcyonides Reichenbach, Handb. d. Sp. Orn. p. 83 (1851).

KEY OF THE SPECIES

- A. *With a white ear-patch in the male* G. LEUCOTIS.
 B. *Without a white ear-patch in either sex* G. PURUSIANUS.

1. **Galbalcyrhynchus leucotis** Des Murs (**Plate, Fig. 7**). Upper Amazonia and Ecuador.
Galbalcyrhynchus leucotis Des Murs, Rev. Zool. 1845, p. 307; Sclater, Mon. Jacam. p. 53, pl. 17 (1882); id. Cat. Birds Brit. Mus. Vol. 19, p. 175 (1891).
2. **Galbalcyrhynchus purusianus** Goeldi.
Galbalcyrhynchus purusianus Goeldi, Aves do Brazil, p. 172 (1904); id. Album de Aves Amazonicas, fasc. 3, p. 22, pl. 27, f. 1, 2.
Galbalcyrhynchus leucotis innotatus Ihering, Rev. Mus. Paulista, Vol. 6, p. 445 (1905); id. Cat. Fauna Braz. Aves, p. 172.

The *Galbalcyrhynchus* of the River Purus is said to differ from the typical form in that the male is like the female and has no white ear-patch.

2. SUBFAM. JACAMEROPINÆ

6. GENUS JACAMEROPS LESSON

Jacamerops Lesson, *Traité d'Ornith.* p. 234 (1831).

Lamprotila Swainson, *Class. Birds*, Vol. 2, p. 336 (1837).

1. **Jacamerops grandis** Gmelin (Plate, Figs. 8, 9).

Alcedo grandis Gmelin, *Syst. Nat.* Vol. 1, p. 458 (1788).

Jacamerops grandis Sclater, *Mon. Jacam.* p. 57, pl. 18 (1882); id. *Cat. Birds Brit. Mus.* Vol. 19, p. 176 (1891).

Guiana, Amazonia, Ecuador, Colombia and Veragua.

EXPLANATION OF THE PLATE

Fig. 1. Male of *Galbula pastazae*, from Eastern Ecuador, from a specimen in Graf von Berlepsch's Collection.

- 2. Female of the same, from Mapoto, E. Ecuador (one of the original types of Stolzman), from Graf von Berlepsch's collection.
- 3. Bill of *Urogalba paradisea* (side view).
- 4. Foot of — — — — —
- 5. Tail-end of *Galbula viridis* from beneath.
- 6. Tail-end of *Brachygalba lugubris* from beneath.
- 7. Bill of *Galbalcyrhynchus leucotis* (side view).
- 8. Bill of *Jacamerops grandis* (side view).
- 9. Tail-end of *Jacamerops grandis*.

Odiham (Hants), 15th January 1908.

FAM. GALBULIDÆ

1. 2. GALBULA PASTAZÆ ♂ ♀. 3. 4. BILL AND FOOT OF UROGALBA PARADISEA.
 5. TAIL-END OF GALBULA VIRIDIS. 6. TAIL-END OF BRACHYGALBA LUGUBRIS. 7. BILL OF GALBACYRHYNCHUS LEUCOTIS.
 8. 9. BILL AND TAIL-END OF JACAMEROPS GRANDIS.

GENERA AVIUM

CONDUCTED BY

P. WYTSMAN

WITH CONTRIBUTIONS BY THE Hon. W. ROTHSCHILD, MESSRS. P. L. SCLATER,
R. BOWDLER SHARPE, W. R. OGILVIE-GRANT, E. HARTERT, C. E. HELLMAYR,
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THE *Loriidæ* like the *Nestoridæ* form a very distinct family of the order *Psittaci*. They are easily defined :

Characters. *Bill* much compressed, generally longer than deep, not notched and smooth; culmen rounded and narrow, not grooved along the middle; upper mandible with no file-like surface on the under side of the hook, which has only some very superficial longitudinal ridges; lower mandible rather long, with the gonys narrow, straight, and obliquely slanting upwards, not flattened in front and with no keel-like ridge. *Tongue* brushy. *Cere* broader over the culmen and gradually becoming narrower along the sides of the bill. *Tail* graduated or rounded, sometimes even, rarely longer than the wings, generally shorter. *Wings* acute, with the three first quills generally the longest. *Tarsus* short. *Orbital ring* incomplete.

Habits. The *Loriidæ*, like Parrots generally do, live in flocks; they are arboreal in their habits clinging to the smaller branches of the trees, looking for the flowers as they feed of the nectar and pollen; they are very partial to the blossoms of the *Eucalypti* and coral trees. It is not difficult to tame them and can be very gentle birds, but they are very indifferent talkers.

Range. The *Loriidæ* are confined to the Australian region (except New Zealand, but including Polynesia).

Bibliography. Weinland, Journ. f. Orn. 1853, Extrah. p. 69, t. 2, f. 1-9; Wallace, Ann. and Mag. Nat. Hist. (3), Vol. 3, p. 147, 148 (1859); Finsch, Die Papageien, Vol. 2 (2), p. 731-882 (1868); Salvadori, Cat. Birds Brit. Mus. Vol. 20, p. 11-85 (1891); Mivart, Monograph of the Lories, or Brush-tongued Parrots, composing the Family Loriidæ (1896); Forbes & Robinson, Bull. Liverp. Mus. Vol. 1, p. 5-8 (1897); Dubois, Syn. Avium. p. 28-33 (1899); Sharpe, Hand List of Birds. Vol. 2, p. 1-7 (1899); Rothschild & Hartert, Novit. Zool. Vol. 8, p. 64-71 (1901); Salvadori, The Ibis, 1905, pp. 405-429.

KEY OF THE GENERA OF THE LORIIDÆ

The *Loriidæ* embrace several genera, some of which are based principally in their peculiar colouring, a character which is not unimportant among birds.

1. Tail-feathers 12; point of the maxilla long, but not thin :
 - a. Tail rather short and nearly square; the two middle tail-feathers shorter than the lateral ones; feathers of the hind-neck long and covering the upper back. 4. Genus CALLIPTILUS.
 - b. Tail moderate, or very long; the two middle tail-feathers always longer than the lateral ones.
 - a'. Tail-feathers rather broad and more or less rounded at the tip.
 - a''. Dimensions larger; about the size of a Turtle-dove.
 - a'''. Bill black, like the cere and the naked chin. 1. Genus CHALCOPSITTACUS.
 - b'''. Bill orange-red.
 - a⁴. Red colour predominant also on the wings 2. Genus EOS.
 - b⁴. Wings green. 3. Genus LORIUS.
 - b''. Dimensions smaller, but larger than those of a Sparrow; feathers of the crown long and shaft-streaked.
 - c'''. The first three or four primaries notched at the tip; general colour green 5. Genus VINIA.
 - d'''. General colour blue; no red or green colour in the plumage 6. Genus CORIPHILUS.
 - b'. Tail-feathers gradually tapering to a point, more or less acute.
 - e''. Predominant colour underneath as well as above green.
 - e'''. Tail-feathers green, with no yellow or red colour at the tip; tail moderate; the two middle tail-feathers not very long; 4 or 5 first primaries not distinctly attenuated towards the tips.
 1. Shaft-streaks more or less blue on the forehead (as on the rest of the head); breast generally tinged with red 7. Genus TRICHOGLOSSUS.
 2. Like Trichoglossus, only differing in colour; no blue shaft-streaks on the forehead and no red colour on the breast; bill orange-red . . . 8. Genus PSITTEUTELES.
 3. Predominant colour green, with shaftstreaks on the neck and body; bill orange-red 9. Genus PTILOSLERA.
 4. First primary equal or a little longer than the second and the third; predominating colour green; bill black; dimensions rather small. . . 10. Genus GLOSSOPSITTACUS.
 - f'''. Tail-feathers green with the tips yellow or red 11. Genus HYPOCHARMOSYNA.
 - d''. Predominant colour on the head, neck and lower parts red.

- g'''. The two middle tail-feathers not much longer than the lateral ones;
the primaries not abruptly attenuated towards the tips 12. GENUS CHARMOSYNOPSIS.
- k'''. The two middle tail-feathers generally much longer than the lateral
ones and very narrow towards the tips; the primaries, especially the
first 4 or 5, abruptly attenuated towards the tips 13. GENUS CHARMOSYNA.
- II. Tail-feathers 14; point of the maxilla very long and thin; bill black 14. GENUS OREOPSITTACUS.

I. GENUS CHALCOPSITTACUS BONAPARTE

Chalcopsitta Bonaparte, Consp. Gen. Av. Vol. 1, p. 3 (1849) (type of the genus *Psittacus ater* Scopoli).

Chalcopsittacus Salvadori, Ann. Mus. Stor. Nat. Genova, Vol. 9, p. 15 (1876) (nomen emend.).

Characters. Tail-feathers twelve; tail moderate, with the two middle tail-feathers longer than the lateral ones, all rather broad and rounded at the tip; bill black like the cere and the naked chin.

Geographical Distribution. The known forms are confined to the Papuan Islands.

Seven forms are included in this genus, but one (*C. stavorini*) is rather doubtful. *C. bernsteini* and *C. insignis* are subspecies of *C. ater*, and *C. chloropterus* is a subspecies of *C. scintillatus*.

KEY OF THE SPECIES (2)

- I. No green colour whatever.
- a. Black, more or less purple.
- a'. Abdomen like the breast black.
- a''. Quills with no red on the inner web.
- a'''. Tibiæ black *C. ater*.
- b'''. Tibiæ dark red *C. bernsteini* (2).
- b''. Quills with the base of the inner web red *C. insignis*.
- b'. Abdomen red *C. stavorini* (?).
- b. Olive-brown; forehead, a band from the lores encircling the throat, tibiæ and under wing-coverts orange-yellow. *C. duyvenbodei*.
- II. Green, with shaft-streaks green and yellow; forehead (in the adult bird) and tibiæ red:
- c'. Under wing-coverts and axillaries red; shaft-streaks on the hind-neck mostly orange-yellow *C. scintillatus*.
- d'. Under wing-coverts and axillaries mostly green and red, sometimes entirely green; shaft-streaks on the hind neck mostly green *C. chloropterus*.

1. *Chalcopsittacus ater* (Scopoli).

Psittacus ater Scopoli, Del. Flor. et Faun. Insubr. Vol. 2, p. 87, n° 29 (1786) (ex Sonnerat.).

Chalcopsittacus ater Salvadori, cf. Salvadori, Cat. Birds Brit. Mus. Vol. 20, p. 13 (1891);

Mivart, Mon. Lor. pl. 1 (1896); Salvadori, Ibis, 1905, p. 406.

Western New Guinea,
from Dorei-Hum and
Has to Sorong, Sal-
watty, Batanta.

(1) *Chalcopsitta spectabilis* Van Oort, Not. Leyd. Mus. Vol. 30, p. 127 (1908) from Mambrioe (N. W. New Guinea) described from a single specimen in the Leyden Museum, appears intermediate between *C. insignis* or *C. bernsteini* and *C. scintillatus*; possibly an hybrid.

(2) *C. bernsteini* has sometimes a red patch, or a mere indication of it, on the inner web of the quills.

2. ***Chalcopsittacus bernsteini*** Rosenberg. Mysol.
Chalcopsitta bernsteini Rosenberg, Journ. f. Orn. 1861, p. 46.
Chalcopsittacus bernsteini Salvadori, Cat. Birds Brit. Mus. Vol. 20, p. 14 (1891); Mivart,
 Mon. Lor. pl. 1, f. 2 (1896); Salvadori, Ibis, 1905, p. 406.
3. ***Chalcopsittacus insignis*** Oustalet (**Plate 1, Fig. 7, 8, 9, 10**). Amberpon Isl. (Geelvink Bay).
Chalcopsitta insignis Oustalet, Assoc. Sc. France, Bull. n° 533, p. 247 (1878).
Chalcopsittacus insignis Salvadori, Cat. Birds Brit. Mus. Vol. 20, p. 15 (1891); Mivart,
 Mon. Lor. pl. 2 (1896); Salvadori, Ibis, 1905, p. 406.
4. ***Chalcopsittacus stavorini*** (Lesson). Waigiou (?).
Psittacus stavorini Lesson, Voy. Coquille, Zool. Vol. 1, p. 355 (1826), p. 628 (1828).
Chalcopsittacus stavorini Salvadori, Cat. Birds Brit. Mus. Vol. 20, p. 15 (1891); Salvadori,
 Ibis, 1905, p. 406.
5. ***Chalcopsittacus duyvenbodei*** Dubois (**Plate 1, Fig. 5**). North coast of New Guinea, from Takar to Stephansort in Kaiser Wilhelm's Land.
Chalcopsittacus duyvenbodei Dubois, Bull. Mus. Hist. Nat. Belg. Vol. 3, p. 113, pl. 5 (1884);
 Salvadori, Cat. Birds Brit. Mus. Vol. 20, p. 16 (1891); Rothschild, Novit. Zool. Vol. 1,
 p. 677 (1894); Mivart, Mon. Lor. pl. 3 (1896); Rothschild & Hartert, Novit. Zool.
 Vol. 8, p. 65 (1901); Salvadori, Ibis, 1905, p. 406.
6. ***Chalcopsittacus scintillatus*** (Temminck) (**Plate 1, Fig. 6**). Western New Guinea, Aru Islands.
Psittacus scintillatus Temminck, Pl. Col. Ois. 569 (juv.) (1835).
Chalcopsittacus scintillatus Salvadori, Cat. Birds Brit. Mus. Vol. 20, p. 16 (1891); Mivart,
 Mon. Lor. pl. 4, f. 1, 3 (1896); Salvadori, Ibis, 1905, p. 407.
7. ***Chalcopsittacus chloropterus*** Salvadori. S. E. New Guinea.
Chalcopsittacus chloropterus Salvadori, Ann. Mus. Stor. Nat. Genova, Vol. 9, p. 15 (1876);
 id. Cat. Birds Brit. Mus. Vol. 20, p. 17 (1891); Mivart, Mon. Lor. pl. 4, f. 2 (1896);
 Salvadori, Ibis, 1905, p. 407.

2. GENUS EOS WAGLER

Eos Wagler, Mon. Psitt. p. 494 (1832) (Type of the genus *Psittacus indicus* Gmelin [= *P. histrio* Müller]).

Characters. Nearly the same as those of the genus *Chalcopsittacus*, but the bill orange-red and the predominant colour of the plumage red.

Geographical Distribution. This genus extends from the Moluccas to the Papuan Islands and also to Puynipet of the Caroline Islands.

Fifteen species are included in this genus; one (*E. fuscata*) is less typical and forms a connecting link between *Eos* and *Chalcopsittacus*.

KEY OF THE SPECIES

- A. *Dusky, mingled with red or yellow; uropygium whitish-grey, more or less tinged with sulphur-yellow* **E. FUSCATA.**
- B. *Red; uropygium also red.*
 - a. *Tail above black; middle tail-feathers entirely black, the lateral ones with the inner web red.*
 - a'. *Upper wing-coverts black; interscapular region red* **E. CYANOGENYS.**
 - b'. *Upper wing-coverts red; hind neck and interscapular region with blue shaft-streaks.* **E. RETICULATA.**
 - b. *Tail above dark purple; the lateral tail-feathers with the inner web red; interscapular region and nape blue.*
 - c'. *Larger; the upper part of the breast entirely blue; wing 6.6 inches (= 165 mm.), tail 5.3 inches (= 134 mm.).*

- a'. Tips of the upper wing-coverts and of the quills black. E. HISTRIO.
 b'. Upper wing-coverts almost entirely red, and black band at the tip of the secondaries narrower E. TALAUTENSIS.
 d'. Smaller, the upper part of the breast red, mixed with blue; wing 6 inches (= 153 mm.), tail 4 inches (= 102 mm.) E. CHALLENGERI.
 c. Tail above dull red.
 e'. No violet collar.
 c'. Almost entirely red; only the wing-coverts, along the edge of the wing, edged with bluish-purple E. CARDINALIS.
 d''. Red; the scapulars mostly blue.
 a'''. Whole of the face red.
 a⁴. Larger; wing 152-174 mm.
 a⁵. Ear-coverts, back and thighs red E. RUBRA.
 b⁵. Ear-coverts lavender blue, and the back and thighs purplish-blue E. GOODFELLOWI.
 b⁴. Smaller; wing 146-155 mm. E. CYANONOTA.
 b'''. A blue band through the subocular region E. SEMILARVATA.
 f'. A purple collar round the neck.
 e''. Head red; no purple spot on the occiput in the adult bird E. WALLACEI.
 f''. Head red; a purple spot on the occiput E. INSULARIS.
 g''. Head, neck and occiput purple like the collar E. RICINIATA.
 d. Tail above olive, yellowish towards the tip; red colour all over the body, except tail and quills, very dark. E. RUBIGINOSA.

Besides the above mentioned species there is a form (*Eos variegata obiensis* Rothschild, Bull. Brit. Orn. Club. Vol. 10, p. 16, 1899) on which I have not been able to make up my mind. From Mr. Walter Rothschild's description it appears that adult examples have no purple occiput nor purple collar round the neck and all the greater wing-coverts and scapulars black, while other individuals, probably younger, exhibit a wide collar and a purple patch on the occiput, the latter however not being connected with the collar. These individuals, according to Mr. W. Rothschild, can only be distinguished from typical *E. variegata* by the greater extent of the black colour on the wings. I have examined in the Leyden Museum specimens from Obi, and in my *Papuan Ornithology* (Vol. 1, p. 263) I have attributed them to *E. riciniata* (= *E. variegata*). According to Dr. Hartert (in litt.) *E. variegata obiensis* is a very interesting and distinguishable form.

1. ***Eos fuscata*** Blyth. New Guinea, Jobi, Salwati.
Eos fuscata Blyth, Journ. Asiat. Soc. Beng. Vol. 27, p. 279 (1858); Salvadori, Cat. Birds Brit. Mus. Vol. 20, p. 30 (1891); Mivart, Mon. Lor. pl. 15 (1896); Martorelli, Ibis, 1897, pp. 60-63; Rothschild et Hartert, Novit. Zool. Vol. 8, p. 65 (1901); Salvadori, Ibis, 1905, p. 410.
2. ***Eos cyanogenys*** Bonaparte (Plate 1, Fig. 4). Mafor, Pulo-Manin, Mysore (Geelvink-Bay).
Eos cyanogenys Bonaparte, Consp. Gen. Av. Vol. 1, p. 4 (1850); Salvadori, Cat. Birds Brit. Mus. Vol. 20, p. 19 (1891); Mivart, Mon. Lor. Pl. 5 (1896); Salvadori, Ibis, 1905, p. 407.
3. ***Eos reticulata*** (S. Müller) (Plate 2, Fig. 1). Tenimber Islands, Little Key, Dammer Isl.
Psittacus reticulatus S. Müller, Verh. Land- en Volkenk. pp. 107-108 (1839-1844).
Eos reticulata Sclater cf. Salvadori, Cat. Birds Brit. Mus. Vol. 10, p. 20 (1891); Mivart, Mon. Lor. pl. 6 (1896); Hartert, Novit. Zool. Vol. 7, p. 19 (1900); Vol. 8, p. 5 (1901); Salvadori, Ibis, 1905, p. 407.

4. **Eos histrio** (P. L. S. Müller) (**Plate 1, Fig. 1**).
Psittacus histrio P. L. S. Müller, Syst. Nat. Suppl. p. 76 (1776).
Eos histrio Gray, cf. Salvadori, Cat. Birds Brit. Mus. Vol. 10, p. 21 (1891); Mivart, Mon. Lor. pl. 7, ff. 1-3 (1896); Salvadori, Ibis, 1905, 407. Sanghir Is.
5. **Eos talautensis** Meyer & Wigglesworth.
Eos histrio part. Salvadori, Cat. Birds Brit. Mus. Vol. 20, p. 21 (1891).
Eos histrio talautensis Meyer & Wigglesworth, Journ. f. Orn. 1894, p. 240.
Eos histrio var. *talautensis* Mivart, Mon. Lor. p. 24 (1896).
Eos talautensis Sharpe, Handl. Birds, Vol. 2, p. 2, n. 4 (1900); Salvadori, Ibis, 1905, p. 408. Talaut Islands.
6. **Eos challengeri** Salvadori.
Eos challengeri Salvadori, Cat. Birds Brit. Mus. Vol. 20, p. 22 (1891); Mivart, Mon. Lor. pl. 7, f. 2 (1896); Salvadori, Ibis, 1905, p. 408. Meangis Islands (N. E. of Talaut Is.
7. **Eos cardinalis** (G. R. Gray).
Lorius cardinalis G. R. Gray, Gen. Birds. App. p. 20 (1849) (ex Hombr. et Jacquinot).
Eos cardinalis Bonaparte; cf. Salvadori, Cat. Birds Brit. Mus. Vol. 20, p. 22 (1891); Mivart, Mon. Lor. pl. 8 (1896); Rothschild & Hartert, Novit. Zool. Vol. 8, p. 186 (Florida, Kulambangra), 378, (Guadalcanar) (1901); Vol. 9, p. 588 (Isabel) 594 (Treasury I.) (1902); Salvadori, Ibis, 1905, p. 408. Solomon Islands.
8. **Eos rubra** (Gmelin).
Psittacus ruber Gmelin, Syst. Nat. Vol. 1, p. 335, no. 101 (1788).
Eos rubra Wagler, cf. Salvadori, Cat. Birds Brit. Mus. Vol. 20, p. 23 (1891); Mivart, Mon. Lor. pl. 9 (1896); Sharpe, Handl. Birds, Vol. 2, p. 2 (1900); Salvadori, Ibis, 1905, p. 408.
Eos Kühni Rothschild, Novit. Zool. Vol. 5, pp. 110, 509 (= *rubra*, juv. from Ké Islands) (1898). S. E. Moluccas (Ceram, Amboina, Ké Islands, etc.).
9. **Eos goodfellowi** Ogilvie-Grant.
Eos goodfellowi Ogilvie-Grant, Bull. Brit. Orn. Club, Vol. 19, p. 102 (1907). Obi Major.
10. **Eos cyanonota** (Vieillot).
Psittacus cyanonotus Vieillot, Nouv. Dict. Vol. 25, p. 334 (1817) (ex Levaill. pl. 93).
Eos rubra part., Salvadori, Cat. Birds Brit. Mus. Vol. 20, p. 23 (1891).
Eos bornea (!) *cyanonota* Hartert, Novit. Zool. Vol. 7, p. 228 (1900).
Eos cyanonota, Salvadori, Ibis, 1905, p. 409. Buru.
11. **Eos semilarvata** Bonaparte (**Plate 1, Fig. 3**).
Eos semilarvata Bonaparte, Consp. Gen. Av. Vol. 1, p. 4 (1850); cf. Salvadori, Cat. Birds Brit. Mus. Vol. 20, p. 25 (1891); Mivart, Mon. Lor. pl. 10 (1896); Salvadori, Ibis, 1905, p. 409. Patria ignota.
12. **Eos wallacei** Finsch (**Plate 2, Fig. 4**).
Lorius (Eos) wallacei Finsch, Journ. f. Orn. 1864, p. 411.
Eos wallacei Newton, cf. Salvadori, Cat. Birds Brit. Mus. Vol. 20, p. 26 (1891); Mivart, Mon. Lor. pl. 11 (1896); Salvadori, Ibis, 1905, p. 409. W. Papuan Islands (Waigiou, Guébé, Bantanta and a small Island near Mysol).
13. **Eos insularis** Guillemard (**Plate 2, Fig. 2**).
Eos insularis Guillemard, Proc. Zool. Soc. Lond. 1885, p. 565, pl. 34; cf. Salvadori, Cat. Birds Brit. Mus. Vol. 20, p. 27 (1891); Mivart, Mon. Lor. pl. 12 (1896); Salvadori, Ibis, 1905, p. 409. Weeda Island to the S. E. of Halmahera.
14. **Eos riciniata** (Bechstein) (**Plate 2, Fig. 3**).
Psittacus riciniatus Bechstein, Kurze Uebers. p. 94 (1811).
Eos riciniata Bonaparte, cf. Salvadori, Cat. Birds Brit. Mus. Vol. 20, p. 28 (1901); Mivart, Mon. Lor. pl. 13 (1896); Salvadori, Ibis, 1905, p. 409.
Eos variegata (Gmelin), Sharpe, Handl. Birds, Vol. 2, p. 2, n. 11 (1900). Northern Moluccas, or Halmahera Group.
15. **Eos obiensis** Rothschild(?).
Eos riciniata part. Salvadori, Orn. Pap. e Mol. Vol. 1, p. 259-263 (1880).
Eos variegata obiensis Rothschild, Bull. Brit. Orn. Club, Vol. 10, p. 16 (1899).
Eos obiensis Sharpe, Hand List, Vol. 2, p. 2, no. 12 (1900); Salvadori, Ibis, 1905, p. 409.
Eos riciniatus obiensis Hartert, Novit. Zool. Vol. 10, p. 5 (1903). Obi Islands.

16. *Eos rubiginosa* (Bonaparte) (Plate 1, Fig. 2).*Chalcopsitta rubiginosa* Bonaparte, Consp. Gen. Av. Vol. 1, p. 3 (1850).*Eos rubiginosa* Gray, cf. Salvadori, Cat. Birds Brit. Mus. Vol. 20, p. 29 (1891); Mivart, Mon. Lor. pl. 14 (1896); Salvadori, Ibis, 1905, p. 409.

Puynipet (Caroline Islands).

3. GENUS LORIUS VIGORS

Lorius Vigors, Zool. Journ. Vol. 2, p. 400 (1825) (type of the genus *Psittacus domicella* Linnæus).

Characters. The species of this genus form a very natural group, which although nearly allied to the genera *Chalcopsittacus* and *Eos*, may be easily distinguished by the combination of the body red or purple with olive-green wings.

Geographical Distribution. This genus extends from the Moluccas on the West to the Solomon Islands on the East, covering also the Papuan Islands.

KEY OF THE SPECIES

A. *Pileum black.*

a. No yellow band across the crop region.

a'. Under wing-coverts red.

a''. Abdomen purple.

a'''. A black bar at the tip of the longest under wing-coverts. L. HYPOENOCROUS.

b'''. Without the black bar at the tip of the longest under wing-coverts. L. DEVITTATUS.

b''. Abdomen blue.

c'''. Breast dark blue; the blue colour joining in the adult birds with the blue of the nape L. LORY.

d'''. Breast red L. ERYTHROTHORAX.

b' Under wing-coverts blue.

c''. A band below the occiput red.

e'''. Larger; wing of adult male about 170 mm. L. JOBIENSIS.

f'''. Smaller; wing about 160 mm. L. SALVADORII.

d''. No red band below the occiput L. CYANAUCHEN.

b. A yellow band across the crop region.

c'. Quills with the base of the inner web yellow. L. DOMICELLA.

d'. Quills with the base of the inner web red L. CHLOROCERCUS.

B. *Pileum like the rest of the head red.*

a. Under wing-coverts light blue; tibiae of a brighter blue L. TIBIALIS.

b. Under wing-coverts yellow.

a'. Interscapular region red, often with a few yellow feathers in the middle. L. GARRULUS.

b'. Interscapular region yellow L. FLAVOPALLIATUS.

1. *Lorius hypœnochrous* Gray (Plate 3, Fig. 2).*Lorius hypœnochrous* Gray, List Psitt. Brit. Mus. p. 49 (1859).*Lorius hypœnochrous* Wallace, cf. Salvadori, Cat. Birds Brit. Mus. Vol. 20, p. 32 (part.) (1901); Mivart, Mon. Lor. pl. 16 (1896); Salvadori, Ibis, 1905, p. 410.Lousiade Archipelago
(Sudest Island, St. Aignan, Rossel Isl.).2. *Lorius devittatus* Hartert (Plate 3, Fig. 3).*Lorius hypœnochrous* part. Salvadori, Cat. Birds Brit. Mus. Vol. 20, p. 32 (1891).*Lorius hypœnochrous devittatus* Hartert, Novit. Zool. Vol. 5, p. 530 (1898).*Lorius devittatus*. Sharpe, Hand-List, Vol. 2, p. 3, no 2 (1900); Salvadori, Ibis, 1905, p. 410.

S. E. New Guinea, Fergusson Island, Woodlark Island, Bismarck Archipelago.

3. **Lorius lory** (Linnæus) (Plate 2, Figs. 8, 9). N. W. New Guinea, Salawati, Batanta, Mysol, Waigiu.
Psittacus lory Linnæus, Syst. Nat. Vol. 1, p. 145 (1766).
Lorius lory Wallace, cf. Salvadori, Cat. Birds Brit. Mus. Vol. 20, p. 33 (1891); Mivart, Mon. Lor. pl. 17, f. 1 (1896); Salvadori, Ibis, 1905, p. 411.
Lorius lory major Rothschild & Hartert, Novit. Zool. Vol. 8, p. 66 (1901) (Waigiu).
4. **Lorius erythrothorax** Salvadori. New Guinea, except the Northern Peninsula, and perhaps also the Eastern part.
Lorius erythrothorax Salvadori, Ann. Mus. Stor. Nat. Gen. Vol. 10, p. 32 (1887); idem, Cat. Birds Brit. Mus. Vol. 20, p. 35 (1891); Mivart, Mon. Lor. pl. 22, f. 2 (1896); Salvadori, Ibis, 1905, p. 411.
Lorius erythrothorax rubiensis Meyer, Abh. Mus. Dresd. 1892-93, n° 3, p. 10.
Lorius lory erythrothorax Rothschild & Hartert, Novit. Zool. Vol. 8, p. 66 (1901).
5. **Lorius jobiensis** (Meyer) (Plate 3, Fig. 1). Jobi and Miosnom Is. (Geelvink Bay).
Domicella lori, var. *jobiensis* Meyer, Sitzb. Akad. Wissensch. Wien. Vol. 70, pp. 229, 231, 233 (1874).
Lorius jobiensis Salvadori, cf. Salvadori, Cat. Birds Brit. Mus. Vol. 20, p. 35 (1891); Mivart, Mon. Lor. pl. 18, f. 1 (1896); Salvadori, Ibis, 1905, p. 412.
6. **Lorius salvadorii** Meyer (Plate 2, Fig. 7). German New Guinea.
Lorius Salvadorii Meyer, Abh. u. Ber. Zool. u. Anthrop. Mus. Dresd. 1890-1891, n° 4, p. 9 (1891); Salvadori, Cat. Birds Brit. Mus. Vol. 20, p. 617 (1891); Mivart, Mon. Lor. pl. 19 (1896); Salvadori, Ibis, 1905, p. 412.
Lorius lory Salvadorii Rothschild & Hartert, Novit. Zool. Vol. 8, p. 67 (1901).
7. **Lorius cyanauchen** (S. Müller) (Plate 2, Fig. 10). Mysori Is. (Geelvink Bay)
Psittacus cyanauchen S. Müller, Verh. Land- u. Volkenk. p. 107 (1839-1844).
Lorius cyanauchen Souancé, cf. Salvadori, Cat. Birds Brit. Mus. Vol. 20, p. 36 (1891); Mivart, Mon. Lor. pl. 20 (1896); Salvadori, Ibis, 1905, p. 412.
8. **Lorius domicella** (Linnæus). Ceram, Amboyna.
Psittacus domicella Linnæus, S. N. Vol. 1, p. 145 (1766).
Lorius domicella Vigors, cf. Salvadori, Cat. Birds Brit. Mus. Vol. 20, p. 37 (1901); Mivart, Mon. Lor. pl. 21 (1896); Salvadori, Ibis, 1905, p. 412.
9. **Lorius chlorocercus** Gould. (Plate 2, Fig. 6). Solomon Is.
Lorius chlorocercus Gould, Proc. Zool. Soc. Lond. 1856, p. 137; cf. Salvadori, Cat. Birds Brit. Mus. Vol. 20, p. 38 (1891); Mivart, Mon. Lor. pl. 22 (1896); Salvadori, Ibis, 1905, p. 412.
10. **Lorius tibialis** Sclater (Plate 2, Fig. 11, Plate 4, Fig. 1). Patr. ignota.
Lorius tibialis Sclater, Proc. Zool. Soc. Lond. 1871, pp. 499, 544, pl. 40; cf. Salvadori, Cat. Birds Brit. Mus. Vol. 20, p. 30 (1891); Mivart, Mon. Lor. pl. 23 (1896); Salvadori, Ibis, 1905, p. 413.
11. **Lorius garrulus** (Linnæus). Halmahera (N. Moluccas).
Psittacus garrulus Linnæus, Syst. Nat. Vol. 1, p. 144 (1766).
Lorius garrulus Stephens, cf. Salvadori, Cat. Birds Brit. Mus. Vol. 20, p. 39 (1891); Mivart, Mon. Lor. pl. 24, f. 1 (1896); Salvadori, Ibis, 1905, p. 413.
12. **Lorius flavopalliatus** Salvadori (Plate 2, Fig. 5). Obi, Batchian, Morotai, Raou (N. Moluccas).
Lorius flavopalliatus Salvadori, Ann. Mus. Stor. Nat. Genova. Vol. 10, p. 33, n° 64 (1877); cf. Salvadori, Cat. Birds Brit. Mus. Vol. 20, p. 41 (1891); Mivart, Mon. Lor. pl. 24, f. 2 (1896); Salvadori, Ibis, 1905, p. 413.

4. GENUS CALLIPTILUS SUNDEVALL⁽¹⁾

Calliptilus Sundevall, Meth. nat. Av. disp. Tent. p. 71 (1872) (type of the genus *Psittacus solitarius* Latham).

Characters. Point of maxilla long, but not thin; tail-feathers twelve, tail rather short and nearly square; the two middle feathers shorter than the lateral ones; feathers of the hind neck long and covering the upper back.

⁽¹⁾ *Calliptilus*? *stephensi* North. Rec. Austral. Mus. Vol. 7, p. 29 (1908) from Elizabeth Island (Saumotu Group) is doubtfully attributed to the genus *Calliptilus*.

Geographical Distribution. Only one species inhabiting the Fiji Islands.

1. **Calliptilus solitarius** (Latham) (Plate 3, Fig. 5).

Fiji Islands.

Psittacus solitarius Latham, Ind. Orn. Suppl. Vol. 2, p. 23 (1801).

Calliptilus solitarius Sundevall, cf. Salvadori, Cat. Birds Brit. Mus. Vol. 20, p. 42 (1891);

Mivart, Mon. Lor. pl. 25 (1896); Salvadori, Ibis, 1905, p. 413.

5. GENUS VINIA LESSON

Vini Lesson, Illustr. Zool. pl. 28 (1831) (type *Vini coccinea* Lesson = *Psittacula kuhlii* Vigors).

Synonym : *Vinia* (nomen emend.) Sharpe, Hand List, Vol. 2, p. 4 (1900).

Characters. Point of maxilla long, but not thin; tail-feathers twelve, rather broad and more or less rounded at the tip; tail moderate; two middle feathers longer than the lateral ones; size small, but somewhat larger than that of a sparrow; feathers of the crown long and shaft-streaked; the first three or four primaries notched at the tip; general colour green.

Geographical Distribution. Only two species are known, confined to Samoa, Friendly and Fanning Islands.

KEY OF THE SPECIES

a. Forehead green, vertex and occiput bright blue V. AUSTRALIS.

b. Forehead and vertex green, occiput dark blue V. KUHII.

1. **Vinia australis** (Gmelin).

Samoa and Friendly Is.

Psittacus australis Gmelin, Syst. Nat. Vol. 1, p. 329, n° 90 (1788).

Vini australis Salvadori, Cat. Birds Brit. Mus. Vol. 20, p. 43 (1891); Mivart, Mon. Lor. pl. 26, f. 2 (1896).

Vinia australis, Sharpe, Hand List, Vol. 2, p. 4 (1900); Salvadori, Ibis, 1905, p. 413.

2. **Vinia kuhlii** (Vigors) (Plate 3, Fig. 4).

Washington and Fanning Islands.

Psittacula kuhlii Vigors, Zool. Journ. Vol. 1, p. 412, pl. 16 (1824).

Vini kuhlii, Salvadori, Cat. Birds Brit. Mus. Vol. 20, p. 45 (1891); Mivart, Mon. Lor. pl. 26, f. 2 (1896).

Vinia kuhlii, Sharpe, Hand List, Vol. 2, p. 4 (1900); Salvadori, Ibis, 1905, p. 413.

6. GENUS CORIPHILUS WAGLER

Coriphilus Wagler, Mon. Psitt. p. 494 (1832) (type of the genus *Psittacus taitianus* Gmelin).

Characters. Point of maxilla long, but not thin; tail moderate; tail-feathers twelve, broad, more or less rounded at the tips, the two middle feathers somewhat longer than the lateral ones; feathers of the crown long and shaft-streaked; general colour blue; no red or green colour in the plumage.

Geographical Distribution. Only two species confined to the Society and Marquesas Islands.

KEY OF THE SPECIES

a. Dark blue; cheeks, throat and upper breast white C. TAITIANUS,

b. Pale blue; cheeks and throat blue, dotted with white C. ULTRAMARINUS.

1. **Coriphilus taitianus** (Gmelin). (Plate 3, Fig. 6).

Society Is.

Psittacus taitianus Gmelin, Syst. Nat. Vol. 1, p. 329, n° 91 (1788).*Coriphilus taitianus* Bonaparte, cf. Salvadori, Cat. Birds Brit. Mus. Vol. 20, p. 46 (1891);

Mivart, Mon. Lor. pl. 27, f. 1 (1896); Forbes & Robinson, Bull. Liverp. Mus.

Vol. 1, p. 6, pl. 2, f. 1 (var.) (1897); Salvadori, Ibis, 1905, p. 413.

Sparrman (Mus. Carls. fasc. 2, pl. 27) has described and figured (*Psittacus cyaneus*) a bird entirely blue with no white on the cheeks and throat; possibly it may belong to a distinct species; similar to it appears to be a bird figured by Forbes & Robinson (loc. cit.), but I should say that it is an immature specimen of *C. taitianus*. The same remark applies to *C. cyaneus* Scott Wilson, Ibis, 1907, p. 653, from Bora-Bora Island (Society group) (*C. cyaneus* Scott Wilson (nec Sparrman), Ibis, 1907, p. 378, pl. 8; Salvadori, Ibis, 1907, 652). Scott Wilson's plate shows the bill black, not red as in the one of Sparrman.

2. **Coriphilus ultramarinus** (Kuhl) (Plate 3, Fig. 7).

Marquesas Is.

Psittacus ultramarinus Kuhl, Consp. Psitt. p. 49 (1820).*Coriphilus ultramarinus* Salvin, cf. Salvadori, Cat. Birds Brit. Mus. Vol. 20, p. 48 (1891);

Mivart, Mon. Lor. pl. 27, f. 2 (1896); Salvadori, Ibis, 1905, p. 413.

7. GENUS TRICHOGLOSSUS VIGORS & HORSFIELD

Trichoglossus Vigors & Horsfield, Trans. Linn. Soc. Lond. Vol. 15, p. 287 (1826) (type *Psittacus capistratus* Bechstein = *P. haematodes* Linnæus).

Synonym : *Australasia* Lesson, Tr. d'Orn. p. 209 (1831).

Characters. Point of maxilla long, but not thin; tail moderate of twelve feathers gradually tapering to a point, the two middle tail-feathers not very long; four or five first primaries not distinctly attenuated at the tip; predominant colour green; tail-feathers green above with the tip uniform; shaft-streaks more or less blue on the forehead; breast generally tinged with red.

Geographical Distribution. Australian Region, except New Zealand.

KEY OF THE SPECIES

A. Quills underneath with a coloured band towards the base.

a. Band towards the base of the quills underneath yellow.

a'. Band across the nape greenish-yellow.

a''. Middle of the abdomen not blue.

a'''. Breast mostly yellow; occiput bright green T. HAEMATODES.

b'''. Breast red.

a⁴. Head not entirely blue.

a⁵. Breast-feathers red, with no tinge of yellow towards the edges (except in young birds).

a⁶. No dark cross bands on the breast of the adult birds.

a⁷. Forehead bluish.

a⁸. Purple patch behind the green collar smaller T. FORSTENI.

b⁸. Purple patch behind the green collar large and conspicuous. T. DJAMPEANUS.

b⁷. Forehead greenish (fide Rothschild et Hartert). T. MITCHELLI.

b⁶. Breast with dark cross bands.

c⁷. Dark cross bands on the breast much broader and very conspicuous.

c⁸. Ear-coverts blue T. CYANOGRAMMUS.

d⁸. Ear-coverts greenish T. INTERMEDIUS.

- d⁷. Dark cross bands on the breast much narrower.
 e⁸. Upper parts grass-green T. MASSENA.
 f⁸. Upper parts olive-green T. FLAVICANS.
 b⁵. Brest-feathers red, slightly tinged with yellow towards the edges;
 forehead and cheeks blue T. NIGRIGULARIS.
 b⁶. Flanks green and yellow; belly green and black T. NIGRIGULARIS.
 f⁶. Belly and flanks entirely black (Ogilvie-Grant) T. BROOKI.
 b⁴. Head entirely blue T. CÆRULEICEPS.
 b¹¹. Middle of the abdomen blue; head entirely blue T. NOVE HOLLANDIÆ.
 b¹. Band across the nape orange T. RUBRITORQUES.
 b. Band towards the base of the quills underneath red T. ROSENBERGI.
 B. Quills with no coloured band beneath; cheeks and breast red T. ORNATUS.

1. **Trichoglossus haematodes** (Linnæus) (Plate 4, Fig. 6).

Lesser Sunda Is. (Timor,
Sema, Wetter.)

Psittacus haematodes Linnæus, Mant. Plant. p. 524 (part.) (1771)

Trichoglossus haematodes Hartlaub, cf. Salvadori, Cat. Birds Brit. Mus. Vol. 20, p. 49 (1891); Mivart, Mon. Lor. pl. 28 (1896); Salvadori, Ibis, 1905, p. 415.

Dr Hartert under the name of *Trichoglossus fortis* (Novit. Zool. Vol. 5, p. 120, 1898) has described a bird from Sumba Island, perfectly like typical *haematodes*, only (bill and wings), somewhat larger, besides some minor differences in coloration. According to Dr Finsch both forms occur in Wetter and the differences are due to age (sic!) cf. Sharpe, Hand-List, Vol. 2, p. 4, note.

2. **Trichoglossus forsteni** (Temminck) (Plate 3, Fig. 8).

Sumbawa.

Trichoglossus forsteni Bonaparte, Consp. Gen. Av. Vol. 1, p. 3 (1850) (ex Temminck);

Salvadori, Cat. Birds Brit. Mus. Vol. 20, p. 51 (1891); Mivart, Mon. Lor. pl. 20 (1896); Salvadori, Ibis, 1905, p. 415.

3. **Trichoglossus djampeanus** Hartert.

Djampea Isl.

Trichoglossus forsteni djampeanus Hartert, Novit. Zool. Vol. 4, p. 172 (1897).

Trichoglossus djampeanus Sharpe, Hand-List, Vol. 2, p. 4 (1900); Salvadori, Ibis, 1905, p. 416.

Trichoglossus djampeanus appears scarcely different from typical *T. forsteni*.

4. **Trichoglossus mitchelli** Gray (Plate 4, Fig. 7).

Lombok.

Trichoglossus mitchelli Gray, List Psitt. Brit. Mus. p. 62 (1859); Salvadori, Cat. Birds

Brit. Mus. Vol. 20, p. 57 (1891); Mivart, Mon. Lor. pl. 33 (1896); Hartert, Novit.

Zool. Vol. 3, p. 562 (1896) (Lombok); Salvadori, Ibis, 1905, p. 417.

5. **Trichoglossus cyanogrammus** Wagler (Plate 4, Fig. 4).

N. New Guinea, W. Pa-
puan Isl., S. Moluccas,
and exceptionally on
the Ké Islands.

Trichoglossus cyanogrammus Wagler, Mon. Psitt. p. 554 (1832); Salvadori, Cat. Birds

Brit. Mus. Vol. 20, p. 51 (1891); ? Mivart, Mon. Lor. pl. 30, f. 1 (1896); Salvadori,

Ibis, 1905, p. 417.

6. **Trichoglossus intermedius** Rothschild & Hartert.

N. New Guinea (type :
Stephansort).

Trichoglossus nigrogularis Madarasz (nec Gray), Term. Füzet. Vol. 20, p. 42 (1897)
(Gauta-Fluss).

Trichoglossus haematodus intermedius Rothschild & Hartert, Novit. Zool. Vol. 8, p. 70 (1901).

Trichoglossus intermedius, Madarasz, Term. Füzet. Vol. 25, p. 351 (1902); Salvadori,
Ibis, 1905, p. 419.

This form, although intermediate between *T. cyanogrammus* and *T. massena*, appears scarcely of subspecific value, as, even according to its authors, some specimens from W. New Guinea are indistinguishable from those from Kaiser Wilhelm's Land.

7. **Trichoglossus massena** Bonaparte.

S. E. New Guinea; Bis-
marck Archip., Solo-
mons Is., New Hebrides,
New Caledonia.

Trichoglossus massena Bonaparte, Rev. Mag. Zool. 1854, p. 157; Salvadori, Cat. Birds

Brit. Mus. Vol. 20, p. 53 (1891); Mivart, Mon. Lor. pl. 31, f. 1 (1896); Salvadori,

Ibis, 1905, p. 418.

8. **Trichoglossus flavicans** Cabanis & Reichenow (**Plate 4, Fig. 8**).
Trichoglossus flavicans Cabanis & Reichenow, Sitzb. Ges. Naturf. Freunde Berlin, p. 73 (1876); Salvadori, Cat. Birds Brit. Mus. Vol. 20, p. 55 (1891); Mivart, Mon. Lor. pl. 32 (1896); Salvadori, Ibis, 1905, p. 418. New Hanover, Admiralty and Echuquer Islands.
9. **Trichoglossus nigrigularis** Gray.
Trichoglossus nigrigularis Gray, Proc. Zool. Soc. Lond. 1858, p. 183, 195; Salvadori, Cat. Birds Brit. Mus. Vol. 20, p. 55 (1891); Mivart, Mon. Lor. pl. 30, f. 2 (1896); Salvadori, Ibis, 1905, p. 418. Aru and Ke Is., S. New Guinea. Middle Fly River.
10. **Trichoglossus brooki** Ogilvie-Grant.
Trichoglossus brooki Ogilvie-Grant, Bull. Brit. Orn. Club, Vol. 19, p. 102 (1907). Spirit Isl. (Aru Isl.).
11. **Trichoglossus caeruleiceps** D'Albertis & Salvadori.
Trichoglossus caeruleiceps D'Albertis & Salvadori, Ann. Mus. Stor. Nat. Genova, Vol. 14, p. 41 (1879); Salvadori, Cat. Birds Brit. Mus. Vol. 20, p. 57 (1891); Mivart, Mon. Lor. pl. 34 (1896); Salvadori, Ibis, 1905, p. 418. S. New Guinea, along the Kataw River.
12. **Trichoglossus novae hollandiae** (Gmelin).
Psittacus novae hollandiae Gmelin, Syst. Nat. Vol. 1, p. 316 (1788).
Trichoglossus novae hollandiae Blyth, cf. Salvadori, Cat. Birds Brit. Mus. Vol. 20, p. 57 (1891); Mivart, Mon. Lor. pl. 35 (1896); Salvadori, Ibis, 1905, p. 418.
 A distinct form of *T. novae hollandiae* has been described from North Queensland, *T. novae hollandiae* var. *septentrionalis* Robinson, Bull. Liverp. Mus. Vol. 2, p. 115 (1903), but it appears to me that the differences both in size and coloration are very small and not sufficient to establish a new subspecies. E. Australia, Tasmania.
13. **Trichoglossus rubritorques** Vigors & Horsfield (**Plate 4, Fig. 3**).
Trichoglossus rubritorques Vigors & Horsfield, Trans. Linn. Soc. Lond. Vol. 15, p. 291 (1826); Salvadori, Cat. Birds Brit. Mus. Vol. 20, p. 60 (1891); Mivart, Mon. Lor. pl. 37 (1896); Salvadori, Ibis, 1905, p. 419. N. W. Australia.
14. **Trichoglossus rosenbergi** Schlegel (**Plate 4, Fig. 5**).
Trichoglossus rosenbergi Schlegel, Nederl. Tijdschr. Dierk. Vol. 4, p. 9 (1871); Salvadori, Cat. Birds Brit. Mus. Vol. 20, p. 61 (1891); Mivart, Mon. Lor. pl. 38 (1896); Salvadori, Ibis, 1905, p. 419. Mysore Is., Geelvink Bay.
15. **Trichoglossus ornatus** (Linnæus) (**Plate 4, Fig. 2**).
Psittacus ornatus Linnæus, Syst. Nat. Vol. 1, p. 143, n° 19 (1766).
Trichoglossus ornatus Gray, cf. Salvadori, Cat. Birds Brit. Mus. Vol. 20, p. 61 (1891); Mivart, Mon. Lor. pl. 39 (1896); Salvadori, Ibis, 1905, p. 419. Celebes and Togian Islands.

Besides the above mentioned species, two more are mentioned in Catalogues, *T. verreauxius* Bonaparte, Rev. Mag. Zool. 1854, p. 157 (Australia), and *T. coccineifrons* Gray, Proc. Zool. Soc. Lond. 1858, pp. 183, 194 (Aru Islands) (**Plate 5, Fig. 1**), but I have no doubt that both are based on abnormal individuals, perhaps hybrids.

8. GENUS PSITTEUTELES BONAPARTE

Psitteuteles Bonaparte, Rev. Mag. Zool. 1854, p. 157 (type of the genus *Psittacus euteles* Temminck).

Characters. Similar to those of *Trichoglossus*, only the colouring is different; the shaft-streaks on the forehead are not blue and the breast is not red; head yellowish or bluish-green; bill orange-red.

Geographical Distribution. Australia, Tenimber Islands, Timor, Celebes and Sula Islands.

KEY OF THE SPECIES

- a. *Underside of the quills with no coloured band.*
 a'. *Larger; breast bright yellow* P. FLAVOVIRIDIS.
 b'. *Smaller; breast greenish yellow.*
 a''. *Green bands on the under parts narrow* P. MEYERI.
 b''. *Green bands on the under parts broad* P. BONTHAINENSIS.
- b. *Underside of the quills with a coloured band.*
 c'. *Face partly red.* P. JOHNSTONIÆ.
 d'. *No red colour on the face.*
 e''. *Band on the under side of the quills yellow.*
 a'''. *No yellow band across the breast* P. EUTELES.
 b'''. *A broad yellow band across the breast* P. WEBERI.
 f''. *Band on the underside of the quills red* P. CHLOROLEPIDOTUS.

1. **Psitteuteles flavoviridis** (Wallace). Sula Islands.
Trichoglossus flavoviridis Wallace, Proc. Zool. Soc. Lond. 1862, p. 337, pl. 39.
Psitteuteles flavoviridis Salvadori, Cat. Birds Brit. Mus. Vol. 20, p. 63; Mivart, Mon. Lor. pl. 14 (1896); Salvadori, Ibis, 1905, p. 420.
2. **Psitteuteles meyeri** (Walden). North Celebes.
Trichoglossus meyeri Walden, Ann. Mag. Nat. Hist. (4), Vol. 8, p. 281 (1871).
Psitteuteles meyeri Salvadori, Cat. Birds Brit. Mus. Vol. 20, p. 63 (1891); Mivart, Mon. Lor. pl. 41, f. 1 (1896); Salvadori, Ibis, 1905, p. 420.
3. **Psitteuteles bonthainensis** (Meyer). South Celebes.
Trichoglossus meyeri var. *bonthainensis* Meyer, Sitzb. Abh. Ges. Isis. 1884, Abh. 1, p. 16;
 Salvadori, Cat. Birds Brit. Mus. Vol. 20, p. 64 (note) (1891).
Psitteuteles bonthainensis Mivart, Mon. Lor. pl. 41, f. 2, 3 (1896); Salvadori, Ibis, 1905, p. 420.
Psitteuteles bonthainensis probably is not different from *P. meyeri*.
4. **Psitteuteles johnstoniæ** (Hartert). Mount Apo (S. Minda-
 nao).
Trichoglossus johnstoniæ Hartert, Bull. Brit. Orn. Cl. Vol. 16, p. 10 (1903); Salvadori, Ibis, 1905, p. 421; Goodfellow, Avic. Mag. (n. s.) 4, p. 83, pl. 1 (1906); Mc Gregor & Worcester, Handl. Birds Philipp. Isl. p. 48 (1906); Grant, Ibis, 1906, p. 495; Hartert, Novit. Zool. 13, p. 755 (1906).
5. **Psitteuteles euteles** (Temminck) (Plate 5, Fig. 8). Timor, Wetter, Lettie,
 Babbar, Timor-Laut
 and perhaps Flores.
Psittacus euteles Temminck, Pl. Col. Ois. 568 (1835).
Psitteuteles euteles Bonaparte, Rev. Mag. Zool. 1854, p. 157; Salvadori, Cat. Birds Brit. Mus. Vol. 20, p. 64 (1891); Mivart, Mon. Lor. pl. 42 (1896); Salvadori, Ibis, 1905, p. 420.
Trichoglossus aloreensis Finsch, Not. Leyd. Mus. Vol. 20, p. 226 (1898); Hartert, Novit. Zool. Vol. 7, p. 19 (1900) (= *P. euteles* juv.).
6. **Psitteuteles weberi** Büttikofer. Flores.
Psitteuteles weberi Büttikofer, in Weber, Zool. Ergeb. u. Reise Niederl. O.-Ind. Vol. 3, p. 290, pl. 17, f. 1 (1894); Hartert, Novit. Zool. Vol. 5, p. 43 (1898); Salvadori, Ibis, 1905, p. 420.
7. **Psitteuteles chlorolepidotus** (Kuhl). Australia.
Psittacus chlorolepidotus Kuhl, Consp. Psitt. p. 48 (1820).
Psitteuteles chlorolepidotus Salvadori, Cat. Birds Brit. Mus. Vol. 20, p. 65 (1891); Mivart, Mon. Lor. pl. 43 (1896); Salvadori, Ibis, 1905, p. 421.
Psitteuteles neglectus Reichenow, Orn. Monatsb. Vol. 6, p. 4 (1898) (N. Queensland).

9. GENUS PTILOSCLERA BONAPARTE

Ptilosclera Bonaparte, Compt. Rend. Acad. Sc. Paris, Vol. 46, p. 597, Gen. 66 (1857); Gray, List Psitt. Brit. Mus. p. 59 (1859) (type *Trichoglossus versicolor* Vigors).

Characters. Almost the same as those of the genus *Psittaculodes*, differing mainly in the shaft-streaks on the neck and body.

Geographical Distribution. Only one species North and West Australia.

Ptilosclera versicolor (Vigors) (Plate 5, Fig 10).

N. and W. Australia.

Trichoglossus versicolor Vigors in Lear's, Ill. Parr. pl. 36 (1832).

Ptilosclera versicolor, Gould; cf. Salvadori, Cat. Birds Brit. Mus. Vol. 20, p. 66 (1891);

Mivart, Mon. Lor. pl. 46 (1896); Salvadori, Ibis, p. 422 (1905).

10. GENUS GLOSSOPSITTACUS BONAPARTE

Glossopsitta Bonaparte, Rev. Mag. Zool. 1857, p. 157 (type *Psittacus concinnus* Shaw).

Synonym : *Centrourus* G. R. Gray (nec Swainson) List Gen. Birds, p. 51 (1840).

Characters. Tail-feathers twelve; point of maxilla long, but not thin; tail moderate with the two middle feathers somewhat longer than the lateral ones; tail-feathers gradually tapering to a point, and green with no yellow or red colour at the tip; four or five first primaries not distinctly attenuated towards the tip; first primary equal or a little longer than the second and the third; predominant colour green; bill black.

Geographical Distribution. Australia and South East New Guinea.

KEY OF THE SPECIES

- a. *Underparts with shaft-streaks* G. GOLDIEI.
 - b. *Underparts with no shaft-streaks.*
 - a'. *Cheeks with no red.*
 - a''. *Larger; ear-coverts red like the forehead* G. CONCINNUS.
 - b''. *Smaller; ear-coverts yellow mixed with red, like the forehead; crown deep purple blue* G. PORPHYROCEPHALUS.
 - b'. *Cheeks, as well as the forehead and chin, all round the base of the bill, red.* . . . G. PUSILLUS.
1. **Glossopsittacus goldiei** (Sharpe). S. E. New Guinea.
Trichoglossus goldiei Sharpe, Journ. Linn. Soc., Lond. Vol. 16, pp. 318, 426 (1882).
Glossopsittacus goldiei Salvadori, Cat. Birds Brit. Mus. Vol. 20, p. 68 (1891); Mivart, Mon. Lor. pl. 45, f. 1 (1896); Salvadori, Ibis, p. 422 (1905).
Glossopsittacus (!) goldiei Hartert, Novit. Zool. Vol. 3, p. 552 (1896).
 2. **Glossopsittacus concinnus** Shaw (Plate 5, Fig. 7). E. and S. Australia,
Tasmania.
Psittacus concinnus Shaw, Nat. Misc. Vol. 3, pl. 87 (1791).
Glossopsittacus concinnus Sundevall, cf. Salvadori, Cat. Birds Brit. Mus. Vol. 20, p. 69 (1891); Mivart, Mon. Lor. pl. 45, f. 2 (1896); Salvadori, Ibis, 1905, p. 422.
 3. **Glossopsittacus porphyrocephalus** (Dietrichsen). W. and S. Australia.
Trichoglossus porphyrocephalus Dietrichsen, Trans. Linn. Soc. Lond. Vol. 17 (pt. 4), p. 553 (1837).
Glossopsittacus porphyrocephalus Salvadori, Cat. Birds Brit. Mus. Vol. 20, p. 70 (1891); Mivart, Mon. Lor. pl. 46, f. 1 (1896); Salvadori, Ibis, 1905, p. 422.

4. **Glossopsittacus pusillus** (Shaw).*Psittacus pusillus* Shaw in White's Journ. Voy. N. S. Wales, p. 262, pl. 48 (1790).*Glossopsittacus pusillus* Salvadori, Cat. Birds Brit. Mus. Vol. 20, p. 71 (1891); Mivart, Mon. Lor. pl. 46, f. 2 (1896); Salvadori, Ibis, 1905, p. 422.E. and S. Australia,
Tasmania.11. GENUS **HYPOCHARMOSYNA** SALVADORI**Hypocharmosyna** Salvadori, Cat. Birds Brit. Mus. Vol. 20, pp. 12, 72 (1891) (type of the genus *Psittacus placens* Temminck).**Characters.** Point of maxilla long, but not thin; tail-feathers twelve, gradually tapering to a point; predominant colour underneath as well as above green; tail-feathers green above with the tips yellow, light green, or red; bill red.**Geographical Distribution.** From the Moluccas, through the Papuan Islands to New Caledonia, the New Hebrides and the Fiji Islands.

KEY OF THE SPECIES

- A. *Breast with elongated yellow stripes; male with the inner web of the quills red* H. WILHELMINÆ.
- B. *No elongated yellow stripes on the breast; no red on the inner web of the quills.*
- a. *A yellow band on the underside of the quills.*
- a'. *Ear-coverts bright blue in the males, not blue, streaked with yellow, or green in the females.*
- a''. *No red patch on the upper tail-coverts.*
- a'''. *Rump blue* H. PLACENS.
- b'''. *Rump green without any blue.*
- a⁴. *Darker* (Rothschild & Hartert) H. SUBPLACENS.
- b⁴. *Paler* (Rothschild & Hartert) H. PALLIDIOR.
- b'. *A red patch on the upper tail-coverts.*
- c'''. *Red patch on the upper tail-coverts duller; the female with yellow streaks on the ear-coverts.* H. RUBRONOTATA.
- d'''. *Red patch on the upper tail-coverts brighter; the female with bright green streaks on the ear-coverts.* H. CORDOANA.
- b'. *Ear-coverts not blue, but green; anterior edge of cheeks and upper part of throat red* H. RUBRIGULARIS.
- b. *No yellow band on the underside of the quills which are entirely dusky.*
- c'. *Thighs red; face and throat red; the latter edged with a yellow narrow band below.* H. AUREOCINCTA.
- d'. *Thighs green.*
- c''. *Crown blue; forehead green* H. DIADEMATA.
- d''. *Crown not blue.*
- e'''. *Very little red on the feathers at the base of the bill.*
- e⁴. *No yellow tips to the central tail-feathers* H. MEEKI.
- f⁴. *Central tail-feathers with yellow tips* H. PALMARUM.
- f'''. *No red colour on the feathers at the base of the bill* H. PYGMÆA.

1. **Hypocharmosyna wilhelminæ** (Meyer) (Plate 5, Figs. 2, 3).*Trichoglossus wilhelminæ* Meyer, Journ. f. Orn. 1874, p. 56.*Hypocharmosyna wilhelminæ* Salvadori, Cat. Birds Brit. Mus. Vol. 10, p. 73 (1891); Mivart, Mon. Lor. pl. 48 (1896); Salvadori, Ibis, 1905, p. 422.N. W. and S. E. New
Guinea.

2. **Hypocharmosyna placens** (Temminck) (**Plate 6, Fig. 7**). N. Papuan subregion and Moluccas.
Psittacus placentis (sic) Temminck, Pl. Col. 553 (1835).
Hypocharmosyna placens Salvadori, Cat. Birds Brit. Mus. Vol. 10, p. 74 (1891); Mivart, Mon. Lor. pl. 48 (1896); Salvadori, Ibis, 1905, p. 423.
3. **Hypocharmosyna subplacens** (Sclater) (**Plate 5, Fig. 4; Plate 6, Fig. 8**). E. Papuan subregion.
Trichoglossus subplacens Sclater, Proc. Zool. Soc. Lond., 1876, p. 519.
Hypocharmosyna subplacens Salvadori, Cat. Birds Brit. Mus. Vol. 20, p. 75 (1891); Mivart, Mon. Lor. pl. 49 (1896); Salvadori, Ibis, 1905, p. 423.
4. **Hypocharmosyna pallidior** (Rothschild & Hartert). Bougainville, New Britain, New Ireland, and New Hanover.
Charmosynopsis placentis, pallidior Rothschild & Hartert, Novit. Zool. Vol. 12, p. 253 (1905).
Hypocharmosyna, pallidior Salvadori, Ibis, 1907, p. 318.
5. **Hypocharmosyna rubronotata** (Wallace). Salawati and W. New Guinea.
Coriphilus rubronotatus Wallace, Proc. Zool. Soc. Lond., 1862, p. 105.
Hypocharmosyna rubronotata Salvadori, Cat. Birds Brit. Mus. Vol. 20, p. 76 (1891); Mivart, Mon. Lor. pl. 52 (1896); Salvadori, Ibis, 1905, p. 424.
6. **Hypocharmosyna kordoana** (Meyer) (**Plate 6, Fig. 5**). Misori Islands (Geelvink Bay).
Trichoglossus (Charmosyna) kordoanus Meyer, Verh. Zool.-Bot. Ges. Wien, Vol. 24, p. 38 (1874).
Hypocharmosyna kordoana Salvadori, Cat. Birds Brit. Mus. Vol. 20, p. 77 (1891); Mivart, Mon. Lor. pl. 51 (1896); Salvadori, Ibis, 1905, p. 424.
7. **Hypocharmosyna rubrigularis** (Sclater) (**Plate 5, Fig. 5**). New Britain.
Trichoglossus rubrigularis Sclater, Proc. Zool. Soc. Lond., 1881, p. 451.
Hypocharmosyna rubrigularis Salvadori, Cat. Birds Brit. Mus. Vol. 20, p. 77 (1891); Mivart, Mon. Lor. pl. 50, f. 1 (1896); Salvadori, Ibis, 1905, p. 424.
8. **Hypocharmosyna aureocincta** (Layard). Fiji Island.
Trichoglossus aureocinctus Layard, Ann. Mag. Nat. Hist. 141, Vol. 16, p. 344 (1875).
Hypocharmosyna aureocincta, Salvadori, Cat. Birds Brit. Mus. Vol. 20, p. 78 (1891); Mivart, Mon. Lor. pl. 50, f. 2, 3 (1896); Salvadori, Ibis, 1905, p. 424.
9. **Hypocharmosyna diademata** (Verreaux & O. Des Murs) (**Plate 6, Fig. 6**). New Caledonia.
Psittaculus diadema (sic), Verreaux & O. Des Murs, Rev. Mag. Zool. 1860, p. 390; cf. Oustalet, Bull. Mus. Hist. Nat. Paris, 1895, p. 101-103.
Glossopsittacus diadematus Salvadori, Cat. Birds Brit. Mus. Vol. 20, p. 68 (1891).
Hypocharmosyna diademata Mivart, Mon. Lor. pl. 56 (1896); Salvadori, Ibis, 1905, p. 424.
10. **Hypocharmosyna meeki** Rothschild & Hartert. Kulambangra Island (Solomon Islands).
Hypocharmosyna meeki Rothschild & Hartert, Novit. Zool. Vol. 8, p. 187 (1901), Vol. 9, p. 590, pl. 7, f. 3 (1902); Salvadori, Ibis, 1905, p. 424.
11. **Hypocharmosyna palmarum** (Gmelin). New Hebrides.
Psittacus palmarum Gmelin, Syst. Nat. Vol. 1, p. 329, n. 89 (1788).
Hypocharmosyna palmarum Salvadori, Cat. Birds Brit. Mus. Vol. 20, p. 78 (1891); Mivart, Mon. Lor. pl. 53, f. 1 (1896); Salvadori, Ibis, 1905, p. 425.
12. **Hypocharmosyna pygmaea** (Gmelin). Patria ignota.
Psittacus pygmaeus Gmelin, Syst. Nat. Vol. 1, p. 330, n. 92 (1788).
Hypocharmosyna pygmaea Salvadori, Cat. Birds Brit. Mus. Vol. 20, p. 79 (1891); Mivart, Mon. Lor. pl. 53, f. 2 (1896); Salvadori, Ibis, 1905, p. 425.
13. **Hypocharmosyna pallidior** (Rothschild & Hartert). Bougainville, New Britain, New Ireland and New Hanover.
Charmosynopsis placentis pallidior Rothschild & Hartert, Novit. Zool. Vol. 12, p. 253 (1905).
Hypocharmosyna pallidior Salvadori, Ibis, 1907, p. 318.

12. GENUS CHARMOSYNOPSIS SALVADORI

Charmosynopsis Salvadori, Ann. Mus. Stor. Nat. Genova, Vol. 10, p. 37 (1877) (type *Charmosyna pulchella*, G. R. Gray).

Characters. Point of maxilla long, but not thin; tail-feathers twelve, gradually tapering to a point; the two middle tail-feathers not much longer than the lateral ones; primaries normal, not abruptly attenuated towards the tips; predominant colour on the head, neck and lower parts red.

Geographical Distribution. New Guinea and Solomon Islands.

KEY OF THE SPECIES

- a. *No yellow collar round the base of the neck* C. PULCHELLA.
 b. *A yellow collar round the base of the neck* C. MARGARITAE.

1. **Charmosynopsis pulchella** (G. R. Gray).

New Guinea.

Charmosyna pulchella G. R. Gray, List Psitt. Brit. Mus. p. 102 (1859).

Charmosynopsis pulchella Salvadori; cf. Salvadori, Cat. Birds Brit. Mus. Vol. 20, p. 79 (1891); Mivart, Mon. Lor. pl. 55 (1896); Salvadori, Ibis, 1905, p. 426.

Charmosynopsis bella De Vis, Ann. Queensl. Mus. N. 5, pp. 12, 13, pl. 8 (1900).

2. **Charmosynopsis margaritae** (Tristram) (Plate 5, Figs. 6, 11).

Solomon Islands (Ugi,
San Cristoval, Kulam-
bangra)

Charmosyna margarethae Tristram, Ibis, 1879, p. 442, pl. 12.

Charmosynopsis margaritae Salvadori, Cat. Birds Brit. Mus. Vol. 20, p. 81 (1891); Mivart, Mon. Lor. pl. 56 (1896); Rothschild & Hartert, Novit. Zool. Vol. 8, p. 187 (1901); Salvadori, Ibis, 1905, p. 426.

13. GENUS CHARMOSYNA WAGLER

Charmosyna Wagler, Mon. Psitt. p. 493 (1832) (type *Psittacus papuensis* Gmelin).

Synonym. *Pyrrhodes* Swainson, Classif. Birds. Vol. 2, p. 304 (1837).

Characters. Point of the maxilla long, but not thin; tail-feathers twelve, gradually tapering to a point; the two middle tail-feathers much longer than the lateral ones and very narrow towards the tips; the first four or five primaries abruptly attenuated towards the tips in adult birds; predominant colour on the head, neck and lower parts red.

Geographical Distribution. New Guinea.

KEY OF THE SPECIES

- a. *Head, neck and lower parts carmine-red.*
 a'. *Middle tail-feathers green at the base.*
 a''. *A patch of yellow on the sides of the breast* C. PAPUENSIS.
 b''. *No yellow patch on the sides of the breast.* C. STELLAE.
 c''. *A wide orange-yellow band across the breast* C. WAHNESI.
 b'. *Middle tail-feathers red, with no green at the base* C. JOSEPHINAE.
 b. *Head purplish-black, neck and upper back black; under surface dull black* C. ATRATA.

1. **Charmosyna papuensis** (Gmelin) (Plate 6, Figs. 3, 4).

N. W. New Guinea.

Psittacus papuensis Gmelin, Syst. Nat. Vol. 1, p. 317, n. 57 (1788).

Charmosyna papuensis Wagler; cf. Salvadori, Cat. Birds Brit. Mus. Vol. 20, p. 88 (1891);

Mivart, Mon. Lor. pl. 57 (1896); Salvadori, Ibis, 1905, p. 427.

2. **Charmosyna stellae** Meyer (**Plate 5, Fig. 9**). S. E. New Guinea.
Charmosyna stellae Meyer, Zeitschr. f. Ges. Orn. 1886, p. 9, t. 2; Salvadori, Cat. Birds Brit. Mus. Vol. 20, p. 83 (1891); Mivart, Mon. Lor. pl. 58 (1896); Salvadori, Ibis, 1905, p. 427.
3. **Charmosyna wahnesi** Rothschild. Sattelberg (German New Guinea).
Charmosyna stellae wahnesi Rothschild, Bull. Brit. Orn. Club, Vol. 19, p. 27 (1906).
Charmosyna wahnesi Salvadori, Ibis, p. 319 (1907).
4. **Charmosyna josephinae** (Finsch) (**Plate 6, Fig. 1**). N. W. New Guinea.
Trichoglossus josephinae Finsch, Atti Soc. Ital. Sc. Nat. Vol. 15, p. 427, tav. 7 (2) (1872).
Charmosyna josephinae Sharpe; cf. Salvadori, Cat. Birds Brit. Mus. Vol. 20, p. 84 (1891);
Mivart, Mon. Lor. pl. 59 (1896); Salvadori, Ibis, 1905, p. 427.
5. **Charmosyna atrata** Rothschild. S. E. New Guinea.
Charmosyna atrata Rothschild, Bull. Brit. Orn. Cl. Vol. 7, p. 54 (1898); Vol. 15, p. 7 (1904);
idem, Novit. Zool. Vol. 6, p. 218, pl. 2, f. 1 (1899); Salvadori, Ibis, 1905, p. 427.

14. GENUS OREOPSITTACUS SALVADORI

Oreopsittacus Salvadori, Ann. Mus. Stor. Nat. Genova. Vol. 10, p. 37 (1877) (type *Trichoglossus arfaki*, Meyer).

Characters. Point of the maxilla very long and thin; tail-feathers fourteen; tail rather long and much graduated, the feathers pointed at the tip; bill black.

Geographical Distribution. New Guinea.

KEY OF THE SPECIES

- a. *Smaller; central part of the abdomen tinged with red* **O. ARFAKI.**
- b. *Larger; abdomen entirely green, with no red tinge in the central part* **O. GRANDIS.**

1. **Oreopsittacus arfaki** (Meyer) (**Plate 6, Fig. 9**). N. W. New Guinea.
Trichoglossus (*Charmosyna*) *arfaki* Meyer, Verh. Zool. bot. Ges. Wien. Vol. 29, p. 37 (1874).
Oreopsittacus arfaki Salvadori; cf. Salvadori, Cat. Birds Brit. Mus. Vol. 20, p. 84 (1891);
Mivart, Mon. Lor. pl. 40 (1896); Salvadori, Ibis, 1905, p. 428.
2. **Oreopsittacus grandis** Grant (**Plate 4, Figs. 9, 10**). S. E. New Guinea.
Oreopsittacus grandis Grant, Bull. Brit. Orn. Club, Vol. 5, p. 15 (1895); Mivart, Mon. Lor.
pl. 61 (1896); Salvadori, Ibis, 1905, p. 428.
Oreopsittacus viridigaster De Vis, Rep. Brit. New Guinea, 1898, App. p. 81; cf. Rothschild, Novit. Zool. Vol. 5, p. 510 (1898) (= *O. grandis*).
Oreopsittacus chlorigaster (nom. emend.), Sharpe, Zool. Record, 1898, p. 43.
Oreopsittacus frontalis Reichenow, Orn. Monatsb. Vol. 8, p. 186 (1900) (1).

(1) I believe that Dr Reichenow has described two young birds of *O. grandis*. This is confirmed (in litt.) by Dr Hartert who has examined the type.

EXPLANATION OF PLATES

PLATE I

- Fig. 1. *Eos histrio* (P. L. S. Müller).
 — 2. — *rubiginosa* (Bonaparte).
 — 3. — *semilarvata* Bonaparte.
 — 4. — *cyanogenys* Bonaparte.
 — 5. *Chalcopsittacus duyvenbodei* Dubois.
 — 6. — *scintillatus* (Temminck).
 — 7. — *insignis* Oustalet.
 — 8. — — — — Underside of the tail.
 — 9. — — — — Foot.
 — 10. — — — — Underside of the wing.

PLATE 2

- Fig. 1. *Eos reticulata* (Müller).
 — 2. — *insularis* Guillemard.
 — 3. — *riciniata* (Bechstein).
 — 4. — *wallacei* Finsch.
 — 5. *Lorius flavopalliatu*s Salvadori.
 — 6. — *chlorocercus* Gould.
 — 7. — *salvadorii* Meyer.
 — 8. — *lory* (Linnæus). Underside of the tail.
 — 9. — — — — Underside of the wing.
 — 10. — *cyanauchen* (S. Müller). Left foot.
 — 11. — *tibialis* Sclater. Left foot.

PLATE 3

- Fig. 1. *Lorius jobiensis* Meyer.
 — 2. — *hypœnochrous* Gray. Underside of the wing.
 — 3. — *devittatus* Hartert. Underside of the wing.
 — 4. *Vinia kuhlii* (Vigors).
 — 5. *Calliptilus solitarius* (Latham).
 — 6. *Coriphilus taitianus* (Gmelin).
 — 7. — *ultramarinus* (Kuhl).
 — 8. *Trichoglossus forsteni* (Temminck).

PLATE 4

- Fig. 1. *Lorius tibialis* Sclater.
 — 2. *Trichoglossus ornatus* (Linnæus).
 — 3. — *rubritorques* Vigors & Horsfield.

- Fig. 4. *Trichoglossus cyanogrammus* Wagler.
 — 5. — *rosenbergi* Schlegel.
 — 6. — *haematodes* (Linnæus).
 — 7. — *mittelli* Gray.
 — 8. — *flavicans* Cabanis & Reichenow.
 — 9. *Oreopsittacus grandis* Grant.
 — 10. — — Underside of the tail.

PLATE 5

- Fig. 1. *Trichoglossus coccineifrons*.
 — 2. *Hypocharmosyna wilhelminae* Meyer.
 — 3. — — Underside of the wing.
 — 4. — *subplacens* (Sclater). Underside of the wing.
 — 5. — *rubrigularis* (Sclater).
 — 6. *Charmosynopsis margaritae* (Tristram). Underside of the tail.
 — 7. *Glossopsittacus concinnus* (Shaw).
 — 8. *Psitteuteles euteles* (Temminck).
 — 9. *Charmosyna stellæ* Meyer.
 — 10. *Ptilosclera versicolor* (Vigors).
 — 11. *Charmosynopsis margaritae* (Tristram). Central feathers of the tail.

PLATE 6

- Fig. 1. *Charmosyna josephinae* (Finsch).
 — 2. — *papuensis* (Gmelin). Underside of the wing.
 — 3. — — Underside of the tail.
 — 4. — —
 — 5. *Hypocharmosyna kordoana* (Meyer).
 — 6. — *diademata* (Verreaux & O. Des Murs).
 — 7. — *placens* (Temminck).
 — 8. — *subplacens* (Sclater).
 — 9. *Oreopsittacus arfaki* (Meyer)

Turin, 15th June 1908.

FAM. LORIIDÆ

1. EOS HISTRIO. 2. EOS RUBIGINOSA. 3. EOS SEMILARVATA. 4. EOS CYANOGENYS. 5. CHALCOPSITTACUS DUYVENBODEI.
6. CHALCOPSITTACUS SCINTILLATUS. 7. CHALCOPSITTACUS INSIGNIS. 8. UNDERSIDE OF TAIL OF CHALCOPSITTACUS INSIGNIS.
9. FOOT OF CHALCOPSITTACUS INSIGNIS. 10. UNDERSIDE OF THE WING OF CHALCOPSITTACUS INSIGNIS.

FAM. LORIIDÆ

1. EOS RETICULATA. 2. EOS INSULARIS. 3. EOS RICINIATA. 4. EOS WALLACEL. 5. LORIUS FLAVOPALLIATUS.
6. LORIUS CHLOROCERCUS. 7. LORIUS SALVADORIL. 8. UNDERSIDE OF THE TAIL OF LORIUS LORY.
9. UNDERSIDE OF THE WING OF LORIUS LORY. 10. LEFT FOOT OF LORIUS CYANAUCHEN. 11. LEFT FOOT OF LORIUS TIBIALIS.

FAM. LORIIDÆ

1. LORIUS JOBIENSIS. 2. UNDERSIDE OF THE WING OF LORIUS HYPOENOCROUS.
3. UNDERSIDE OF THE WING OF LORIUS DEVITTATUS. 4. VINIA KUHLI. 5. CALLIPTILUS SOLITARIUS.
6. CORIPHILUS TAITIANUS. 7. CORIPHILUS ULTRAMARINUS. 8. TRICHOGLOSSUS FORSTENI.

FAM. LORIIDÆ

1. LORIUS TIBIALIS. 2. TRICHOGLOSSUS ORNATUS. 3. TRICHOGLOSSUS RUBRITORQUES. 4. TRICHOGLOSSUS CYANOGRAMMUS.
 5. TRICHOGLOSSUS ROSENBERGL. 6. TRICHOGLOSSUS HÆMATODES. 7. TRICHOGLOSSUS MITCHELLI.
 8. TRICHOGLOSSUS FLAVICANS. 9. OREOPSITTACUS GRANDIS ♂. 10. UPSIDE OF THE TAIL OF OREOPSITTACUS GRANDIS.

FAM. LORIIDÆ

1. TRICHOGLOSSUS COCCINEIFRONS. 2. HYPOCHARMOSYNA WILHELMINÆ. 3. UNDERSIDE OF THE WING OF HYPOCHARMOSYNA WILHELMINÆ. 4. UNDERSIDE OF THE WING OF HYPOCHARMOSYNA SUBPLACENS. 5. HYPOCHARMOSYNA RUBRIGULARIS. 6. UNDERSIDE OF THE TAIL OF CHARMOSYNOPSIS MARGARITÆ. 7. GLOSSOPSITTACUS CONCINNUS. 8. PSITTEUTELES EUTELES. 9. CHARMOSYNA STELLÆ. 10. PTILOSLERA VERSICOLOR. 11. CENTRAL FEATHERS OF THE TAIL OF CHARMOSYNOPSIS MARGARITÆ.

FAM. LORIIDÆ

1. CHARMOSYNA JOSEPHINÆ. 2. UNDERSIDE OF THE WING OF CHARMOSYNA PAPUENSIS. 3. UNDERSIDE OF THE TAIL OF CHARMOSYNA PAPUENSIS. 4. CHARMOSYNA PAPUENSIS. 5. HYPOCHARMOSYNA KORDOANA. 6. HYPOCHARMOSYNA DIADEMATA. 7. HYPOCHARMOSYNA PLACENS ♂. 8. HYPOCHARMOSYNA SUBPLACENS. 9. OREOPSITTACUS ARFAKI ♂.

GENERA AVIUM

CONDUCTED BY

P. WYTSMAN

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PSITTACI

FAM. CYCLOPSITTACIDÆ

by T. SALVADORI

WITH 2 COLOURED PLATES

1910.

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FAM. CYCLOPSITTACIDÆ

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BY T. SALVADORI

HIS family was established by me in the *Catalogue of the Psittaci* (1891) (Introd. p. viii). I there wrote as follows : « A peculiar feature in my classification is the establishment of the family *Cyclopsittacidæ*. The under surface of the hook of the bill without file-like sculpture in the species of the genera *Neopsittacus* and *Cyclopsittacus* separates them from all the other *Psittaci proprii* and approaches them to the *Psittaci orthognati*; when the structure of their tongue is known we shall be able to understand better their true affinities. »

Characters. Bill moderately or much swollen on the sides; upper mandible notched, without transverse ridges on the under surface of the hook; lower mandible with the gonys upright and flattened in front; cere naked round the exposed nostrils, or feathered and nostrils hidden; tongue not known; tail moderate and gratuated, or short and cuneate, or rounded.

Habits. We only know that these small Parrots live on fruits, especially of a kind of fig (*Wallace, von Rosenberg, D'Albertis*).

Range. Austro-Malayan Subregion.

Bibliography. Salvadori, Cat. of the *Psittaci* in the collection of the British Museum. Vol. 20, p. 86-100 (1891); Hartert, On some Species of the genera *Cyclopsitta* and *Ptilinopus* (Novit. Zool. Vol. 6, p. 219, pl. 4) (1899); Rothschild & Hartert (the genus *Cyclopsitta*), op. cit. Vol. 8, p. 72-77 (1901); Salvadori, Notes on the Parrots (part 2), *Ibis*, 1905, p. 535-542.

Only two genera are known.

1. GENUS NEOPSITTACUS SALVADORI

Neopsittacus Salvadori, Ann. Mus. Stor. Nat. Genova, Vol. 7, p. 161 (1875) (type *Nanodes musschenbroekii* Rosenberg).

Characters. Bill yellow-orange, moderately swollen on the sides; under mandible moderately broad, with the gonys flattened in front, smooth, and with no distinct ridges; nostrils exposed.

Geographical distribution. New Guinea and Timor.

KEY TO THE SPECIES

- a. Inner web of the quills towards the base red.
 - a'. Tail longer, brighter green above, ochre-yellow below N. MUSSCHENBROEKI.
 - b'. Tail shorter (86 mm.) darker green above, brownish green below. N. PULLICAUDA.
 - b. Inner web of the quills with no red at the base.
 - c'. Hind part of the pileum purple-blue N. IRIS.
 - d'. Pileum entirely red. N. RUBRIPILEUS.
1. **Neopsittacus musschenbroeki** (Rosenberg) (Plate 1, Fig. 3, 7, 8, 9). N. W. New Guinea.
Nanodes musschenbroekii Rosenberg, fide Schlegel, Nederl. Tijdschr. Dierk. Vol. 4, p. 34 (1871).
Neopsittacus musschenbroeki Salvadori, cf. Salvadori, Cat. Birds Brit. Mus. Vol. 20, p. 86 (1891); Hartert, Novit. Zool. Vol. 3, p. 533 (1896); Salvadori, Ibis, 1905, p. 535.
 2. **Neopsittacus pullicauda** Hartert (Plate 1, Fig. 6). S. E. New Guinea.
Neopsittacus pullicauda Hartert, Novit. Zool. Vol. 3, p. 17 (1896); Salvadori, Ibis, 1905, p. 536.
Neopsittacus viridiceps De Vis, Ibis, 1897, p. 371; cf. Hartert, Novit. Zool. Vol. 4, p. 360 (1897 = *pullicauda*); Rothschild, Novit. Zool. Vol. 5, p. 510 (1898).
 3. **Neopsittacus iris** (Temminck) (Plate 1, Fig. 1). Timor.
Psittacus iris Temminck, Pl. Col. 567 (1835).
Neopsittacus iris Salvadori, Cat. Birds Brit. Mus. Vol. 20, p. 87 (1891).
 4. **Neopsittacus rubripileus** Salvadori (Plate 1, Fig. 2). E. Timor.
Neopsittacus rubripileum (sic) Salvadori, Cat. Birds Brit. Mus. Vol. 20, p. 88 (1891); cf. Hartert, Novit. Zool. Vol. 5, p. 119 (1898).
Neopsittacus rubripileus Salvadori, Ibis, 1905, p. 536.

2. GENUS CYCLOPSITTACUS REICHENBACH

Cyclopsitta Reichenbach, Syst. Av. Nat. tab. 83 (1850); Jacquinot & Pucheran, Voy. Pôle Sud, Zool. Vol. 3, p. 107 (1853) (type *Psittacula diophthalma* Hombr. & Jacquinot).

Synonym: *Opopsitta* Selater, Proc. Zool. Soc. Lond. 1860, p. 227.

Characters. Bill black or dark horn-colour, much swollen on the sides; gonys broadly flattened in front, and with several distinct ridges and grooves; nostrils exposed, or hidden when the cere is feathered.

Geographical distribution. The Papuan Islands and North-eastern Australia.

KEY TO THE SPECIES

- A. *Feathers of the cheeks and ear-coverts very long and narrow.*
- a. *No black crescent-like band on the nape; no blue band on the breast; breast red in the male, with a pale greenish band in the female.* C. SALVADORII.
- b. *Nape with a black crescent-like band; a deep blue pectoral band; breast and middle of the abdomen red in the male, green, stained with orange in the female* C. EDWARDSII.
- B. *Feathers of the cheeks and ear-coverts not very long and narrow.*
- c. *Central tail-feathers distinctly pointed.*
- a'. *Larger; wing about 4.3 inches (= mm. 108); pectoral band blue; sides of the breast pale blue.*
- a''. *Subocular spot blue.*
- a'''. *Cheeks yellowish green; a blue spot on the occiput; subocular blue spot broad and bright.* C. DESMARESTI.
- b'''. *Cheeks golden-yellow; generally no blue spot on the occiput; subocular blue spot small and pale.* C. OCCIDENTALIS.
- b''. *No subocular blue spot.*
- c'''. *Pectoral band pale blue; below this a second band brown-orange; hind neck green.* C. BLYTHI.
- d'''. *Pectoral band deep blue; a yellow collar on the hind-neck of the adult bird, and a blue one in the young bird.* C. CERVICALIS.
- b'. *Smaller; wing under 4 inches (= mm. 101); no pectoral band; sides of the breast yellow; a red concealed spot on the inner web of the inner greater wing-coverts.*
- e'''. *Red on the pileum confined to the forehead.*
- e⁴. *Larger; wing 3.9 inches (= mm. 95); frontal feathers red, tipped with green, a few of the median ones bluish* C. COXENI.
- f⁴. *Smaller; wing 3.5 inches (= mm. 86).*
- f⁵. *Frontal red patch not surrounded posteriorly with blue* C. MACCOVI ♂ ♀.
- g⁵. *Frontal red patch surrounded posteriorly with blue.*
- g⁶. *Cheeks bluish* C. VIRAGO ♀.
- h⁶. *Cheeks green* C. INSEPARABILIS ♀ ♂.
- f'''. *Red on the pileum extended to the whole sinciput.*
- g⁴. *Red colour on the sinciput darker and bordered behind with yellow; middle of the cheeks buff-grey in the female* { C. DIOPHTHALMUS.
C. COCCINEIFRONS.
- h⁴. *Red colour on the sinciput paler, without distinct yellow border behind.*
- i⁵. *A blue spot before the eyes* C. ARUENSIS ♂.
- j⁵. *A green spot before the eyes* C. VIRAGO ♂.
- g'''. *No red whatever on the head; sinciput blue; cheeks dull grey, slightly tinged with blue* C. ARUENSIS ♀.
- d. *Central tail-feathers not pointed; tail rather short; a concealed yellow spot on the inner web of the inner greater wing-coverts; breast orange in the male, greenish-orange in the female.*
- d'. *Sinciput blue.*
- d''. *Quills underneath with no distinct yellow bases* C. GUGLIELMI III.
- e''. *Quills underneath with very distinct pale yellow bases* C. SUAVISSIMUS.

e'. *Sinciput brown-black, tinged more or less with blue.*

f'. *Smaller; inner web of the quills edged with yellow* C. MELANOGENYS.

g'. *Larger; inner web of the quills entirely black.*

h'. *Wing mm. 90 (fide Hartert)* C. NIGRIFRONS.

i'. *Wing mm. 87 (fide Rothschild and Hartert)* C. MACILWRAITHI.

j'. *Wing mm. 82 (fide Rothschild and Hartert)* C. AMABILIS.

1. **Cyclopsittacus salvadorii** Oustalet. N. New Guinea, East of
Cyclopsittacus salvadorii Oustalet, Bull. Ann. Sc. France, 1880, p. 172; cf. Salvadori, Geelvink Bay,
 Cat. Birds Brit. Mus. Vol. 20, p. 89 (1891); id. Ibis, 1905, p. 536.
2. **Cyclopsittacus edwardsii** Oustalet (**Plate 2, Fig. 4**). Kaiser Wilhelm's Land
Cyclopsittacus edwardsii Oustalet, Ann. Sc. Nat., Zool. 1885, art. no 3, p. 1; cf. Salvadori,
 Cat. Birds Brit. Mus. Vol. 20, p. 90 (1891); Salvadori, Ibis, 1905, p. 537.
Cyclopsittacus purpuratus Madarasz, Termés. Füzetek, Vol. 25, p. 350, t. 17 (1902); cf.
 Rothschild & Hartert, Ann. Mus. Nat. Hung. 1903, p. 449 (= *C. edwardsii*).
3. **Cyclopsittacus desmaresti** (Garnot). N. W. New Guinea, near
Psittacus desmarestii Garnot, Voy. Coq. Zool. Vol. 1, p. 600, pl. 35 (1828). Dorey.
Cyclopsittacus desmarestii Bonaparte; cf. Salvadori, Cat. Birds Brit. Mus. Vol. 20, p. 91
 (1891); Salvadori, Ibis, 1905, p. 537.
4. **Cyclopsittacus occidentalis** Salvadori (**Plate 2, Fig. 2**). Salawati, Batanta and
Cyclopsittacus occidentalis Salvadori, Ann. Mus. Stor. Nat. Genova, Vol. 8, p. 910 (1875); N. W. coast of New
 cf. Salvadori, Cat. Birds Brit. Mus. Vol. 20, p. 92 (1891); Salvadori, Ibis, Guinea,
 1905, p. 537.
5. **Cyclopsittacus blythi** Wallace (**Plate 1, Fig. 4**). Mysol.
Cyclopsitta blythi Wallace, Proc. Zool. Soc. 1864, pp. 284, 294.
Cyclopsittacus blythi Salvadori, Cat. Birds Brit. Mus. Vol. 20, p. 93 (1891); idem, Ibis,
 1905, p. 538.
6. **Cyclopsittacus cervicalis** Salvadori et D'Albertis. S. E. New Guinea
Cyclopsittacus cervicalis Salvadori et D'Albertis, Ann. Mus. Stor. Nat. Genova, Vol. 7,
 p. 811 (1875); cf. Salvadori, Cat. Birds Brit. Mus. Vol. 20, p. 93 (1891); idem, Ibis,
 1905, p. 538.
7. **Cyclopsittacus coxeni** Gould. E. Australia.
Cyclopsitta coxeni Gould, Proc. Zool. Soc. Lond. 1867, p. 182.
Cyclopsittacus coxeni Reichenow; cf. Salvadori, Cat. Birds Brit. Mus. Vol. 20, p. 94
 (1891); idem, Ibis, 1905, p. 538.
8. **Cyclopsittacus maccoyi** Gould. (**Plate 1, Fig. 5**). N. E. Australia.
Cyclopsitta maccoyi Gould, Proc. Zool. Soc. Lond. 1875, p. 314.
Cyclopsittacus maccoyi Reichenow; cf. Salvadori, Cat. Birds Brit. Mus. Vol. 20, p. 95
 (1891); Salvadori, Ibis, 1905, p. 538.
Cyclopsitta macleayana Ramsay, cf. Hartert, Novit. Zool. Vol. 4, pl. 4, f. 1, 2 (heads ♀ ♂)
 (1899).
9. **Cyclopsittacus virago** Hartert. (**Plate 2, Fig. 5, 6**). Fergusson and Goode-
Cyclopsittacus virago Hartert, Novit. Zool. Vol. 2, p. 61 (1895); Vol. 3, p. 245 (1896); nough Isl. (D'Entre-
 Vol. 6, pl. 4, f. 3, 4 (♂ ♀ heads) (1899); Rothschild & Hartert, Novit. Zool. Vol. 8, casteaux Group).
 p. 76 (1901); Salvadori, Ibis, 1905, p. 538.
10. **Cyclopsittacus inseparabilis** Hartert (**Plate 2, Fig. 3**). Sudest Isl.
Cyclopsittacus inseparabilis Hartert, Bull. Brit. Orn. Cl. Vol. 8, p. 9 (1898); idem, Novit.
 Zool. Vol. 5, p. 530 (1898); Vol. 6, pl. 6, f. 7 (head) (1899); Salvadori, Ibis, 1905,
 p. 539.
11. **Cyclopsittacus diophthalmus** (Hombron & Jacquinot). (**Plate 2, Fig. 1**). W. New Guinea and W.
Psittacula diophthalma Hombron & Jacquinot, Ann. Sc. Nat. Vol. 16, p. 318 (1841). Papuan Isl.
Cyclopsittacus diophthalmus Salvadori, cf. Salvadori, Cat. Birds Brit. Mus. Vol. 20, p. 95
 (part.) (1891); idem, Ibis, 1905, p. 539.

12. **Cyclopsittacus coccineifrons** Sharpe. S. E. and N. E. New Guinea.
Cyclopsittacus coccineifrons Sharpe, Journ. Linn. Soc. Lond. Zool. Vol. 16, pp. 318, 426 (1882); Salvadori, Ibis, 1905, p. 540.
Cyclopsittacus diophthalmus part., Salvadori, Cat. Birds Brit. Mus. Vol. 20, p. 95 (1891).
Cyclopsittacus diophthalmus coccineifrons Rothschild & Hartert, Novit. Zool. Vol. 8, pp. 74, 76 (= *diophthalmus* ?) (1901).
Cyclopsittacus festeticchi Madarasz, Termés. Füzetek. Vol. 25, p. 350 (1902); cf. Rothschild & Hartert, Ann. Mus. Nat. Hung. 1903, p. 449 (= *diophthalmus*).
13. **Cyclopsittacus aruensis** (Schlegel). Aru Isl. and central New Guinea along the Fly River.
Psittacula diophthalma aruensis Schlegel, Mus. Pays-Bas. Psittaci. *Revue*, p. 33 (1874).
Cyclopsittacus aruensis Salvadori, cf. Salvadori, Cat. Birds Brit. Mus. Vol. 20, p. 97 (1891); idem, Ibis, 1905, p. 540.
Cyclopsitta aruensis Salvadori cf. Hartert, Novit. Zool. Vol. 6, pl. 4, f. 5, 6 (♂ ♀ heads) (1899).
14. **Cyclopsittacus guglielmi** III (Schlegel). Salawati and N.W. New Guinea.
Psittacula guglielmi III Schlegel, Nederl. Tijdschr. Dierk. Vol. 3, p. 252 (1866).
Cyclopsittacus guglielmi III Salvadori, cf. Salvadori, Cat. Birds Brit. Mus. Vol. 20, p. 98 (1891); idem, Ibis, 1905, p. 541.
15. **Cyclopsittacus suavisissimus** Scater. S. E. New Guinea.
Cyclopsitta suavisissima Scater, Proc. Zool. Soc. Lond. 1876, p. 520, pl. 54.
Cyclopsittacus suavisissimus Salvadori, cf. Salvadori, Cat. Birds Brit. Mus. Vol. 20, p. 98 (1891); idem, Ibis, 1905, p. 541.
? *Cyclopsittacus nanus* De Vis, Ann. Rep. Brit. New Guin. App. AA, p. 81 (1898); Rothschild & Hartert, Novit. Zool. Vol. 5, p. 511 (1898) (? = *suavisissimus*).
16. **Cyclopsittacus melanogenys** (Rosenberg) (Plate 2, Fig. 7). Aru Isl. and S. New Guinea along the Fly River.
Psittacula melanogenia « Rosenberg » Schlegel, Nederl. Tijdschr. Dierk. Vol. 3, p. 330 (1866).
Cyclopsittacus melanogenys Salvadori, cf. Salvadori, Cat. Birds Brit. Mus. Vol. 20, p. 99 (1891); idem, Ibis, 1905, p. 541.
17. **Cyclopsittacus nigrifrons** Reichenow. N. German New Guinea.
Cyclopsittacus nigrifrons Reichenow, Allg. deutsche orn. Ges. Berlin, Bericht 3, p. 6 (1891); Salvadori, Cat. Birds Brit. Mus. Vol. 20, p. 100 (1891); idem, Ibis, 1905, p. 542.
18. **Cyclopsittacus macilwraithi** Rothschild (Plate 2, Fig. 9). British New Guinea.
Cyclopsittacus macilwraithi Rothschild, Bull. Brit. Orn. Cl. No. 49, p. 21 (1897); idem, Novit. Zool. Vol. 5, p. 510, pl. 18, f. 2 (♀) (1898); Salvadori, Ibis, 1905, p. 542.
Cyclopsitta nigrifrons macilwraithi Rothschild & Hartert, Novit. Zool. Vol. 8, p. 75 (1901) (? = *nigrifrons*).
19. **Cyclopsittacus amabilis** Reichenow (Plate 2, Fig. 8). E. New Guinea.
Cyclopsittacus amabilis Reichenow, Journ. f. Orn. 1891, p. 432, (Bericht 7, p. 6); cf. Salvadori, Cat. Birds Brit. Mus. Vol. 20, p. 617 (1891); idem, Ibis, 1905, p. 542.
Cyclopsitta nigrifrons amabilis Rothschild & Hartert, Novit. Zool. Vol. 8, p. 75 (1901).

EXPLANATION OF PLATES

PLATE 1

- Fig. 1. *Neopsittacus iris* Temminck.
 — 2. — *rubripileus* Salvadori.
 — 3. — *musschenbroeki* Rosenberg.
 — 4. *Cyclopsittacus blythi* Wallace.
 — 5. — *maccoyi* Gould.
 — 6. *Neopsittacus pullicauda* Hartert.
 — 7-8. Tail of *Neopsittacus musschenbroeki* Rosenberg (upper and underside).
 — 9. Foot of *Neopsittacus musschenbroeki* Rosenberg.

PLATE 2

- Fig. 1. *Cyclopsittacus diophthalmus* Hombron & Jacquinot.
 — 2. — *occidentalis* Salvadori.
 — 3. — *inseparabilis* Hartert.
 — 4. — *edwardsii* Oustalet.
 — 5-6. — *virago* Hartert, ♂, ♀.
 — 7. — *melanogenys* Rosenberg.
 — 8. — *amabilis* Reichenow, ♂.
 — 9. — *macilwraithi* Rothschild.

Turin, 15th August 1908.

GENERA AVIUM

PSITTACI

FAM. CYCLOPSITTACIDÆ

1. NEOPSITTACUS IRIS. 2. N. RUBRIPILEUS. 3. N. MUSSCHENBRÆKI. 4. CYCLOPSITTACUS BLYTHI.
5. C. MACCOYI. 6. N. PULLICAUDA. 7. 8. TAIL OF N. MUSSCHENBRÆKI. 9. FOOT OF N. MUSSCHENBRÆKI.

GENERA AVIUM

PSITTACI

FAM. CYCLOPSITTACIDÆ

1. C. DIOPHTHALMUS. 2. C. OCCIDENTALIS. 3. C. INSEPARABILIS. 4. C. EDWARDSII ♂. 5. C. VIRAGO ♀.
6. C. VIRAGO ♂. 7. C. MELANOGENYS. 8. C. AMABILIS ♂. 9. C. MACILWRAITHI.

GENERA AVIUM

CONDUCTED BY

P. WYTSMAN

WITH CONTRIBUTIONS BY MESSRS. A. DUBOIS, E. HARTERT,
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PICARIÆ

FAM. BUCEROTIDÆ

by Dr ALPHONSE DUBOIS

WITH 3 COLOURED PLATES

1911

PRICE 15/10 (FR. 19.80)

FAM. BUCEROTIDÆ

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BY Dr. ALPHONSE DUBOIS

THE *Bucerotidae* or Hornbills are especially conspicuous by the large size of many of the species and by the frequently enormous casque which covers partly the bill of the greatest part of the species. They form consequently a family well characterized in the order of the *Passeres anisodactylae*.

What is especially surprising, is the great lightness of their skeleton; nearly all the bones are formed by pneumatic cells. In a great many of these birds, if not in all, the air can come as far as the skin, which adheres only weakly on the muscles, and the subcutaneous tissue contains some great pouches filled with air.

Characters. Bill large, stout, slightly curved, and more or less compressed; base of the culmen with a variously shaped casque, in some species of large size, while in others it is rudimentary or wanting; this casque is generally closed, hollow, and supported by bony tissue. Wings ample, covering more or less the base of the tail; under wing-coverts do not cover the basal parts of the quills. Tail more or less long and formed by ten feathers. Tarsus strong, short, shorter or about equal to the middle toe and claw (*Bucerotinae*), rarely long (*Bucoracinae*); middle toe united at base to the outward toe.

Margins of the eyelids furnished with strong lashes. Skeleton pneumatic. Palate desmognathous. Basipterygoide process absent.

Eggs white. Young hatched naked and helpless.

Habits and Reproduction. The Hornbills frequent the tropical forest-lands and all, except the *Bucorvus*, live essentially on the trees. Although they live in couples as a rule, they are sociable and frequently assemble in great or small numbers. Nearly all walk clumsily, but

they move with agility in the branches of the trees. They fly well, but noisily. The hearing and sight are well developed among these birds, and they are generally prudent, timorous and watchful.

Their food consists of fruits, herbaceous plants, insects, reptiles and other small vertebrates; some being really omnivorous.

The mode of reproduction of the Hornbills is no less uncommon than their aspect, and the unique custom of the males of inclosing the female in the hollow of a tree, firmly fastening her in by a wall of mud, and keeping her a close prisoner until the eggs are hatched, has no parallel in the customs of any other species of birds. The male is thus obliged to bring the food to his mate during the brooding-time.

Range. This family is confined to Africa, to tropical Asia, and to the Indian archipelago as far as the Philippine Islands.

Bibliography. Temminck, Planches coloriées (1820-39); Hemprich & Ehrenberg, Symbolae physicae, etc. (1828); Cuvier, Règne animal (1829); Lesson, Traité d'Ornithologie (1831); Rüppell, Neue Wirbelthiere zu der Fauna von Abyssinien (1835-40); G. R. Gray, Genera of Birds (1844-49); Bonaparte, Conspectus generum avium (1850); Conspectus volucrum anisodactylorum (1854); Cabanis & Heine, Museum Heineanum (1860); Schlegel, Museum des Pays-Bas (Buceros) (1862); von Heuglin, Ornithologie N.-O.-Afrika's (1871); Elliot, A Monograph of the Bucerotidae (1882); A. Dubois, Revue critique des Oiseaux de la famille des Bucerotidés (Bull. Mus. Hist. Nat. Belg. [1884]); Ogilvie-Grant, Catalogue of the Birds in the British Museum, Vol. 17 (1892); A. Dubois, Synopsis avium (1899-1904); A. Reichenow, Die Vögel Afrika's (1904); A. Dubois, Remarque sur l'Ornithologie de l'Etat Indépendant du Congo (Annales du Muséum du Congo [1905]).

Two subfamilies can be distinguished :

SUBFAM. A — BUCORACINÆ

Bill long, pointed, compressed and slightly curved; casque hollow, covers about the basal third of the culmen, open or closed anteriorly. Throat naked. Tarsus very long.

The *Bucoracinae* consist of a single genus.

SUBFAM. B. — BUCEROTINÆ

Bill very large, compressed and slightly curved; casque more or less large, rudimentary or wanting, always closed anteriorly. Tarsus short, shorter or about equal to the middle toe and claw; toes short.

The *Bucerotinae* are divided into sixteen genera.

A. BUCORACINÆ

GENUS BUCORVUS LESSON

Bucorvus Lesson, Traité d'Ornith. p. 259 (1831) (type : *B. abyssinicus*).

Synonyms : *Tragopan* Gray, List Gen. of Birds, p. 65 (1841) (type : *B. abyssinicus*); *Tmetoceros* Cabanis,

Wiegman. Arch. p. 345 (1847) (type : *B. abyssinicus*); *Bucorax*, Sundevall, Oefv. Vet.-Akad. Förh. Vol. 6, p. 161 (1849) (type : *B. abyssinicus*).

Characters. Bill long, compressed, slightly curved, terminating in a sharp point; casque large, extending from base of culmen for about one-third its length, and open or closed anteriorly. Throat naked. Wings ample, reaching to one-third the length of the tail. Tail long, ample, rounded. Tarsus very long, covered with scales; toes rather short; claws short, strong. Plumage black, except the primaries, which are white.

Geographical Distribution. Africa. Only two species and one variety are known.

KEY TO THE SPECIES

A. Casque open anteriorly; base of the upper mandible with a reddish plate.

1. Casque wide open in front; size large *B. ABYSSINICUS*.
2. Casque slightly open in front; size much smaller. *B. GUINEENSIS*.

B. Casque closed or scarcely open anteriorly; size large.

3. No reddish plate on the upper mandible *B. CAFFER*.

1. ***Bucorvus abyssinicus*** (Boddaert) (Plate 1, Figs. 1, 1a.)

North-eastern Africa :
Abyssinia, Sennaar,
Kordofan, Somali,
Zanguebar N.

Buceros abyssinicus Boddaert, Tabl. Pl. Enl. p. 48 (1783).
Buceros bræ Dumont, Dict. Sc. Nat. Vol. 6, p. 201 (1817).
Buceros carunculatus Wagler, Syst. Avium, Buceros, no. 6 (1827).
Bucorvus abyssinicus Lesson, Traité d'Ornith. p. 256 (1831); Elliot, Monogr. Bucerot. pl. 1 (1882); Dubois, Bull. Mus. Hist. Nat. Belg. p. 221 (1884).
Tragopan abyssinicus Gray, List Gen. of Birds, p. 65 (1841).
Bucorax abyssinicus Sundevall, Oefv. Vet.-Akad. Förh. Vol. 6, p. 161 (1849).
Tmetoceros abyssinicus Cabanis & Heine, Mus. Heinean. Vol. 2, p. 175 (1860).
Buceros carunculatus abyssinicus Schlegel, Mus. Pays-Bas (Buceros), p. 19 (1862).

2. ***Bucorvus abyssinicus* var. *guineensis*** (Schlegel).

West Africa, from the
12° N. and the Gold
coast to the Congo
and North Angola.

Buceros abyssinicus (part.) auct. plur. (nec Bodd.).
Buceros abyssinicus guineensis Schlegel, Mus. Pays-Bas (Buceros), p. 20 (1862).
Bucorvus pyrrhops Elliot, Ann. Mag. Nat. Hist. Vol. 20, p. 171 (1877); Monogr. Bucerot. pl. 2 (1882).
Bucorax guineensis Barboza du Bocage, Proc. Zool. Soc. Lond. p. 698 (1873); Bull. Soc. Zool. Fr. p. 375 (1877).
Bucorvus abyssinicus var. *guineensis*, Dubois, Bull. Mus. Hist. Nat. Belg. Vol. 3, p. 221 (1884).
Bucorax abyssinicus (part.) Ogilvie-Grant, Cat. Birds Brit. Mus. Vol. 17, p. 350 (1892).

3. ***Bucorvus caffer*** (Verreaux).

South Africa, from the
Cap to the Zambezia
and Benguela.

Buceros leadbeateri (?) Vigors et *B. caffer* Verreaux, in Hartlaub, Ornith. West-Afr. p. 166 (1857).
Buceros abyssinicus (part.) auct. plur. (nec Bodd.).
Buceros carunculatus cafer Schlegel, Mus. Pays-Bas (Buceros), p. 20 (1862).
Bucorvus abyssinicus Layard, Birds S. Afr. p. 228 (1867).
Tmetoceros abyssinicus (part.) Finsch & Hartlaub, Vög. Ost-Afr. p. 480 (1870); Heuglin, Ornith. N.-O.-Afr. Vol. 1, p. 731 (1871).
Bucorvus leadbeateri Gray, Hand-list of Birds, Vol. 2, p. 131 (1870).
Bucorax caffer Barboza du Bocage, Proc. Zool. Soc. Lond. p. 698 (1873).
Bucorvus cafer Elliot, Monogr. Bucerot. pl. 3 (1882).
Bucorvus abyssinicus var. *cafer* Dubois, Bull. Mus. Hist. Nat. Belg. Vol. 3, p. 222 (1884).

B. BUCEROTINÆ

KEY TO THE GENERA OF THE BUCEROTINÆ

A. Anterior part of casque solid; neck, throat and a stripe down the centre of the back naked.

1. *Size large; middle tail-feathers very long.* 1. Genus RHINOPLAX.

B. Casque hollow; upper part of the neck and middle of the back feathered.

2. *Casque elevated in front and rounded off behind, nearly half the length of bill; throat naked. Size large.* 2. Genus CRANORRHINUS.
3. *Casque very large, rounded on upper edge, the anterior point either nearly straight or recurved; sides of throat naked. Size very large.* 3. Genus BUCEROS.
4. *Casque very broad, subquadrate, covering basal half of culmen, flat, concave anteriorly, with the corners turned slightly upwards into miniature horns projecting forward; sides of throat naked. Size large.* 4. Genus DICHOCEROS.
5. *Casque flat, widest posteriorly, rather pointed anteriorly; sides of throat naked. Size large.* 5. Genus HYDROCORAX.
6. *Casque large, subcrescentic, somewhat swollen posteriorly, compressed and elevated anteriorly. Middle of chin and throat feathered. Size more or less large.* 6. Genus ANTHRACOCEROS.
7. *Casque large and swollen; a naked wattle at the base of the throat, which is also naked. Medium sized.* 7. Genus CERATOGYMNA.
8. *Casque of the males, more or less large, elevated and compressed; females without casque, but the base of both mandibles deeply grooved transversally. Crest well developed. Chin and throat feathered. Size more or less large.* 8. Genus BYCANISTES.
9. *No casque. Base of culmen covered with a series of overlapping plates. Throat naked. Size large.* 9. Genus RHYTHOCEROS.
10. *Casque rudimentary; base of the upper mandible transversally grooved. Chin and throat naked. Size very large.* 10. Genus ACEROS.
11. *Casque moderate or small, keel-shaped, extending over half the culmen, highest at its anterior end, whence it inclines gradually backward to the base of the bill. Throat naked or feathered. Size moderate.* 11. Genus ANORRHINUS.
12. *Casque moderately elevated, covering the greater part of the culmen. Tail very long. Crest of long soft feathers. Size middling.* 12. Genus ORTHOLOPHUS.
13. *Casque moderate, upright, compressed; basal half of bill transversally grooved. Chin and throat naked. Size middling or small.* 13. Genus PENELOPIDES.
14. *Casque low, compressed, and indented by three deep grooves for its entire length. Size small.* 14. Genus RHABDOTORRHINUS.
15. *Bill curved, with a small keel-shaped casque, which is rarely absent (L. nasutus). Size small.* 15. Genus LOPHOCEROS.
16. *No casque; bill long, slender, much curved, compressed. Size small.* 16. Genus ALOPHIUS.

1. GENUS RHINOPLAX GLOGER

Rhinoplax Gloger, Hand- u. Hilfsb. p. 335 (1842) (type : *R. galeatus*).

Synonyms : *Cranoceros* Reichenbach, Syst. Avium, pl. 1 (1849) (type : *Buceros vigil*); *Buceroturus* Bonaparte, Consp. Gen. Avium, Vol. 1, p. 89 (1850) (type : *B. galeatus*).

Characters. Bill moderate, sloping to a sharp point; anterior wall of casque solid, cylindrical, extending from the middle of the eye and ending abruptly in front at right angles to the middle of the culmen. Skin round the eye, throat, neck and a stripe down the centre of the back naked. Wings long, reaching a short distance beyond the upper tail-coverts. Centre pair of tail-feathers very long.

Geographical Distribution. Malay Peninsula, Sumatra, Borneo.

1. *Rhinoplax vigil* (Forster). (Plate 3, Fig. 5.)

South Tenasserim, Malacca, Sumatra, Borneo.

Buceros vigil Forster, Ind. Zool. p. 40 (1781).

Buceros scutatus Boddaert, Tabl. Pl. Enl. p. 55 (1783).

Buceros galeatus Gmelin, Syst. Nat. Vol. 1, p. 360 (1788).

Rhinoplax galeatus Gloger, Hand- u. Hilfsb. p. 335 (1842).

Buceroturus galeatus Bonaparte, Consp. Gen. Avium, Vol. 1, p. 89 (1850).

Rhinoplax scutatus Horsfield & Moore, Cat. Birds Mus. E. Ind. Co. Vol. 2, p. 581 (1856).

Rhinoplax vigil Elliot, Monogr. Bucerot. (text) pl. 10 (1882).

2. GENUS CRANORRHINUS CABANIS & HEINE

Cranorrhinus Cabanis & Heine, Mus. Heinean. Vol. 2, p. 173 (1860) (type : *Buceros cassidix*).

Synonym : *Cassidix*, Bonaparte, Consp. Gen. Avium, Vol. 1, p. 90 (1850).

Characters. Bill large, curved and compressed; base of both mandibles, or the lower only, transversally grooved; casque elevated in front and rounded off behind, covering nearly the basal half of the culmen, subcylindrical and smooth, or somewhat compressed and folded. Throat naked. Crest more or less developed. Wings ample. Tail long, rounded. Head coloured in the males, black in the females. Four species are known.

Geographical Distribution. Malacca, Sumatra, Borneo, Celebes and Philippine Islands.

KEY TO THE SPECIES

A. Base of both mandibles grooved.

1. Casque large, deep red. Tail white C. CASSIDIX.

B. Base of the lower mandible grooved only.

2. Tail with basal third black, rest buffy-white C. CORRUGATUS.

3. Tail white, with a terminal black band C. LEUCOCEPHALUS.

4. Tail whitish or cinnamon, apical portion and basal third greenish black C. WALDENI.

1. *Cranorrhinus cassidix* (Temminck). (Plate 2, Fig. 3.)

Celebes.

Buceros cassidix Temminck, Pl. Col. Vol. 2, p. 66, pl. 210 (1823).

Calao cassidix Bonaparte, Consp. Gen. Avium, Vol. 1, p. 90 (1850).

Cranorrhinus cassidix Cabanis & Heine, Mus. Heinean. Vol. 2, p. 173 (1860); Elliot, Monogr. Bucerot. pl. 10 (1882).
Buceros (*Cranorrhinus*) *cassidix* Gray, Hand-list of Birds, Vol. 2, p. 129 (1870); Dubois, Bull. Mus. Hist. Nat. Belg. Vol. 3, p. 192 (1884).

2. ***Cranorrhinus leucocephalus* (Vieillot).**

Mindanao, Camiguin
 (Philippine Islands).

Buceros leucocephalus Vieillot, Nouv. Dict. Hist. Nat. Vol. 4, p. 592 (1816).
Buceros sulcatus Temminck, Pl. Col. Vol. 2, p. 89, pl. 69 (1823).
Tockus sulcatus Bonaparte, Consp. Gen. Avium, Vol. 1, p. 91 (1850).
Calao sulcatus Bonaparte, Consp. Volucr. Anisod. p. 3 (1854).
Buceros (*Cranorrhinus*) *sulcatus* Gray, Hand-list of Birds, Vol. 2, p. 129 (1870).
Cranorrhinus leucocephalus Walden, Trans. Zool. Soc. Lond. p. 165, pl. 27 (1875); Elliot, Monogr. Bucerot. pl. 19 (1882).
Buceros (*Cranorrhinus*) *leucocephalus*, Dubois, Bull. Mus. Hist. Nat. Vol. 3, p. 193 (1884).

3. ***Cranorrhinus corrugatus* (Temminck).**

Malacca, Sumatra, Borneo.

Buceros corrugatus Temminck, Pl. Col. Vol. 2, p. 85, pl. 531 (1832) (Mas.).
Buceros gracilis Temminck, ibidem, p. 87, pl. 535 (1832) (Fem.).
Buceros rugosus Beugbie, Ann. Mag. Nat. Hist. Vol. 17, p. 404 (1846).
Calao (*Cassidix*) *corrugatus* Bonaparte, Consp. Gen. Avium, Vol. 1, p. 90 (1850).
Rhyticeros (*Cassidix*) *corrugatus* Bonaparte, Consp. Volucr. Anisod. p. 3 (1854).
Hydrocissa migratoria Maingay, Proc. Asiat. Soc. Beng. p. 196 (1868).
Cranorrhinus corrugatus Walden, Trans. Zool. Soc. Lond. Vol. 8, p. 51 (1872); Elliot, Monogr. Bucerot. pl. 17 (1882).
Buceros (*Cranorrhinus*) *corrugatus* Dubois, Bull. Mus. Hist. Nat. Belg. Vol. 3, p. 192 (1884).

4. ***Cranorrhinus waldeni* Sharpe.**

Guimaras, Panay (Philippine Islands).

Cranorrhinus waldeni Sharpe, Trans. Linn. Soc. Lond. (2), Vol. 1, pp. 322, 351 (1877); Elliot, Monogr. Bucerot. pl. 28 (1882).
Buceros (*Cranorrhinus*) *waldeni* Dubois, Bull. Mus. Hist. Nat. Belg. Vol. 3, p. 193 (1884).

3. GENUS BUCEROS LINNÆUS

Buceros Linnaeus, Syst. Nat. Vol. 1, p. 153 (1766) (type : *B. rhinoceros*).

Synonym : *Meniceros* Gloger, Hand- u. Hilfsb. p. 335 (1842) (type : *B. rhinoceros*).

Characters. Bill large, curved, terminating in a sharp point; casque very large, two-thirds the length of the culmen, elevated, rounded on the upper edge, straight or much curved upward anteriorly; base of the casque and of both mandibles black only in the males. Nostrils small, basal, lateral, and hidden. Sides of throat naked. Crest moderate. Tail long, rounded, white with a broad subterminal black band. Size very large.

Geographical Distribution. Malacca, Sumatra, Borneo, Java.

KEY TO THE SPECIES

1. *Casque curved upwards anteriorly* B. RHINOCEROS.
2. *Casque nearly straight, not curved upwards anteriorly* B. SILVESTRIS.

1. ***Buceros rhinoceros* Linnaeus (Plate 1, Fig. 2.)**

Malacca, Sumatra, Borneo.

Buceros rhinoceros Linnaeus, Syst. Nat. Vol. 1, p. 153 (1766).
Buceros rhinoceros : a. *sumatranus*, b. *borneensis*, c. *indica* Müller & Schlegel, Verh. Ges. Ned. Ind. p. 22 (1839-44).
Buceros rhinoceroïdes et *sublunatus* (Temminck) Bonaparte, Consp. Gen. Avium, Vol. 1, p. 89, 90 (1850).

2. *Buceros rhinoceros* var. *silvestris* (Vieillot).

Java.

? *Buceros africanus* Gmelin, Syst. Nat. Vol. 1, p. 350 (1788).*Buceros silvestris* Vieillot, Nouv. Dict. Hist. Nat. Vol. 4, p. 592 (1816); Elliot, Monogr. Bucerot. pl. 5 (1882).*Buceros diadematus* Dumont, Dict. Sc. Nat. Vol. 4, p. 203 (1817).*Buceros niger* Merrem, Ersch. u. Grub., Encycl. Vol. 13, p. 286 (1824).*Buceros lunatus* Temminck, Pl. Col. Vol. 2, p. 63, pl. 546 (1834).*Buceros rhinoceros javanicus* Müller & Schlegel, Verh. Ges. Ned. Ind. p. 22 (1839-44).*Buceros rhinoceros lunatus* Schlegel, Mus. Pays-Bas (Buceros), p. 5 (1862).*Buceros rhinoceros* var. *silvestris* Dubois, Bull. Mus. Hist. Nat. Belg. Vol. 3, p. 194 (1884).

4. GENUS DICHOCEROS GLOGER

Dichoceros Gloger, Hand- u. Hilfsb. p. 335 (1842) (type : *Buceros cavatus*).Synonym : *Homrains* Bonaparte, Consp. Volucr. Anisod. p. 2 (1854) (type : *Buceros bicornis*).

Characters. Bill very large, stout, curved and pointed at tip; casque very broad, sub-quadrate, covering about the basal half of the culmen, flat, convex behind, concave in front, and rising on both sides into a square corner, which turns slightly upwards into miniature horns projecting forward. Skin around eyes and sides of throat naked. Wings ample. Tail long, broad, rounded, with a broad sub-terminal black band. Tarsi short, stout. Size large.

Geographical Distribution. Only one species, inhabiting South-eastern Asia and Sumatra.

1. *Dichoceros bicornis* (Linnaeus). (Plate 1, Figs. 3, 3a.)Indo-Chinese countries,
Malacca, Sumatra.*Buceros bicornis* Linnaeus, Syst. Nat. Vol. 1, p. 153 (1766).*Buceros cavatus*, Shaw, Gen. Zool. Vol. 8, p. 18 (1811); Gould, Cent. Birds, p. 44, pl. (1832).*Buceros cristatus* Vieillot, Nouv. Dict. Hist. Nat. Vol. 4, p. 591 (1816).*Buceros homrai* Hodgson, Journ. Asiat. Soc. Beng. p. 251 (1832).*Dichoceros cavatus* Gloger, Hand- u. Hilfsb. p. 335 (1842).*Homrains bicornis* Bonaparte, Consp. Volucr. Anisod. p. 2 (1854).*Dichoceros bicornis* Cabanis & Heine, Mus. Heinean. Vol. 2, p. 173 (1860); Elliot, Monogr. Bucerot. pl. 6 (1882).*Dichoceros homrai* Hume, Nests and Eggs Ind. Birds, p. 111 (1873).*Buceros* (*Dichoceros*) *bicornis* Dubois, Bull. Mus. Hist. Nat. Belg. Vol. 3, p. 195 (1884).

5. GENUS HYDROCORAX BRISSON

Hydrocorax Brisson, Ornith. Vol. 4, p. 565 (1760) (type : *Buceros hydrocorax*).Synonym : *Platyceros* Cabanis & Heine, Mus. Heinean. Vol. 2, p. 170 (1860) (type : *Buceros hydrocorax*).

Characters. Bill large, strong, pointed, much curved towards the tip; casque large, flat, extending two-thirds the length of the culmen, wide at the posterior end, rather pointed anteriorly. Skin around eyes and sides of the throat naked. Wings ample, rather long. Tail long and rounded, white stained with buff. Crest moderate.

Geographical Distribution. Philippine Islands.

KEY TO THE SPECIES

A. Anterior part of casque raised above the culmen.

1. Bill and casque entirely brick-red II. PLANICORNIS.
 2. Anterior half of bill yellowish-white. II. MINDANENSIS.

B. Anterior part of casque not raised above the culmen.

3. Throat white III. SEMIGALEATUS.

1. **Hydrocorax planicornis** (Merrem). (Plate I, Fig. 4.)

Luzon, Marinduque
 Philippine Islands.

Buceros hydrocorax Linnæus, Syst. Nat. Vol. 1, p. 153 (1766).

Buceros bicornis var. Shaw, Gen. Zool. Vol. 8, p. 17 (1811).

Buceros planicornis, Merrem, Ersch. u. Grub. Encycl. Vol. 13, p. 287 (1824).

Buceros platyrhynchus Pearson, Journ. Asiat. Soc. Beng. p. 652 (1841).

Hydrocorax planicornis Bonaparte, Consp. Volucr. Anisod. p. 2 (1854); Elliot, Monogr.

Bucerot. pl. 7 (1882); Dubois, Syn. Avium, Vol. 1, p. 100 (1899).

Platyceros hydrocorax, Cabanis & Heine, Mus. Heinean. Vol. 2, p. 174 (1860).

Hydrocorax hydrocorax, Ogilvie-Grant, Cat. Birds Brit. Mus. Vol. 17, p. 358 (1892).

2. **Hydrocorax mindanensis** (Tweeddale).

Mindanao, Basilan (Phi-
 lippine Islands).

Buceros mindanensis Tweeddale, Proc. Zool. Soc. Lond. pp. 543, 823 (1878); Slater,
 Chall. p. 15, pl. 3 (1880).

Hydrocorax mindanensis Elliot, Monogr. Bucerot. pl. 8 (1882); Ogilvie-Grant, Cat.
 Birds Brit. Mus. Vol. 17, p. 359 (1892).

Buceros hydrocorax var. *mindanensis* Dubois, Bull. Mus. Hist. Nat. Belg. Vol. 3, p. 196
 (1884).

Hydrocorax planicornis var. *mindanensis* Dubois, Syn. Avium, Vol. 1, p. 100 (1899).

3. **Hydrocorax semigaleatus** (Tweeddale).

Samar, Panaon, Leyte
 (Philippine Islands).

Buceros semigaleatus Tweeddale, Proc. Zool. Soc. Lond. pp. 279, 341, 379 (1878).

Hydrocorax semigaleatus Elliot, Monogr. Bucerot. pl. 9 (1882); Dubois, Syn. Avium,
 Vol. 1, p. 100 (1899).

Buceros hydrocorax var. *semigaleatus* Dubois, Bull. Mus. Hist. Nat. Belg. Vol. 3, p. 196 (1884).

6. GENUS ANTHRACOCEROS REICHENBACH

Anthracoceros Reichenbach, Syst. Avium, Pt. 49 (1849) (type : *Buceros malabaricus*).

Synonyms : *Hydrocissa* Bonaparte, Consp. Gen. Avium, Vol. 1, p. 90 (1850) (type : *Buceros monoceros*); *Limnophalus* Elliot, Monogr. Bucerot. texte of pl. 25 (1882) (type : *Buceros montani*); *Gymnolaemus* Ogilvie-Grant, Cat. Birds Brit. Mus. Vol. 17, p. 370 (1892) (type : *Anthracoceros marchii*).

Characters. Bill large, compressed, abruptly curved at tip; casque large, sub-crescentic, somewhat swollen posteriorly, compressed and elevated anteriorly, extending over the basal three-fifths of, and forming an obtuse angle with the culmen. Skin around eyes and sides of throat naked, latter rarely entirely naked. Crest and wings moderate.

Geographical Distribution. South and South-eastern Asia, Java, Sumatra, Borneo and Sooloo.

KEY TO THE SPECIES

1. Middle tail-feathers black or black tipped with white.

A. Outer tail-feathers white.

a. Casque with a great black patch extending over the greater part.

1. Casque black posteriorly (♂), or not black posteriorly (♀) A. CORONATUS.

a'. Casque with a black patch anteriorly.

2. Bill black at the extremity (♀), or white with a black patch at the base of the mandibles (♂) A. CONVEXUS.

B. Outer tail-feathers black tipped with white.

b. Breast and belly black.

3. Eyebrow white (♂), or blackish-grey (♀) A. MALAYANUS.

c. Posterior end of casque and mandibles black (♂), or anterior part of bill black, with a reddish-brown patch in front of the black at the base of the lower mandible (♀).

4. Size larger. * A. AFFINIS.
5. Size smaller A. MALABARICUS.

11. Tail pure white.

6. Bill and casque blackish. A. MONTANI.
7. Bill and casque yellowish-white, with a black patch at the base of the lower mandible. A. MARCHII

1. **Anthracoceros coronatus** (Boddaert). (Plate 1, Figs. 5, 5a.)

Indian Peninsula and Ceylon.

- Buceros coronatus* Boddaert, Tabl. Pl. Enl. p. 53 (1783).
Buceros pica Scopoli, Faun. et Flor. Insub. p. 87 (1786).
Buceros malabaricus var. Latham, Ind. Ornith. Vol. 1, p. 144 (1790), et auct. plur. (nec Gmelin).
Buceros dschindschicus Latham & Davis, Faun. Ind. p. 6 (1795).
Buceros violaceus Shaw, Gen. Zool. Vol. 8, p. 19 (1811).
Buceros monoceros Shaw, ibidem, p. 8 (1811).
Anthracoceros coronatus Reichenbach, Syst. Avium, pl. 49 (1850); Elliot, Monogr. Bucerot. pl. 11 (1882).
Hydrocissa pica, monoceros et violaceus Bonaparte, Consp. Gen. Avium, Vol. 1, p. 90 (1850).
Anorrhinus violaceus Bonaparte, Consp. Volucr. Anisod. p. 2 (1854).
Hydrocissa coronata Horsfield & Moore, Cat. Birds Mus. E. Ind. Co. Vol. 2, p. 588 (1856-1858).

2. **Anthracoceros convexus** (Temminck).

Malacca, Sumatra, Java and Borneo.

- Buceros albirostris* Horsfield (nec Shaw), Trans. Linn. Soc. Lond. Vol. 13, p. 175 (1822).
Buceros convexus Temminck, Pl. Col. Vol. 2, p. 82, pl. 530 (1832).
Buceros violaceus Hay (nec Shaw), Madr. Journ. Vol. 13, p. 148 (1844).
Buceros intermedius Blyth, Journ. Asiat. Soc. Beng. Vol. 16, p. 994 (1847).
Hydrocissa convexa Horsfield & Moore, Cat. Birds Mus. E. Ind. Co. Vol. 2, p. 591 (1856-58).
Anthracoceros convexus Sharpe, Proc. Zool. Soc. Lond. p. 329 (1878); Elliot, Monogr. Bucerot. pl. 12 (1882).
Hydrocissa albirostris Nicholson (nec Shaw), The Ibis, p. 56 (1882).

3. **Anthracoceros malabaricus** (Gmelin).

Burma, Tenasserim, Siam, Cochin-China and Malacca.

- Buceros malabaricus* Gmelin, Syst. Nat. Vol. 1, p. 359 (1788).
Buceros albirostris Shaw, Gen. Zool. Vol. 8, p. 13 (1811).
Buceros leucogaster Blyth, Journ. Asiat. Soc. Beng. Vol. 10, p. 922 (1843).
Buceros nigrallbus Hodgson, in Gray, Zool. Misc. p. 85 (1844).
Hydrocissa albirostris Horsfield & Moore, Cat. Birds Mus. E. Ind. Co. Vol. 2, p. 589 (1856-58).
Hydrocissa coronata Godwin-Austen, Journ. Asiat. Soc. Beng. Vol. 14, p. 95 (1875).
Anthracoceros fraterculus Elliot, Ann. Mag. Nat. Hist. (5), Vol. 1, p. 85 (1878); Monogr. Bucerot. pl. 14 (1882).
Anthracoceros malabaricus Elliot, Monogr. Bucerot. pl. 13 (1882).
Anthracoceros albirostris Oates, Birds Brit. Burma, Vol. 2, p. 90 (1883).

4. **Anthracoceros malabaricus var. affinis** (Hutton).

Himalaya, India.

- Buceros malabaricus et albirostris* (part.) auct. plur.
Buceros affinis Hutton, Journ. Asiat. Soc. Beng. Vol. 18, p. 803 (1849).
Hydrocissa affinis Jerdon, Birds Ind. Vol. 1, p. 247 (1862).
Anthracoceros affinis Ogilvie-Grant, Cat. Birds Brit. Mus. Vol. 17, p. 366 (1892).
Anthracoceros malabaricus var. affinis Dubois, Syn. Avium, Vol. 1, p. 101 (1899).

5. **Anthracoceros malayanus** (Raffles).

Malacca, Sumatra, Borneo

- Buceros malayanus* Raffles, Trans. Linn. Soc. Lond. Vol. 13, p. 202 (1822).
Buceros anthracinus Temminck, Pl. Col. Vol. 2, p. 80, pl. 592 (1832).
Buceros antarcticus Swainson, Classif. Birds, Vol. 2, p. 206 (1837).
Buceros bicolor Eyton, Proc. Zool. Soc. Lond. p. 104 (1839).
Buceros elliotti Hay, Madr. Journ. Vol. 13, Pt. 2, p. 152 (1844).
Buceros nigrirostris Blyth, Journ. Asiat. Soc. Beng. Vol. 16, p. 995 (1847).
Hydrocissa malayana Bonaparte, Consp. Gen. Avium, Vol. 1, p. 90 (1850).
Hydrocissa bicolor Bonaparte, Consp. Volucr. Anisod. p. 2 (1854).
Hydrocissa nigrirostris Horsfield & Moore, Cat. Birds Mus. E. Ind. Co. Vol. 2, p. 593 (1856-58).
Anthracoceros malayanus Elliot, Monogr. Bucerot. pl. 15 (1882).

6. **Anthracoceros montani** (Oustalet).

Sooloo Islands

- Buceros montani* Oustalet, Bull. hebdom. Assoc. Sc. Fr. p. 205 (1880).
Limnophalus montani Elliot, Monogr. Bucerot. pl. 25 (1882).
Anthracoceros montani Ogilvie-Grant, Cat. Birds Brit. Mus. Vol. 17, p. 370 (1892); Dubois, Syn. Avium, Vol. 1, p. 101 (1899).

7. **Anthracoceros marchii** Oustalet.

Palawan.

- Anthracoceros marchii* Oustalet, Le Naturaliste, p. 108 (1885, 20th April); Dubois, Syn. Avium, Vol. 1, p. 101 (1899).
Anthracoceros lemprieri Sharpe, Proc. Zool. Soc. Lond. p. 446, pl. 26 (1885, 5th May).
Gymnolaemus marchii Ogilvie-Grant, Cat. Birds Brit. Mus. Vol. 17, p. 370 (1892).

7. GENUS CERATOGYMNA BONAPARTE

Ceratogymna Bonaparte, Consp. Volucr. Anisod. p. 2 (1854) (type : *Buceros elatus*).

Synonyms : *Tmetoceros* Bonaparte (nec Cabanis) loc. cit. (type : *Buceros atratus*); *Sphagolobus* Cabanis & Heine, Mus. Heinean. Vol. 2, p. 171 (1860) (type : *Buceros atratus*).

Characters. Bill large, deep, and somewhat curved, especially at the apical third; casque large, elevated, subcylindrical, swollen laterally and rounded on top. A naked wattle at the base of the throat, which latter is also more or less naked. Head black in the males, rufous in the female, and covered by a long bushy crest. Wings rather long. Tail long, slightly rounded.

Geographical Distribution. West Africa.

KEY TO THE SPECIES

1. Lateral tail-feathers white C. ELATA.
 2. Lateral tail-feathers black, with white ends C. ATRATA.

1. **Ceratogymna elata** (Temminck). (Plate 2, Fig. 4.)

West Africa, from Sierra Leone to Gaboon.

- Buceros elatus* Temminck, Pl. Col. Vol. 2, p. 75, pl. 521, f. 1 (1831).
Buceros cultratus Sundevall, Oefv. Vet.-Akad. Forh. p. 160 (1849).
Buceros elatus Bonaparte, Consp. Gen. Avium, Vol. 1, p. 89 (1850).
Ceratogymna elata Bonaparte, Consp. Volucr. Anisod. p. 2 (1854); Elliot, Monogr. Bucerot. pl. 23 (1882).
Tmetoceros cultratus Bonaparte, Consp. Volucr. Anisod. p. 2 (1854).

2. **Ceratogymna atrata** (Temminck).

North-western tropical Africa, from Ashantee to Loango, Fernando Po, Belgian Congo (Ituri, Umangi, Mayumbe).

- Buceros atratus* Temminck, Pl. Col. Vol. 2, p. 69, pl. 558 (1834).
Buceros atratus Bonaparte, Consp. Gen. Avium, Vol. 1, p. 89 (1850).
Tmetoceros atratus Bonaparte, Consp. Volucr. Anisod. p. 12 (1854).
Buceros poensis Fraser, Ann. Mag. Nat. Hist. p. 136 (1855).
Sphagolobus atratus Cabanis & Heine, Mus. Heinean. Vol. 2, p. 171 (1860); Elliot, Monogr. Bucerot. pl. 24 (1882).
Ceratogymna atrata Shelley, The Ibis, p. 51 (1888); Dubois, Syn. Avium, p. 101 (1899).

8. GENUS BYCANISTES CABANIS & HEINE

Bycanistes Cabanis & Heine, Mus. Heinean. Vol. 2, p. 171 (1860) (type : *Buceros buccinator*).

Synonym : *Pholidophalus* Elliot, Monogr. Bucerot. pl. 32 (1882) (type : *Buceros fistulator* ♀).

Characters. Bill more or less large, and compressed; casque more or less large in the males, occasionally longer than bill, compressed, longitudinally or transversally furrowed, usually covering the basal three-quarters of the culmen; in the females the casque is quite rudimentary, and the bill has several irregular deep transverse grooves. Crest large, composed of long soft feathers. Tail subquadrate. Plumage black glossed with dark-green, and white. Size more or less large.

Geographical Distribution. Africa, south of the Sahara.

KEY TO THE SPECIES

A. Breast and belly white.

1. Outer tail-feathers black, tipped with white, casque blackish B. BUCCINATOR.
2. Secondaries and outer tail-feathers pure white ¹), casque yellowish. B. LEUCOPYGUS.
3. Secondaries and outer tail-feathers black with white ends (or nearly so), size smaller B. FISTULATOR.

B. Breast black, belly white.

- a. Feathers on sides of head with grey ends.
- b. Ends of secondaries black, sometimes slightly margined with white.
 4. Outer tail feathers black, with the basal portion and the terminal quarter white B. CRISTATUS.
- c. Greater wing-coverts with white ends.
 5. Tail white, a black band at base, and the middle tail-feathers uniformly black B. SUBCYLINDRICUS.
 6. Tail black, the third end white. B. ALOYSII.
- d. Feathers on sides of head black, without grey ends.
- e. Tail white, with a wide sub-basal black band.
 7. Thighs black in front B. CYLINDRICUS.
 8. Thighs pure white B. ALBOTIBIALIS.

1. *Bycanistes buccinator* (Temminck). (Plate 3, Fig. 2.)

Buceros buccinator Temminck, Pl. Col. Vol. 2, p. 93, pl. 284 (1824).

Bucorvus buccinator Bonaparte, Consp. Gen. Avium, Vol. 1, p. 89 (1850).

Tmetoceros buccinator Bonaparte, Consp. Volucr. Anisod. p. 2 (1854).

Bycanistes buccinator Cabanis & Heine, Mus. Heinean. Vol. 2, p. 171 (1860); Elliot,

Monogr. Bucerot. pl. 27 (1882); Dubois, Syn. Avium, Vol. 1, p. 101 (1899).

South Africa, from Zambesi to the Cape Colony, and northwards to Angola.

2. *Bycanistes leucopygus* (Giebel).

Buceros leucopygus Giebel, Zeitschr. Ges. Naturw. Vol. 47, p. 73, ♀ (1876).

Buceros (Bycanistes) leucopygius Dubois, Bull. Mus. Hist. Nat. Belg. Vol. 3, p. 202, pl. 10,

f. 1 (♂ juv.) (1884).

Buceros fistulator var. Dubois, ibidem, pl. 11 (♀) (1884).

Buceros sharpii (nec Elliot) Sharpe, Journ. Linn. Soc. Lond. Zool. p. 438 (1884);

Ogilvie-Grant (part.), Cat. Birds Brit. Mus. Vol. 17, p. 422 (1892); Reichenow,

Journ. f. Ornith. p. 94 (1894); Vög. Afr. Vol. 2, p. 245 (1903).

Nijam-Nijam, Belgian Congo, Gaboon.

¹ The primaries have occasionally white ends.

Bycanistes leucopygius Ogilvie-Grant, Cat. Birds Brit. Mus. Vol. 17, p. 418 (1892); Shelley, Birds Afr. Vol. 1, p. 113 (1896); Dubois, Syn. Avium, Vol. 1, p. 101 (1899); Ann. Mus. Congo, Zool. (4), Tome 1, p. 6, pl. 4 (♂, ♀) (1905); Proc. fourth Intern. Ornith. Congr. (Lond. 1905), p. 519 (1907); Bull. Soc. Zool. Fr. p. 133 (1909).
Buceros vivi Ogilvie-Grant, Cat. Birds Brit. Mus. Vol. 17, p. 423 (1892) (in synonym, nec Dubois).

3. **Bycanistes fistulator** (Cassin). (Plate 3, Figs. 3, 3a.)

West Africa, from Senegambia to Angola.

Buceros fistulator Cassin, Proc. Acad. Nat. Sc. Philad. Vol. 5, p. 68 (1852).
Tmetoceros fistulator Bonaparte, Consp. Volucr. Anisod. p. 2 (1854).
Buceros leucostigma (Temminck) Schlegel, Mus. Pays-Bas (Buceros), p. 16 (1862).
Buceros (*Bycanistes*) *fistulator* Gray, Hand-list of Birds, Vol. 2, p. 131 (1870).
Buceros sharpii Elliot, The Ibis, pp. 177, 179 (♀) (1873).
Bycanistes sharpei Bouvier, Cat. p. 28 (1875).
Pholidophalus fistulator et sharpii Elliot, Monogr. Bucerot. pls. 32, 33 (1882); Dubois, Syn. Avium, Vol. 1, p. 101 (1899).
Bycanistes fistulator Ogilvie-Grant, Cat. Birds Brit. Mus. Vol. 17, p. 422 (1892).

4. **Bycanistes cristatus** (Rüppell).

East Africa, from Abyssinia to Zambesi.

Buceros cristatus Rüppell, Fauna Abyss. Vög. p. 3, pl. 1 (1835).
Buceros cristatus Bonaparte, Consp. Gen. Avium, Vol. 1, p. 89 (1850).
Tmetoceros cristatus Bonaparte, Consp. Volucr. Anisod. p. 2 (1854).
Bycanistes cristatus Cabanis & Heine, Mus. Heinean. Vol. 2, p. 72 (1860); Elliot, Monogr. Bucerot. pl. 26 (1882).

5. **Bycanistes subcylindricus** (Scalater).

West Africa : Angola, Nijam-Nijam Country, Upper White Nile, Elgon.

Buceros subcylindricus Scalater, Proc. Zool. Soc. Lond. p. 668, pl. 39 (♀) (1870); Dubois, Bull. Mus. Hist. Nat. Belg. Vol. 3, p. 201 (1884).
Bycanistes subquadratus Cabanis, Journ. f. Ornith. p. 350, pl. 1 (♂) (1880).
Buceros subquadratus Hartlaub, Abh. Bremen, p. 208 (1882).
Bycanistes subcylindricus et subquadratus Elliot, Monogr. Bucerot. pls. 18, 19 (1882).

6. **Bycanistes aloysii** Salvadori.

Ruwenzori.

Bycanistes aloysii Salvadori, Boll. Mus. Zool. Anat. comp. Univ. Torino, Vol. 21, no. 542 (1906).

7. **Bycanistes cylindricus** (Temminck).

North-western Africa, from Gaboon to Liberia.

Buceros cylindricus Temminck, Pl. Col. Vol. 2, p. 76, pl. 521, f. 2 (1824).
Buceros cylindricus Bonaparte, Consp. Gen. Avium, Vol. 1, p. 89 (1850).
Tmetoceros cylindricus Bonaparte, Consp. Volucr. Anisod. p. 2 (1854).
Bycanistes cylindricus Cabanis & Heine, Mus. Heinean. Vol. 2, p. 173 (1860); Elliot, Monogr. Bucerot. pl. 30 (1882).
Buceros casuarinus Gray, Ann. Mag. Nat. Hist. Vol. 8, p. 437, pl. 17 (1871).
Pholidophalus casuarinus Elliot, Monogr. Bucerot. pl. 34 (1882).

8. **Bycanistes albotibialis** (Cabanis & Reichenow).

Cameroons, Gaboon, Loango, Belgian Congo.

Buceros albotibialis Cabanis & Reichenow, Journ. f. Ornith. pp. 10, 103 (1877), pl. 1 (♂) (1878).
Bycanistes albotibialis Elliot, Monogr. Bucerot. pl. 31 (1882).
Pholidophalus kethullei Dubois, Ornith. Monatsb. p. 69 (♀) (1900); Syn. Avium, Vol. 2, p. 1061 (1903).

9. GENUS RHYTIDOCEROS REICHENBACH

Rhytidoceros Cabanis & Heine, Mus. Heinean. Vol. 2, p. 172 (1860) (type : *Buceros obscurus*).

Synonyms : *Rhyticeros* Reichenbach, Syst. Avium, pl. 1 (1849) (type : *Buceros undulatus*); *Calao* Bonaparte, Consp. Gen. Avium, Vol. 1, p. 90 (1854) (type : *Buceros plicatus*).

Characters. Bill large, curved and compressed; culmen covered for nearly half its basal length by a casque like protuberance, apparently formed of large scales overlapping each other; base of both mandibles grooved or not grooved transversally. Throat naked. Crest well developed. Wings ample. Tail long, subequal, white or black.

Geographical Distribution. — South-eastern Asia, and the greater part of the Malayan Archipelago.

KEY TO THE SPECIES

A. Tail pure white.

1. Base of both mandibles grooved transversally R. UNDULATUS.
- a. Base of both mandibles not grooved.
 2. Top of head and occiput dark chestnut; rest of head and neck white tinged with buff in the male; head black, and gular skin deep blue in the female . . . R. SUBRUFICOLLIS.
 - b. Head and neck bright chestnut in the male; head black, and gular skin white in the female.
 3. Size large R. PLICATUS.
 4. Size much smaller R. NARCONDAMI.

B. Tail black.

5. Like *R. narcondami*, but with a black tail, and top of head and neck darker brown R. EVERETTI.

1. *Rhytidoceros undulatus* (Shaw). (Plate 2, Fig. 5.)

Cachar, Manipur, Pegu,
Tenasserim, Malacca,
Sumatra, Borneo, Ja-
va.

- Buceros undulatus* et *javanicus* Shaw, Gen. Zool. Vol. 8, pp. 26, 28 (1811).
Buceros niger Vieillot, Nouv. Dict. Hist. Nat. Vol. 4, p. 592 (1816).
Buceros annulatus et *javanus* Dumont, Dict. Sc. Nat. Vol. 6, pp. 210, 215 (1817).
Buceros plicatus Muller & Schlegel (nec Forster), Verh. Ges. Ned. Ind. pp. 24, 30 (1839-1844).
Buceros pucoran Blyth, Journ. Asiat. Soc. Beng. Vol. 12, Pt. 2, p. 990 (1843).
Buceros fusaran Blyth, ibidem, Vol. 16, p. 998 (1847).
Rhyticeros plicatus Reichenbach, Syst. Avium, pl. 40 (1849).
Calao plicatus Bonaparte, Consp. Gen. Avium, Vol. 1, p. 90 (1850).
Rhytidoceros obscurus Cabanis & Heine (nec Gmelin), Mus. Heinean. Vol. 2, p. 172 (1860).
Buceros (*Rhyticeros*) *obscurus* Gray, Hand-list of Birds, Vol. 2, p. 129 (1870).
Rhyticeros obscurus Hume, Nests and Eggs Ind. Birds, p. 115 (1873).
Aceros plicatus Blyth, Cat. Mamm. and Birds Burma, p. 69 (1875).
Rhytidoceros undulatus Tweeddale, The Ibis, p. 292 (1877); Elliot, Monogr. Bucerot. pl. 35 (1882).
Rhyticeros undulatus Hume & Davis, Str. F. Vol. 6, p. 111 (1878).
Buceros plicatus var. *undulata* Dubois, Bull. Mus. Hist. Nat. Belg. Vol. 3, p. 206 (1884).

2. *Rhytidoceros subruficollis* (Blyth).

Arrakan, Pegu, Tenasse-
rim, Siam, Malacca,
Sumatra, Borneo.

- Buceros subruficollis* Blyth, Journ. Asiat. Soc. Beng. Vol. 12 (1), p. 177 (1843).
Buceros plicatus Blyth (nec Forster), ibidem, p. 991 (1843).
Rhyticeros subruficollis Horsfield & Moore, Cat. Birds Mus. E. Ind. Co. Vol. 2, p. 600 (1856-1858).
Rhytidoceros subruficollis, Cabanis & Heine, Mus. Heinean. Vol. 2, p. 172 (1860); Elliot, Monogr. Bucerot. pl. 36 (1882).
Buceros (*Rhyticeros*) *pusan* (part.) Tickell, The Ibis, p. 180 (1864).
Aceros subruficollis Blyth, Cat. Mamm. and Birds Burma, p. 69 (1875).
Buceros plicatus var. *subruficollis* Dubois, Bull. Mus. Hist. Nat. Belg. Vol. 3, p. 206 (1884).

3. *Rhytidoceros plicatus* (Forster).

Moluccas, Papua and
Solomon Islands; New
Britain, New Guinea,
Waigiou, Mysol, Hal-
mahera, Morty, Bat-
chian, Ceram, Amboy-
na, Salwatti, Ravak,
Guebeh and Batanta.

- Buceros plicatus* et *rostratus* Forst., Ind. Zool. p. 40 (1781).
Buceros obscurus Gmelin, Syst. Nat. Vol. 1, p. 362 (1788).
Buceros ruficollis, Vieillot, Nouv. Dict. Hist. Nat. Vol. 4, p. 600 (1816).
Calao ruficollis Bonaparte, Consp. Gen. Avium, Vol. 1, p. 90 (1850).
Rhyticeros ruficollis et *plicatus* Bonaparte, Consp. Volucr. Anisod. p. 3 (1854).
Calao papuensis Rosenberg, Nat. Tijdschr. Ned. Ind. p. 229 (1863).
Rhytidoceros ruficollis Salvadori, Ann. Mus. Stor. Nat. Genova, Vol. 7, p. 763 (1875).
Buceros flavicollis Ramsay, Proc. Linn. Soc. N. S. Wales, Vol. 1, p. 393 (1876).

Rhytidoceros plicatus Tweeddale, The Ibis, p. 294 (1877); Elliot, Monogr. Bucerot. pl. 37 (1882); Dubois, Syn. Avium, Vol. 1, p. 101 (1899).

Rhytidoceros plicatus var. *ruficollis*, Salvadori, Ann. Mus. Stor. Nat. Genova, Vol. 10, p. 299 (1877).

4. **Rhytidoceros narcondami** Hume.

Rhytidoceros narcondami Hume, Str. Feath. Vol. 1, p. 411 (1873).

Rhytidoceros narcondami Elliot, Monogr. Bucerot. pl. 38 (1882).

Buceros plicatus (part) Dubois, Bull. Mus. Hist. Nat. Belg. Vol. 3, p. 205 (1884).

Narcondam Island (Bay of Bengal).

5. **Rhytidoceros everetti** Hartert.

Rhytidoceros everetti Hartert, Ornith. Monatsb. Vol. 5, p. 117 (1897); Dubois, Syn. Avium, Vol. 1, p. 102 (1899).

Sumba Island.

10. GENUS ACEROS HODGSON

Aceros Hodgson in Gray, Zool. Misc. p. 85 (1841) (type : *Buceros nepalensis*).

Characters. Bill large, curved and compressed; base of the upper mandible only is covered by a large transversally grooved plate; casque rudimentary. Tail wedge-shaped, basal half black, rest white. Feathers of the crest and neck very long and hairy.

Geographical Distribution. South-eastern Himalayas, and the hilly districts from Assam to Tenasserim.

1. **Aceros nepalensis** Hodgson. (Plate 2, Fig. 6.)

Buceros nepalensis Hodgson, Asiat. Res. Vol. 18, Pt. 1, p. 178, 2 pls. (1829); Gray, Gen. of Birds, Vol. 2, pl. 99 (1847).

Aceros nepalensis Hodgson, Icon. ined. in Brit. Mus. Pass. pl. 314 (1842); Elliot, Monogr. Bucerot. pl. 45 (1882).

Calao (Aceros) nepalensis Bonaparte, Consp. Gen. Avium, Vol. 1, p. 60 (1850).

Rhytidoceros (Aceros) nepalensis Bonaparte, Consp. Volucr. Anisod. p. 3 (1854).

Aceros leucostigma Salvadori, Ann. Mus. Stor. Nat. Genova (2), Vol. 5, p. 515 (1887).

Nepal, Sikkim, Boutan, Assam to Tenasserim.

11. GENUS ANORRHINUS REICHENBACH

Anorrhinus Reichenbach, Syst. Avium, pl. 49 (1849) (type : *Buceros galeritus*).

Synonyms: *Berenicornis* Bonaparte, Consp. Gen. Avium, Vol. 1, p. 91 (1850) (type : *Buceros comatus*); *Ptilolaemus* Ogilvie-Grant, Cat. Birds Brit. Mus. Vol. 17, p. 392 (1892) (type : *Buceros tickelli*).

Characters. Bill more or less large, somewhat curved and compressed; casque extending about over half the culmen, highest at its anterior end, whence it inclines gradually backward to the base of bill. Skin around eyes, cheeks and throat naked, or with the throat more or less feathered. Head covered by a long loose bushy crest. Wings long. Tail long, broad and usually rounded.

Geographical Distribution. Asalu, Cachar, Tenasserim, Malacca, Sumatra, Borneo.

KEY TO THE SPECIES

1. Tail brownish grey with the last third black A. GALERTUS.
2. Tail long, white, the middle pair of feathers considerably the longest A. COMATUS.
- a. Tail brownish black, tipped with white.
 1. Sides of the head, chin and throat rufous-buff. A. TICKELLI.
 2. Sides of the head, chin and throat white A. AUSTENI.

1. **Anorrhinus galeritus** (Temminck). (Plate 2, Fig. 7.)

South Tenasserim, Malacca, Sumatra, Borneo.

Buceros galeritus Temminck, Pl. Col. Vol. 2, p. 78, pl. 520 (1824).*Buceros carinatus* Blyth, Journ. Asiat. Soc. Beng. Vol. 14, p. 187 (1845).*Hydrocissa galeritus* Bonaparte, Consp. Gen. Avium, Vol. 1, p. 90 (1850).*Anorrhinus galeritus* Reichenbach, Syst. Avium, pl. 49 (1849); Elliot, Monogr. Bucerot. pl. 42 (1882); Dubois, Syn. Avium, Vol. 1, p. 102 (1899).*Hydrocissa* (*Anthracoceros*) *galeritus* Bonaparte, Consp. Volucr. Anisod. p. 2 (1854).2. **Anorrhinus tickelli** (Blyth).

Burma, Northern Tenasserim Hills.

Buceros tickelli Blyth, Journ. Asiat. Soc. Beng. Vol. 24, p. 266 (1855).*Toccus tickelli* Tickell, The Ibis, p. 173, pl. 3 (1864).*Ocyeros tickelli* Hume, Nests and Eggs Ind. Birds, p. 113 (1873).*Meniceros tickelliae* Hume, Str. Feath. Vol. 2, p. 470 (1874).*Anorrhinus tickelli* Blyth, Cat. Mamm. and Birds Burma, p. 69 (1875); Elliot, Monogr.

Bucerot. pl. 43 (1882); Dubois, Syn. Avium, Vol. 1, p. 102 (1899).

Ptilolaemus tickelli Ogilvie-Grant, Cat. Birds Brit. Mus. Vol. 17, p. 392 (1892).3. **Anorrhinus austeni** Jerdon.

Northern Cachar Hills, Hills south of Dihing River.

Anorrhinus galeritus Godwin-Austen (nec Temminck), Journ. Asiat. Soc. Beng. Vol. 39 (2), p. 96 (1870).*Anorrhinus austeni* Jerdon, The Ibis, p. 6 (1872); Dubois, Syn. Avium, Vol. 1, p. 102 (1899).*Craniorhinus corrugatus* Blyth, Journ. Asiat. Soc. Beng. (extra no.) p. 69 (1875).*Anorrhinus tickelli* (part.) Godwin-Austen, The Ibis, p. 207 (1878); Dubois, Bull. Mus. Hist. Nat. Belg. Vol. 3, p. 209 (part.) (1884).*Ptilolaemus austeni* Ogilvie-Grant, Cat. Birds Brit. Mus. Vol. 17, p. 393 (1892).4. **Anorrhinus comatus** (Raffles).

South Tenasserim, Malacca, Sumatra, Borneo.

Buceros comatus Raffles, Trans. Linn. Soc. Lond. Vol. 13, p. 399 (1822).*Buceros lugubris* Begbie, Malay Penins. p. 513 (1834).*Berenicornis comatus* Bonaparte, Consp. Gen. Avium, Vol. 1, p. 91 (1850).*Anorrhinus comatus* Elliot, Monogr. Bucerot. pl. 39 (1882); Dubois, Syn. Avium, Vol. 1, p. 102 (1899).*Buceros* (*Anorrhinus*) *comatus* Dubois, Bull. Mus. Hist. Nat. Belg. Vol. 3, p. 207 (1884).

12. GENUS ORTHOLOPHUS OGILVIE-GRANT

Ortholophus Ogilvie-Grant, Cat. Birds Brit. Mus. Vol. 17, p. 424 (1892) (type: *Buceros leucolophus*).

Characters. Bill fairly large and curved; casque moderately elevated, keel-shaped, and covering the greater part of the culmen. A tract of feathers down the middle of the naked throat. Tail very long, wedge-shaped, black tipped with white, the middle pair of tail-feathers being very much the longest. Crest of long soft feathers, those on the lores and front of the head growing straight up (Ogilvie-Grant).

Geographical Distribution. West Africa.

KEY TO THE VARIETIES

A. Greater wing-coverts and quills not tipped with white.

1. Stripe on the chin, cheeks and throat feathers black O. ALBOCRISTATUS.

2. Chin black or white, cheeks feathers white with black shafts O. MACROURUS.

B. Greater wing-coverts and quills tipped with white.

3. Cheeks and throat feathers black O. CASSINI.

1. **Ortholophus albocristatus** (Cassin). Sierra Leone, Liberian.
Buceros albocristatus Cassin, Proc. Acad. Nat. Sc. Philad. Vol. 3, p. 330 (1847).
Berenicornis albocristatus (part.) Hartlaub, Ornith. W. Afr. pp. 163, 274 (1857).
Berenicornis leucolophus Battikoffler (nec Sharpe), Notes Leyd. Mus. p. 20 (1892).
Ortholophus leucolophus (part.) Ogilvie-Grant, Cat. Birds Brit. Mus. Vol. 17, p. 426 (1892).
Ortholophus fiaschi Sharpe, The Ibis, p. 610 (1904).
2. **Ortholophus albocristatus var. macroura** (Bonaparte). (Plate 3, Fig. 4.) Liberia S. to the Gold Coast.
Berenicornis macrourus Bonaparte, Conspect. Gen. Avium Vol. 1, p. 91 (1849).
Buceros albocristatus, auct. plur. (nec Cassin).
Berenicornis leucolophus Sharpe, Zool. Rec. p. 54 (1873).
Anorrhinus leucolophus Elliot, Monogr. Bucerot. pl. 41 (1882).
Buceros (*Anorrhinus*) *albocristatus* (part.) Dubois, Bull. Mus. Hist. Nat. Belg. Vol. 3, p. 207 (1884).
Ortholophus leucolophus (part.) Ogilvie-Grant, Cat. Birds Brit. Mus. Vol. 17, p. 426 (1892).
Anorrhinus albocristatus (part.), Dubois, Syn. Avium, Vol. 1, p. 102 (1899).
3. **Ortholophus albocristatus var. cassini** Finsch. Cameroons to Loango, Belgian Congo.
Buceros et *Ortholophus albocristatus*, auct. plur. (nec Cassin): Elliot, Monogr. Bucerot. pl. 40 (1882); Ogilvie-Grant, Cat. Birds Brit. Mus. p. 425 (1892).
Ortholophus cassini Finsch, Notes Leyd. Mus. Vol. 23, p. 201 (1901).
Ortholophus albocristatus var. leucolophus, Dubois, Ann. Mus. Congo (4), Vol. 1, p. 34 (1905).

13. GENUS PENELOPIDES REICHENBACH

Penelopides Reichenbach, Syst. Avium, pl. 49 (1849) (type: *Buceros panini*).

Characters. Bill fairly large and curved; basal half of both mandibles covered with a plate, and either or both transversally grooved; casque low, compressed laterally. Chin, throat and skin around eyes naked. Wings long. Tail long, slightly rounded. Crest moderate.

Geographical Distribution. Celebes and Philippine Islands.

KEY TO THE SPECIES AND VARIETIES

- A. *Belly rufous*.
1. *Base of both mandibles with grooved plates; top of head, neck and breast buffy white.* P. PANINI ♂.
- B. *Belly white tinged with buff*.
2. *Base of both mandibles with grooved plates; basal half of the tail dark brown, and succeeded by a wide white band (stained rufous), followed by a terminal black band glossed with green* P. MANILLÆ ♂.
 3. *Like the preceding, but the two outer tail-feathers black without white band* P. TALISI ♂.
 4. *Base of upper mandible only with a grooved plate; tail without dark brown at the base, upper parts blackish glossed with green 1)* P. MINDORENSIS ♀ ♂.
 - a. *Base of lower mandible only with grooved plate; back, rump, upper tail-coverts and wings black glossed with dark green; tail white (stained rufous), with a wide terminal black band and some black at the base.*
 5. *Basal half of bill and casque dark brown* P. AFFINIS ♂.

1) In the opinion of Prof. Steere, the female differs only from the male in having the bare skin round the eye and at the base of the mandibles dark blue instead of flesh-coloured (*List of the Mamm. and Birds*, p. 13).

6. Upper mandible flesh-coloured to the base P. BASILANICA ♂.
 7. Tail-coverts buff-white, like the under parts P. SAMARENSIS ♂.

C. Belly black (only the females).

1. Base of both mandibles with grooved plates; tail as in the male, but the outer web of the outside feather is slightly black to the base. P. PANINI ♀.
 2. Base of both mandibles with grooved plates; tail as in the male P. MANILLÆ ♀.
 3. Tail probably as in the male P. TALISI ♀.
 5-7. Base of lower mandible only with grooved plate } P. AFFINIS ♀.
 } P. BASILANICA ♀.
 } P. SAMARENSIS ♀.

1. **Penelopides panini** (Boddaert). (Plate 2, Fig. 1.)

Guimaras, Panay, Negros, Masbate (Philippine Islands).

- Buceros panini* Boddaert, Tabl. Pl. Enl. p. 48 (1783).
Buceros panayensis Scopoli, Faun. et Flor. Insubr. Vol. 2, p. 87 (1786).
Buceros insculptus Dumont, Dict. Sc. Nat. Vol. 6, p. 209 (1817).
Buceros sulcirostris Wagler, Syst. Avium, Buceros, no. 13 (1827).
Tockus sulcirostris Bonaparte, Consp. Gen. Avium, Vol. 1, p. 91 (1850).
Penelopides sulcirostris et *panayensis* Bonaparte, Consp. Volucr. Anisod. p. 3 (1854).
Penelopides panini (part.) Cabanis & Heine, Mus. Heinean. Vol. 2, p. 168 (1860); Elliot, Monogr. Bucerot. pl. 21 (1882); Dubois, Syn. Avium, Vol. 1, p. 102 (1899).
Buceros manillae var. *panini* Dubois, Bull. Mus. Hist. Nat. Belg. Vol. 3, p. 211 (1884).

2. **Penelopides manillæ** (Boddaert).

Luzon, Marinduque, Cataguan (Philippine Islands).

- Buceros manillæ* Boddaert, Tabl. Pl. Enl. p. 54 (1783).
Buceros manillensis Gmelin, Syst. Nat. Vol. 1, p. 361 (1788).
Buceros sulcirostris Wagler (part.), Syst. Avium, Buceros, no. 13 (1827).
Buceros panini Gray (part.), Gen. Avium, Vol. 2, p. 400 (1847).
Buceros panayensis Blyth (nec Scopoli), Journ. Asiat. Soc. Beng. Vol. 16, p. 997 (1847).
Penelopides panini (part.) Cabanis & Heine, Mus. Heinean. Vol. 2, p. 168 (1860).
Penelopides manillæ Walden, Trans. Zool. Soc. Lond. Vol. 9, p. 168 (1875); Elliot, Monogr. Bucerot. pl. 20 (1882); Dubois, Syn. Avium, Vol. 1, p. 102 (1899).

3. **Penelopides manillæ** var. **talisi** Finsch.

Luzon N.

- Penelopides talisi* Finsch, Notes Leyd. Mus. Vol. 23, p. 190 (1901).

4. **Penelopides mindorensis** Steere.

Mindorô (Philippine Islands).

- Penelopides mindorensis* Steere, List Birds and Mamm. Philipp. p. 13 (1890).
Penelopides affinis schmackeri Hartert, Cat. Mus. Senckenb. p. 139 (1891).
Penelopides manillæ var. *mindorensis* Dubois, Syn. Avium, Vol. 1, p. 102 (1899).

5. **Penelopides affinis** Tweeddale.

Mindanao (Philippine Islands).

- Penelopides affinis* Tweeddale, Ann. Mag. Nat. Hist. (4), Vol. 20, p. 534 (1877); Elliot, Monogr. Bucerot. pl. 22 (1882).
Buceros manillæ var. *affinis* Dubois Bull. Mus. Hist. Nat. Belg. Vol. 3, p. 211 (1884).
Penelopides manillæ var. *affinis* Dubois, Syn. Avium, Vol. 1, p. 102 (1899).

6. **Penelopides affinis** var. **basilanica** Steere.

Basilan (Philippine Islands).

- Penelopides affinis* Tweeddale, Proc. Zool. Soc. Lond. p. 70 (1879).
Penelopides basilanica Steere, List Birds and Mamm. Philipp. p. 13 (1890).
Penelopides manillæ var. *basilanica* Dubois, Syn. Avium, Vol. 1, p. 102 (1899).

7. **Penelopides affinis** var. **samarensis** Steere.

Samar, Leyte, Dinagat (Philippine Islands).

- Penelopides affinis* Tweeddale, Proc. Zool. Soc. Lond. pp. 108, 341 (1878).
Penelopides samarensis Steere, List Birds and Mamm. Philipp. p. 13 (1890).
Penelopides manillæ var. *samarensis* Dubois, Syn. Avium, Vol. 1, p. 102 (1899).

14. GENUS RHABDOTORRHINUS MEYER & WIGLESWORTH

Hydrocissa (part.) Bonaparte (type : *Buceros monoceros*).

Rhabdotorrhinus Meyer & Wiglesworth, Abh. Mus. Dresden, no. 8, p. 6 (1895) (type : *Buceros exaratus*).

Characters. Bill moderate, curved, sharply pointed; casque low, compressed laterally, and indented by three deep grooves for its entire length. Wings short. Tail rather short, rounded. Sides of head and throat white in the male, black in the female. Size small.

Geographical Distribution. Celebes, (Malacca?).

1. *Rhabdotorrhinus exaratus* (Temminck). (Plate 2, Fig. 2.)

Celebes.

Buceros exarhatus Temminck, Pl. Col. Vol. 2, p. 90, pl. 211 (1823).

Buceros exarhatus Blyth, Journ. Asiat. Soc. Beng. Vol. 16, p. 997 (1847).

Buceros exaratus Blyth, Cat. Birds Asiat. Soc. Beng. p. 44 (1849).

Hydrocissa exaratus Bonaparte, Consp. Gen. Avium, Vol. 1, p. 60 (1850); Elliot, Monogr.

Bucerot. pl. 46 (1882); Dubois, Syn. Avium, Vol. 1, p. 103 (1899).

Anorrhinus exaratus Bonaparte, Consp. Volucr. Anisod. p. 2 (1854).

Penelopides exaratus Ogilvie-Grant, Cat. Birds Brit. Mus. Vol. 17, p. 376 (1892).

Rhabdotorrhinus exaratus Meyer & Wiglesworth, Abh. Mus. Dresden, no. 8, p. 6 (1895).

15. GENUS LOPHOCEROS HEMPRICH & EHRENBERG

Lophoceros Hemprich & Ehrenberg, Symb. Phys. Avium, fol. 2 (1828) (type : *Buceros nasutus*).

Rynchoceros Gloger, Hand- u. Hilfsb. p. 335 (1842) (type : *Buceros melanoleucus*).

Grammicus Reichenbach, Syst. Avium, pl. 49 (1849) (type : *Buceros nasutus*).

Ocyceros Hume, Nests and Eggs Ind. Birds, p. 113 (1873) (type : *Buceros ginginianus*).

Orizoceros Oberholzer, Proc. U. S. Nat. Mus. Vol. 22, p. 28 (1899) (type : *Buceros hartlaubi*).

Characters. Bill moderate, curved, with a small keel-shaped casque, which is rarely wanting. Sides of throat more or less naked. Head with a short occipital crest. Wings moderate. Tail long, slightly rounded. Size small.

Geographical Distribution. India, Ceylon, Africa.

KEY TO THE SPECIES

A. A wide superciliary stripe, chin, breast and rest of under parts white; rest of the body grey, palest on the chest and nape, inclining to brown on the back and tail.

1. Middle pair of tail-feathers longest and slightly, the outer pairs widely tipped with white

L. BIROSTRIS.

B. Wing-coverts neither spotted nor margined with white.

a. Breast and belly white.

a'. Bill orange-red; four outer pairs of tail-feathers with white tips.

2. Sides of the head with very small white striations; no white over the eyes

L. MELANOLEUCUS.

a". Sides of the head with much larger white striations.

3. White feathers over the eyes; plumage much paler

L. ANGOLENSIS.

4. A large white band over the eyes joining behind the nape; sides of the head white variegated with black

L. GEOLENSIS.

a". Middle of breast, belly, front of thighs and under tail-coverts white; remainder of plumage black.

5. Basal part of lower mandible reddish black; third and fourth pairs of tail-feathers white L. FASCIATUS.
6. Basal part of lower mandible yellowish white; third and fourth pairs of tail-feathers black with white ends. L. SEMIFASCIATUS.
7. Breast blackish grey; belly mixed with white; back, rump and upper tail-coverts greyish black; bill blackish, crimson towards the tip L. HARTLAUBI.

C. Wing-coverts spotted or margined with white.

b. Wing-coverts spotted with white.

8. Plumage like *L. hartlaubi*, but the wing-coverts spotted with white; bill and small casque red, mandibles partly black L. GRANTI.

c. Wing-coverts margined with white; middle pair of tail-feathers with whitish shafts.

9. Bill and casque yellowish white; wings more than 230 mm. L. PALIDIROSTRIS.
10. Bill with the end orange-red; wings under 230 mm. L. NEUMANNI.

D. A white or pale buff line from the nape down the centre of the back; middle pair of tail-feathers with white shafts.

11. Casque not developed L. NASATUS.
12. A small but well-developed casque L. EPIRHINUS.

1. *Lophoceros birostris* (Scopoli).

Western and central Peninsula of India to Nepal.

- Buceros birostris* Scopoli, Faun. et Flor. Insubr. Vol. 2, p. 87 (1786).
Buceros ginginianus Latham, Ind. Ornith. Vol. 1, p. 146 (1790).
Buceros oxyurus Wagler, Syst. Avium, Buceros, no. 14 (1827).
Buceros cinerascens Hodgson, Icon. ined. in Brit. Mus. Pass. pl. 313 (1844).
Tockus ginginianus Bonaparte, Consp. Gen. Avium, Vol. 1, p. 91 (1850).
Meniceros ginginianus Bonaparte, Consp. Volucr. Anisod. p. 3 (1854).
Tockus bicornis Horsfield & Moore, Cat. Birds Mus. E. Ind. Co. Vol. 2, p. 597 (1856-1858).
Penelopides ginginianus Cabanis & Heine, Mus. Heinean. Vol. 2, p. 169 (1868).
Meniceros bicornis Jerdon, Birds Ind. Vol. 1, p. 248 (1862).
Ocyeroceros ginginianus Hume, Nests and Eggs Ind. Birds, p. 113 (1873).
Ocyeroceros bicornis Fairbank, Str. Feath. Vol. 5, p. 394 (1877).
Ocyeroceros birostris Davidson & Wenden, Str. Feath. Vol. 7, p. 78 (1878).
Lophoceros birostris Elliot, Monogr. Bucerot. pl. 48 (1882); Dubois, Syn. Avium, Vol. 1, p. 103 (1899).

2. *Lophoceros melanoleucus* (Lichtenstein). (Plate 2, Fig. 8.)

Africa, S. of about 5° N. lat.

- Buceros melanoleucus* Lichtenstein, Cat. Hamb. p. 8, no. 90 (1793).
Buceros coronatus Shaw, Gen. Zool. Vol. 8, p. 35 (1811).
Tockus melanoleucus Bonaparte, Consp. Gen. Avium, Vol. 1, p. 91 (1850); Elliot, Monogr. Bucerot. pl. 49 (1882).
Rhynchoceros melanoleucus Bonaparte, Consp. Volucr. Anisod. p. 3 (1854).
Lophoceros melanoleucus Cabanis & Heine, Mus. Heinean. Vol. 2, p. 168 (1860); Dubois, Syn. Avium, Vol. 1, p. 103 (1899).
Tockus coronatus Gurney, The Ibis, p. 133 (1861).
Lophoceros alboterminatus Büttikofler, Notes Leyd. Mus. Vol. 11, p. 67 (1889).
Lophoceros melanoleucus suahelicus Neumann, Journ. f. Ornith. p. 187 (1905).

3. *Lophoceros melanoleucus* var. *angolensis* Reichenow.

Angola.

- Lophoceros melanoleucus angolensis* Reichenow, Vög. Afr. Vol. 2, p. 250 (1902-03).

4. *Lophoceros melanoleucus* var. *geloensis* Neumann.

Sobat District, N. E. Africa.

- Lophoceros melanoleucus geloensis* Neumann, Journ. f. Ornith. p. 188 (1905).

5. **Lophoceros fasciatus** (Shaw).

West Africa : Angola to Gaboon and Nijam-Nijam, Belgian Congo.

Buceros fasciatus Shaw, Gen. Zool. Vol. 8, p. 34 (1811).*Buceros melanoleucus* Vieillot (nec Lichtenstein), Nouv. Dict. Hist. Nat. Vol. 4, p. 505 (1816).*Tockus fasciatus* Bonaparte, Consp. Gen. Avium, Vol. 1, p. 61 (1850); Elliot, Monogr. Bucerot. pl. 50, f. 1 (1882).*Grammicus fasciatus* Bonaparte, Consp. Volucr. Anisod. p. 3 (1854).*Lophoceros fasciatus* Cabanis & Heine, Mus. Heinean. Vol. 2, p. 168 (1860); Dubois, Syn. Avium, Vol. 1, p. 103 (1899).6. **Lophoceros fasciatus var. semifasciata** (Hartlaub).

West Africa, from the Niger to Senegambia.

Buceros semifasciatus Hartlaub, Journ. f. Ornith. pp. 356, 361 (1851).*Tockus semifasciatus* Hartlaub, Ornith. W. Afr. p. 163 (1857); Elliot, Monogr. Bucerot. pl. 50, f. 2 (1882).*Buceros fasciatus var. semifasciatus* Dubois, Bull. Mus. Hist. Nat. Belg. Vol. 3, p. 215 (1884).*Lophoceros semifasciatus* Shelley, The Ibis, p. 59 (1888).*Lophoceros fasciatus var. semifasciata* Dubois, Syn. Avium, Vol. 1, p. 103 (1899).7. **Lophoceros hartlaubi** (Gould).

West Africa.

Tockus hartlaubi Gould, Proc. Zool. Soc. Lond. p. 380 (1860); Elliot, Monogr. Bucerot. pl. 58 (1882).*Buceros nagtglassi* Schlegel, Nederl. Tijdschr. Dierk. Vol. 1, p. 56, pl. 2 (1862).*Buceros hartlaubi* Reichenow, Journ. f. Ornith. p. 18 (1877).*Tockus nagtglassi* Barboza du Bocage, Ornith. Angola, p. 541 (1881).*Alophius hartlaubi* Dubois, Bull. Mus. Hist. Nat. Belg. Vol. 3, p. 69 (1884).*Lophoceros hartlaubi* Shelley, The Ibis, p. 69 (1888).*Orizoceros hartlaubi* Oberholzer, Proc. U. S. Nat. Mus. Vol. 22, p. 28 (1899).8. **Lophoceros hartlaubi var. granti** Hartert.

Belgian Congo: Aruwini, Lake Léopold II region.

Lophoceros granti Hartert, Novit. Zool. Vol. 2, p. 55 (1895); Dubois, Syn. Avium, Vol. 1, p. 103 (1899); Ann. Mus. Congo, Zool. (4), Tome 1, p. 9, pl. 5 (1905).9. **Lophoceros pallidirostris** (Finsch & Hartlaub).

Benguela, Angola, Belgian Congo to the Lake Tanganyka.

Buceros pallidirostris Finsch & Hartlaub, von der Decken's Reisen O.-Afr. p. 71 (1870).*Tockus pallidirostris* Barboza du Bocage, Ornith. Angola, p. 117 (1881).*Tockus melanoleucus* (part.) Sharpe, Layard, Birds S. Afr. p. 128 (1884).*Buceros nasutus var. dubia* Dubois, Bull. Mus. Hist. Nat. Belg. Vol. 3, p. 213, pl. 10, f. 2 (1884).*Lophoceros pallidirostris* Shelley, The Ibis, p. 64 (1888); Dubois, Syn. Avium, Vol. 1, p. 103 (1899).10. **Lophoceros pallidirostris var. neumanni** Reichenow.

Masailand.

Lophoceros neumanni Reichenow, Journ. f. Ornith. p. 230 (1894); Vög. Afr. pl. 5, f. 2 (1903).*Lophoceros pallidirostris var. neumanni* Dubois, Syn. Avium, Vol. 1, p. 103 (1899).11. **Lophoceros nasutus** (Linnaeus).

Wholly tropical Africa.

Buceros nasutus Linnaeus, Syst. Nat. Vol. 1, p. 154 (1766).*Buceros nasica* Cuvier, Règne Anim. Vol. 1, p. 419 (1817).*Buceros (Lophoceros) forskalii et hemileucus* Hemprich & Ehrenberg, Symb. Phys. Avium, fol. aa, z (1828).*Buceros hastatus* Cuvier, Règne Anim. Vol. 1, p. 446 (1829).*Buceros poecilorhynchus* Lafresnaye, Rev. Zool. p. 257 (1839).*Tockus nasutus* Rüppell, Syst. Uebers. Vög. N.-O.-Afr. p. 79 (1845).*Buceros nasutus var. senegalensis et orientalis*, Sundevall, Oefv. Vet.-Akad. Förh. pp. 108, 130 (1850).*Tockus poecilorhynchus* Bonaparte, Consp. Gen. Avium, Vol. 1, p. 91 (1850).*Grammicus hastatus et nasutus* Bonaparte, Consp. Volucr. Anisod. p. 3 (1854).*Lophoceros forskalii* Cabanis & Heine, Mus. Heinean. Vol. 2, p. 167 (1860).*Lophoceros nasutus* Cabanis & Heine, ibidem, p. 167 (1860); Elliot, Monogr. Bucerot. pl. 47 (1882).*Buceros nasutus* (part.) Dubois, Bull. Mus. Hist. Nat. Belg. Vol. 3, p. 212 (1884).

12. *Lophoceros nasutus* var. *epirhina* (Sundevall).

- Buceros epirhinus* Sundevall, Oefv. Vet.-Akad. Förh. p. 108 (1850).
Buceros nasutus var. *caffer*, Sundevall, ibidem, p. 108 (1850).
Lophoceros epirhinus Cabanis & Heine, Mus. Heinean. Vol. 2, p. 167 (1860).
Tockus poecilorrhynchus Kirk (nec Lafresnaye), The Ibis, p. 327 (1864).
Buceros, *Tockus* et *Lophoceros nasutus* (part.) auct. plur. (nec Linnæus).
Lophoceros nasutus var. *epirhina*, Dubois, Syn. Avium, Vol. 1, p. 103 (1899).
Lophoceros nasutus epirhinus, Reichenow, Vög. Afr. Vol. 2, p. 258 (1904).

South Africa (from the
Cape region to the
Katanga).

16. GENUS *ALOPHIUS* EMPRICH & EHRENBURG

Alophius Hemprich & Ehrenberg, Symb. Phys. Avium, fol. 2, foot-note (1828) (type: *Buceros erythrorhynchus*).

Synonym: *Tockus* Lesson, Traité d'Ornith. p. 252 (1831) (type: *Buceros erythrorhynchus*).

Characters. Bill long, slender, much curved; mandible compressed laterally along the culmen; no casque. Sides of throat more or less naked. Wings and tail long, the latter rounded. Size small.

Geographical Distribution. Africa, Western India, Ceylon.

KEY TO THE SPECIES AND VARIETIES

- A. Under parts grey or greyish-white.
1. Under parts grey; middle and second pairs of tail-feathers brownish black, three outer pairs the same, but with white ends A. GRISEUS.
 2. Under parts greyish-white; middle and second pairs of tail-feathers blackish-brown with white ends; remaining feathers white, some black on the basal half of the outside pair A. GINGALENSIS.
- B. Wing-coverts spotted or margined with white.
- a. Wing-coverts spotted with white.
 3. Bill very long, yellowish red, dark purple towards the tip; middle pair of tail-feathers with black shafts A. MONTEIRI.
 4. Bill bright scarlet; middle pair of tail-feathers with yellow shafts A. CAMURUS.
 - b. Wing-coverts margined with white.
 5. Bill dull red, whitish on the basal part of the upper mandible; middle pair of tail-feathers with black shafts; third and fourth pairs white A. HEMPRICHI.
- C. A white or pale buff stripe from the nape down the centre of the back.
- c. Wing-coverts spotted with white; middle pair of tail-feathers with black or blackish shafts.
 - c'. Bill red.
 6. Top of the head and forehead dark grey tinged with brown; ear-coverts, cheeks and sides of neck white edged with grey; two outer tail-feathers black and white. A. ERYTHORHYNCHUS.
 7. Forehead, cheeks and sides of the head pure white; two outer tail-feathers white. A. DAMARENSIS.
 8. Like A. damarensis, but much smaller A. MEDIANA.
 - d. Bill orange-yellow.
 - e. Feathers on the chest white edged with greyish black.
 9. Middle primaries spotted with white on the outer web only A. LEUCOMELAS.

10. Middle primaries spotted with white on both webs A. ELEGANS.
 11. Feathers on the chest white with black shafts A. FLAVIROSTRIS.
 12. Lower mandible dark red, the upper orange-yellow; size smaller A. SOMALIENSIS.
 13. Wing-coverts with sub-terminal oval white spots; bill red with yellowish-white extremity A. JACKSONI.
 f. Wing-coverts not spotted with white.
 14. Bill red with yellowish-white extremity A. DECKENI.

1. **Alophius griseus** (Latham).

Western India, Kandisch to Travancore.

- Buceros griseus* Latham, Ind. Ornith. Vol. 1, p. 147 (1790).
Buceros cineraceus Temminck, Pl. Col. Vol. 2, p. 80 (1824).
Buceros (*Tockus*) *griseus* Lesson, Traité d'Ornith. p. 252 (1831).
Tockus griseus Bonaparte, Gen. Avium, Vol. 1, p. 91 (1850); Elliot, Monogr. Bucerot. pl. 54 (1882).
Rhinoplax griseus Bonaparte, Consp. Volucr. Anisod. p. 3 (1854).
Tockus gingalensis (part.) Jerdon, Birds Ind. Vol. 1, p. 250 (1862).
Alophius griseus Dubois, Bull. Mus. Hist. Nat. Belg. Vol. 3, p. 216 (1884).

2. **Alophius gingalensis** (Shaw).

Ceylon.

- Buceros gingalensis* Shaw, Gen. Zool. Vol. 8, p. 37 (1811).
Buceros gingala Vieillot, Nouv. Dict. Hist. Nat. Vol. 4, p. 600 (1816).
Buceros pyrrhopygus Wagler, Syst. Avium, Buceros, no. 18 (1827).
Tockus gingalensis Bonaparte, Gen. Avium, Vol. 1, p. 91 (1850); Elliot, Monogr. Bucerot. pl. 55 (1882).
Rhinoplax gingalensis Bonaparte, Consp. Volucr. Anisod. p. 3 (1854).
Tockus griseus Layard, Proc. Zool. Soc. Lond. p. 204 (1873).
Alophius griseus var. *gingalensis*, Dubois, Bull. Mus. Hist. Nat. Belg. p. 216 (1884); Syn. Avium, Vol. 1, p. 103 (1899).

3. **Alophius monteiri** (Hartlaub).

South Africa, Damara-land and Benguela.

- Tockus monteiri* Hartlaub, Proc. Zool. Soc. Lond. p. 87, pl. 5 (1865); Elliot, Monogr. Bucerot. pl. 53 (1882).
Alophius monteiri Dubois, Bull. Mus. Hist. Nat. Belg. Vol. 3, p. 219 (1884); Syn. Avium, Vol. 1, p. 104 (1899).
Lophoceros monteiri Shelley, The Ibis, p. 62 (1888).

4. **Alophius camurus** (Cassin).

Western and central Africa.

- Tockus camurus* Cassin, Proc. Acad. Nat. Sc. Philad. p. 319 (1857); Elliot, Monogr. Bucerot. pl. 59 (1882).
Buceros pulchrirostris Schlegel, Nederl. Tijdschr. Dierk. Vol. 1, p. 74, pl. 4 (1862).
Tockus pulchrirostris Sharpe, The Ibis, p. 485 (1870).
Buceros camurus Reichenow, Journ. f. Ornith. p. 18 (1877).
Alophius camurus Dubois, Bull. Mus. Hist. Nat. Belg. Vol. 3, p. 220 (1884); Syn. Avium, Vol. 1, p. 104 (1899).
Lophoceros camurus Shelley, The Ibis, p. 62 (1888).

5. **Alophius hemprichi** (Ehrenberg).

North-eastern Africa.

- Buceros* (*Lophoceros*) *hemprichii* Ehrenberg, Symb. Phys. Avium, fol. aa, foot-note 3 (1828).
Buceros limbatus Rüppell, Faun. Abyss. Vög. p. 5, pl. 2, f. 1 (1835).
Tockus limbatus Rüppell, Syst. Uebers. Vög. N.-O.-Afr. p. 79 (1845).
Grammicus limbatus Bonaparte, Consp. Volucr. Anisod. p. 3 (1854).
Lophoceros limbatus Cabanis & Heine, Mus. Heinean. Vol. 2, p. 168 (1860).
Tockus hemprichi Blanford, Geol. Zool. Abyss. p. 326 (1870); Elliot, Monogr. Bucerot. pl. 52 (1882).
Buceros hemprichi Finsch, Trans. Zool. Soc. Lond. Vol. 8, p. 317 (1870).
Alophius hemprichi Dubois, Bull. Mus. Hist. Nat. Belg. Vol. 3, p. 215 (1884); Syn. Avium, Vol. 1, p. 103 (1899).
Lophoceros hemprichi Shelley, The Ibis, p. 60 (1888).

6. **Alophius erythrorhynchus** (Temminck), (Plate 3, Fig. 1.) Africa, S. of about 17° N. lat.
Buceros nasutus Vieillot (nec Linnæus), Encycl. Méth. Vol. 1, p. 305, pl. 10, f. 3 (1823).
Buceros erythrorhynchus Temminck, Pl. Col. Vol. 2, sp. 19 (1823).
Buceros Alophius erythrorhynchus var. *leucopterus* Hemprich & Ehrenberg, Symb. Phys. Avium, fol. aa, foot-note 1 (1828).
Buceros (Tockus) erythrorhynchus Lesson, Traité d'Ornith. p. 252 (1831).
Tockus erythrorhynchus Rüppell, Syst. Uebers. Vög. N.-O.-Afr. p. 79 (1845); Elliot, Monogr. Bucerot. pl. 56 (1882).
Buceros rufirostris Sundevall, Oefv. Vet.-Akad. Förh. p. 108 (1850).
Buceros erythrorhynchus var. *caffer* Sundevall, ibidem, p. 108 (1850).
Rhynchaceros erythrorhynchus Cabanis & Heine, Mus. Heinean. Vol. 2, p. 166 (1860).
Alophius erythrorhynchus Dubois, Bull. Mus. Hist. Nat. Belg. Vol. 3, p. 218 (1884); Syn. Avium, Vol. 1, p. 104 (1899).
Lophoceros erythrorhynchus Shelley, The Ibis, p. 65 (1888).
7. **Alophius erythrorhynchus** var. **damarensis** (Shelley). Damaraland.
Tockus erythrorhynchus, auct. plur. (nec Temminck).
Lophoceros damarensis Shelley, The Ibis, p. 66 (1888); Ogilvie-Grant, Cat. Birds Brit. Mus. Vol. 17, p. 411, pl. 14 (1892).
Alophius erythrorhynchus var. *damarensis* Dubois, Syn. Avium, p. 104 (1899).
Lophoceros erythrorhynchus damarensis Reichenow, Vög. Afr. Vol. 2, p. 266 (1904).
8. **Alophius erythrorhynchus** var. **mediana** (Sharpe). Somaliland.
Lophoceros medianus Sharpe, Proc. Zool. Soc. Lond. p. 498 (1895).
Alophius erythrorhynchus var. *mediana* Dubois, Syn. Avium, Vol. 1, p. 104 (1899).
? *Lophoceros erythrorhynchus* Salvadori, Mem. Accad. Torino (2), Vol. 44, p. 553.
9. **Alophius flavirostris** (Rüppell). East Africa, between about 15° N. lat. and 5° S. lat.
Buceros flavirostris Rüppell, Faun. Abyss. Vög, p. 6, pl. 2, f. 2 (1835).
Tockus flavirostris Rüppell, Syst. Uebers. Vög. N.-O.-Afr. p. 79 (1845); Elliot, Monogr. Bucerot. pl. 51 (1882).
Rhynchaceros flavirostris Cabanis, Journ. f. Ornith. p. 235 (1878).
Alophius flavirostris Dubois (part.), Bull. Mus. Hist. Nat. Belg. Vol. 3, p. 218 (1884); Syn. Avium, Vol. 1, p. 104 (1899).
Lophoceros flavirostris Shelley, The Ibis, p. 67 (1888).
10. **Alophius flavirostris** var. **leucomelas** (Lichtenstein). Great Namaqualand, Damaraland, Zambesi, Transvaal, S. Africa.
Buceros leucomelas Lichtenstein, Verz. Säugeth. u. Vög. p. 17 (1842).
Rhynchaceros leucomelas, Cabanis & Heine, Mus. Heinean. Vol. 2, p. 166 (1860).
Buceros, Tockus et *Alophius flavirostris* (part.), auct. plur. (nec Rüppell).
Lophoceros leucomelas Shelley, The Ibis, p. 67 (1888).
Alophius flavirostris var. *leucomelas* Dubois, Syn. Avium, Vol. 1, p. 104 (1899).
11. **Alophius flavirostris** var. **elegans** (Hartlaub). South-western Africa
Tockus elegans Hartlaub, Proc. Zool. Soc. Lond. p. 86, pl. 4 (1865).
Tockus et *Alophius flavirostris* (part.), auct. plur.
Lophoceros elegans Shelley, The Ibis, p. 68 (1888).
Alophius flavirostris var. *elegans* Dubois, Syn. Avium, Vol. 1, p. 104 (1899).
Lophoceros leucomelas 2, von Erlanger, Journ. f. Ornith. p. 444 (1905).
12. **Alophius flavirostris** var. **somaliensis** (Reichenow). Somaliland.
Lophoceros somaliensis Reichenow, Journ. f. Ornith. p. 96 (1894).
Alophius flavirostris var. *somaliensis* Dubois, Syn. Avium, Vol. 1, p. 104 (1899).
13. **Alophius deckeni** (Cabanis). Eastern and E.-central Africa.
Buceros (Rhynchaceros) deckeni Cabanis, von der Decken's Reisen O.-Afr. Vol. 3, p. 36, pl. 6 (1869).
Buceros deckeni Finsch & Hartlaub, Vög. O.-Afr. p. 489 (1870).
Rhynchaceros deckeni Cabanis, Journ. f. Ornith. p. 235, pl. 2 (1870).
Tockus bocagei Oustalet, Bull. Soc. Phil. p. 161 (1881); Rochebrune, Faun. Sénégal. Ois. p. 121, pl. 13.
Tockus deckeni Elliot, Monogr. Bucerot. pl. 57 (1882).
Alophius deckeni Dubois, Bull. Mus. Hist. Nat. Belg. Vol. 3, p. 217 (1884).

Lophoceros deckeni Shelley, The Ibis, p. 68 (1888).

Lophoceros sibbensis Sharpe, ibidem, p. 382 (1895).

Alopius deckeni var. *sibbensis* Dubois, Syn. Avium, Vol. 1, p. 103 (1899).

14. ***Alopius deckeni* var. *jacksoni*** (Ogilvie-Grant).

Torquel, Suk (Jackson).

Lophoceros jacksoni Ogilvie-Grant, The Ibis, p. 127 (1891); Cat. Birds Brit. Mus. Vol. 17, p. 416, pl. 13 (1892).

Alopius deckeni var. *jacksoni* Dubois, Syn. Avium, Vol. 1, p. 103 (1899); Reichenow, Vög. Afr. Vol. 2, p. 266 (1904).

EXPLANATION OF PLATES

PLATE 1

Fig. 1. *Bucorvus abyssinicus* (Boddaert).

— 1a. — — (right foot from inside).

— 2. *Buceros rhinoceros* Linnæus.

— 3. *Dichoceros bicornis* (Linnæus).

— 3a. — — (right foot from inside).

— 4. *Hydrocorax planicornis* (Merrem).

— 5. *Anthracoceros coronatus* (Boddaert).

— 5a. — — (left foot from inside).

PLATE 2

Fig. 1. *Penelopides panini* (Boddaert).

— 2. *Rhabdotorrhinus exaratus* (Temminck).

— 3. *Cranorrhinus cassidix* (Temminck).

— 4. *Ceratogymna elata* (Temminck).

— 5. *Rhytidoceros undulatus* (Shaw).

— 6. *Aceros nepalensis*, Hodgson.

— 7. *Anorrhinus galeritus* (Temminck).

— 8. *Lophoceros melanoleucus* (Lichtenstein).

PLATE 3

Fig. 1. *Alopius erythrorhynchus* (Temminck).

— 2. *Bycanistes buccinator* (Temminck).

— 3. *Bycanistes fistulator* (Cassin), mas. and fem.

— 3a. — — (underneath from the wing).

— 4. *Ortholophus albocristatus* var. *macroura* (Bonaparte).

— 5. *Rhinoplax vigil* (Forst).

Uccle near Brussels, 15th May 1911.

FAM. BUCEROTIDÆ

1, 1a. BUCORVUS ABYSSINICUS. 2. BUCEROS RHINOCEROS. 3, 3a. DICHOCEROS BICORNIS. 4. HYDROCORAX PLANICORNIS.
5, 5a. ANTHRACOCEROS CORONATUS.

FAM. BUCEROTIDÆ

1. PENELOPIDES PANINI. 2. RHABDOTORRHINUS EXARATUS. 3. CRANORRHINUS CASSIDIX. 4. CERATOGYMNA ELATA.
5. RHYTDOCEROS UNDULATUS. 6. ACEROS NEPALENSIS. 7. ANORRHINUS GALERITUS. 8. LOPHOCEROS MELANOLEUCUS.

FAM. BUCEROTIDÆ

1. ALOPHIUS ERYTHORHYNCHUS. 2. BYCANISTES BUCCINATOR. 3, 3a. B. FISTULATOR. 4. ORTHOLOPHUS MACROURUS.
5. RHINOPLAX VIGIL.

14TH PART

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PICARIÆ

FAM. MEROPIDÆ

by Dr CARL PARROT

WITH 1 COLOURED PLATE

1911

PRICE 6/10 (FR. 8.40)

FAM. MEROPIDÆ

FAM. MEROPIDÆ

BY Dr CARL PARROT

THE *Meropidae* (Bee-eaters) form one of the most sharply defined and characteristic groups of the great order *Picariae*, suborder *Coraciae*. From their morphological features it is difficult to say to which other group they are most nearly related, for there are close affinities to the family *Alcedinidae* while it cannot be denied either that the *Meropidae* are also, though more distantly, allied to the *Todidae* and *Momotidae*.

The bee-eaters differ from the other six families of the *Coraciae* by having the episternal process forked (as in the majority of the *Passeres*) and perforated so as to receive the feet of the coracoids (as in the *Upupidae* and *Bucerotidae*). Some authors are inclined to place the *Meropidae* between the *Coraciidae* and the *Galbulidae*.

The most essential characters of the Meropine structure may be summarised as follows : The skull is desmognathous and has a deep groove; the palate is desmognathous; the nasalia are holorhine, the basypterygoid processes are absent; the sternum has four notches on the posterior edge (episternal process vidè suprà); the crista sterni is produced into a distinct point; the scapula is very long and relatively broad. The tongue is narrow, elongated and ends in horny filaments; the œsophagus lacks a crop, the gizzard is provided with a very thick enticula; the right liver-lobe is much enlarged; the coeca are present. Generally there is only the left carotid developed, but in *Nyctiornis* there are two. The oil-gland is nude. The epinal tract is well defined on the neck, but divided into two tracts on the upper back; the pectoral tract has also an outer branch.

The Bee-eaters are slender, delicately built birds. The bill is longer than the head, acutely pointed, with both mandibles curved, the sides compressed and sloping from the culmen,

which, as a rule, has a distinct ridge; the nostrils are basal, lateral, rounded, partly or entirely hidden by short, stiff feathers or bristles. The tarsus is very short, often feathered on the upper part, sometimes bare, sometimes covered in front with narrow transverse scales or scutellæ. The three anterior toes are rather long, the lateral ones more or less united to the middle toe; the hind toe is also relatively long and broadly padded beneath; the claws are moderately long, curved and acute. The tail, long and rather broad, consists of twelve rectrices and is sometimes square, sometimes rounded or forked; the middle feathers are often prolonged beyond the lateral ones. The wing is more or less elongate and pointed; the first primary is rudimentary; either the second is the longest or the third and fourth form the tip of the wing. The iris of the adults is as a rule bright red. The sexes are alike in plumage, but the female is somewhat smaller than the male. The young birds are of a more uniform and fallow coloration, sometimes duller, sometimes lighter.

Habits and Reproduction. The *Meropidae* are very active birds, have a graceful, extremely rapid flight which somewhat resembles that of the swallows, and a loud, sometimes cheerful and chirruping whistling, sometimes a hoarse, repeatedly uttered note. They prefer well-watered countries, especially the neighbourhood of rivers, and frequent the sparingly covered plains and open forests, some migrating, others remaining all the year in the same locality. They usually perch on commanding branches or other objects, from which they are likely to have a good out-look for espying their food, which consists only of flying insects (wasps, bees, dragon-flies, bugs and even butterflies). On migrating they are usually seen in large or small flocks, flying backwards and forwards in graceful sweeps for long periods without resting, and catching its prey entirely on the wing.

The young, being helpless at the beginning of their life, are reared in horizontal holes, digged by their parents in perpendicular banks of rivers, in earthy embankments or in crumbly rocks (sometimes in old quarries and pits); the entrance is small, reaching inwardly to the depth of a yard or more and having at the end of the tube a roomy chambre; the eggs, from four to eight in a clutch, are pure white, glossy and roundish, and are deposited on the bare ground or on a lining of remains of food (fragments of insects) and ejectamenta. It has been reported that some species lay their eggs in the holes of trees.

Range. The distribution of the *Meropidae* is very wide, extending as it does over the temperate and tropical portions of the Old World. The majority of the species are to be found in Africa, where also the origin of the family is probably to be looked for. Up to-date we know about fifty species and subspecies of Bee-eaters, of which twenty-nine are purely African.

Bibliography. Levaillant, Hist. Nat. des Promerops et des Guépriers fais. suite à celle des Oiseaux de Paradis : Hist. Nat. Guépriers, 2^{de} partie (1807); Gould, Birds Australia, Vol. 2 (1840); Nitzsch, in Burmeister, Syst. Pterylographie (1840); G. R. Gray, Gen. of Birds, Vol. 1, p. 85-87 (1844-1849); Gould, Birds Asia, Vol. 1 (1850-1873); Bonaparte, Consp. Gen. Avium, Vol. 1, p. 160-164 (1850); Reichenbach, Handb. Spec. Ornith. Meropinae, p. 61-83 (1852); Cabanis & Heine, Mus. Heinean. 2. Theil, p. 132-142 (1859-60); Schlegel, Mus. Hist. Nat. Pays-Bas, Vol. 3, Merops (1863); Huxley, Proc. Zool. Soc. Lond. 1867, p. 467 ff. (Classif.); Garrod, Proc. Zool. Soc. Lond. 1873, p. 631; 1874, p. 117 (Anatomy); Dresser, Monogr. Meropidae (1884-86); Sharpe, Review rec. attempts classify Birds (1884); Newton, Encycl. Britann. Vol. 18, Ornith. (1884); Fürbringer, Untersuch. Morphol. und System. Vögel, Vol. 2,

p. 1568 (1888); Seebohm, *Classif. of Birds*, p. 21 (1890); Sharpe, *Cat. Birds Brit. Mus.* Vol. 17, p. 41-92 (1892); Oates, *Handb. Birds Brit. Burmah*, Vol. 2, p. 63-69 (1883); Newton, *Diction. of Birds*, p. 29 (1893); Bronn-Gadow, *Klassen und Ordnungen des Thierreichs. Vögel*, 2. Syst. Theil, p. 232 (1893); Blanford, *Fauna Brit. Ind. Birds*, Vol. 3, p. 109-117 (1895); Kuschel, *Journ. f. Ornith.* 1895, p. 223 ff. (Oology); Meyer & Wigglesworth, *Birds Celebes*, Vol. 1, p. 247-261 (1898); Sharpe, *Hand-list Gen. and Spec. Birds*, p. 72-75 (1900); Neumann, *Journ. f. Ornith.* 1900, p. 217-220; 1905, p. 191-193; Finsch, *Notes Leyd. Mus.* Vol. 23, p. 1-14 (1901-03); Reichenow, *Vögel Afrikas*, Vol. 2, p. 301-332 (1902-03) (Review of the African Species); Naumann, *Naturgesch. Vögel Mitteleuropas*, 3. (Folio) Aufl. Vol. 4, p. 330; von Erlanger, *Journ. f. Ornith.* 1905, p. 452-457; Hesse, *ibidem* 1907, p. 225 (Anatomy).

Two subfamilies of the *Meropidae* can be distinguished.

SUBFAM. A. — MEROPINÆ

The breast-plumes of normal shape, the nostrils partially covered by bristles. Birds of slender build and small or moderate size. Sociable in their habits, they frequent open places, steppes and plains, breeding as a rule in colonies and wandering from place to place, according to the change of season or, when inhabitants of temperate regions, performing regular migrations.

SUBFAM. B. — NYCTIORNINÆ

The breast-plumes broad, elongated and pendent; the nasal apertures hidden by dense bristles; birds of rather stout shape and of medium or large size; inhabitants of dense forests, even in the mountains, sociable or living in couples, but not strictly migratory.

A. MEROPINÆ

The *Meropinae* are conveniently divided into four genera.

KEY TO THE GENERA OF THE MEROPINÆ

1. *First primary much longer than the primary coverts* 2.
- *First primary shorter or but slightly longer than the primary coverts; central tail-feathers elongated* 1. Genus MEROPS.
2. *Central tail-feathers elongated* 2. Genus ÆEROPS.
- *Central tail-feathers not elongated* 3.
3. *Tail very distinctly forked* 3. Genus DICROCERCUS.
- *Tail square* 4. Genus MELITTOPHAGUS.

1. GENUS MEROPS LINNÆUS

Merops Linnæus, *Syst. Nat.* Vol. 1, p. 182 (1766) (type: *M. apiaster*); cf. Sharpe, *Cat. Birds Brit. Mus.* Vol. 17, p. 58 (1892).

Characters. Bill long, curved and pointed, with the culmen ridged, the sides compressed, the tip very acute; gape-line curved, the gonys very long and arched; nostrils basal, lateral,

roundish, and covered with a few short hairs, nasal membrane short. Wings long, pointed, covering two-thirds of the length of the tail, the first quill rudimentary, shorter or but very little longer than the primary coverts, the second primary longest, the third rather shorter; scapulars shorter than the secondaries. Tail long, even, with the ends of the two middle feathers elongated beyond the others and pointed. Tarsi very short and covered in front with narrow transverse scales, or indistinctly scutellate; toes rather long, slender, the lateral ones unequal, the outer toe being slightly longer, united as far as the second joint to the middle toe. The lower part of the tibia bare.

These birds are, as a rule, very gregarious and are seen in large flocks, frequenting open places and the borders of forests, chiefly near water, and breeding in colonies.

The forms belonging to the species *M. muelleri* inhabit dense forests and live in couples.

Geographical Distribution. Africa, Madagascar, Southern Europe, Central Asia, India, eastwards to Australia and New Guinea.

KEY TO THE SPECIES AND SUBSPECIES

1. Breast green or blue	2.
— Breast pink or rose colour	19.
2. Back and scapulars chestnut as well as the wings; head purplish blue like the breast	3.
— Back and scapulars not chestnut	4
3. Back dark purplish maroon, the forehead bright cobalt, with whitish stripes	<i>M. MUELLERI MUELLERI.</i>
— Back light chestnut, forehead dark blue, the base of the forehead somewhat paler	<i>M. MUELLERI MENTAUIS.</i>
4. Scapulars green, lower back, rump and upper tail-coverts silvery cobalt, tail blue	5.
— Scapulars ochre yellow like the lower back and rump; upper tail-coverts and tail green	<i>M. APIASTER.</i>
5. Mantle chestnut	6.
— Mantle green.	7.
6. Head and mantle bay	<i>M. AMERICANUS AMERICANUS (ad.).</i>
— Head and mantle deep chestnut	<i>M. AMERICANUS SUMATRANUS (ad.).</i>
7. Mantle dark green	<i>M. AMERICANUS (juv.).</i>
— Mantle grass-green	8.
8. Upper throat yellow, succeeded by chestnut	9.
— Upper throat blue, green or greenish yellow, followed by a narrow line of black, head green or brown washed with green	15.
9. Foreneck with a broad black patch, tail black, washed or edged with blue	<i>M. ORNATUS (ad.).</i>
— Foreneck not black	10.
10. Tail black, washed or edged with blue	<i>M. ORNATUS (juv.).</i>
— Tail blue	11.
— Tail green or golden olive	12.
11. General colour above green, frontal band pale blue	<i>M. SUPERCILIOSUS PHILIPPINUS.</i>
— General colour above golden olive, frontal band yellowish white	<i>M. SUPERCILIOSUS SALVADORII.</i>

12. Forehead, eyebrow and cheek stripe blue, head above light green 14.
 — Forehead, eyebrow and cheek stripe white, head above brown 13.
 13. Colour of head and back contrasted with colour of throat and jugulum . M. SUPERCILIOSUS SUPERCILIOSUS.
 — Colour of head and back scarcely different from that of throat and foreneck,
 upper parts paler. M. SUPERCILIOSUS DONALDSONI.
 14. General colour above grass-green or washed with blue M. SUPERCILIOSUS PERSICUS.
 — General colour above more yellowish green, the central rectrices more
 elongated. M. SUPERCILIOSUS SAHARÆ.
 15. Upper throat blue 16.
 — Upper throat not blue 17.
 16. Head brown, washed with yellowish green M. VIRIDIS VIRIDIS.
 — Head green, suffused with yellow, blue on the forehead 18.
 17. Upper throat green or yellowish green. M. VIRIDIS VIRIDISSIMUS.
 — Upper throat greenish yellow or chrom-yellow M. VIRIDIS REICHENOWI.
 18. Entire forehead and a broad eyebrow deep blue M. VIRIDIS CYANOPHRYS.
 — A narrow line at the base of the forehead and a narrow eyebrow blue . . M. VIRIDIS MUSCATENSIS.
 19. Back crimson-pink; head bluish green; lower back and rump bright cobalt
 blue 20.
 — Back dark ashy-grey with a rosy shade, chin and cheeks white . . . M. MALIMBICUS.
 20. Throat bluish green, breast rosy pink M. NUBICUS NUBICUS.
 — Checks and under surface of body rosy pink M. NUBICUS NUBICOIDES.

1. *Merops muelleri muelleri* (Cassin). (Plate, Fig. 4.)

Meropiscus muelleri Cassin, Journ. Acad. Nat. Sc. Philad. 1857, p. 37 (Muni-river); cf. Sharpe, Cat. Birds Brit. Mus. Vol. 17, p. 59 (1892).

Merops batesiana Sharpe, Bull. Brit. Ornith. Club, Vol. 10, p. 48 (1900) (French Congo).

Fig. notab. Cassin, Journ. Acad. Nat. Sc. Philad. (2), Vol. 4, pl. 49, f. 2 (1860).

Hab. West Africa, from the Southern and Eastern Cameroons to Gaboon (Jaunde, Barombi, Bonge, Benito, Muni, River Ja).

2. *Merops muelleri mentalis* Cabanis.

Merops mentalis Cabanis, Journ. f. Ornith. 1889, p. 78 (Kamerun).

Merops marionis Alexander, Bull. Brit. Ornith. Club, Vol. 13, p. 33 (1903). (Bakaki [Fernando Po]).

Merops northcotti Sharpe, ibidem, Vol. 10, p. 49 (1900) (Gold Coast).

Fig. Dresser, Monogr. Merop. pl. 30 (1885).

Hab. West Africa, from the forests of the Gold Coast to the Sanaga river; mountainous districts of the Cameroons (Fantee, Lake Barombi, Bibundi); Fernando Po.

3. *Merops apiaster* Linnæus. (Plate, Figs. 1, 1a, 1b.)

Merops apiaster Linnæus, Syst. Nat. Vol. 1, p. 182 (1776) (« Europa australi, Oriente »); cf. Sharpe, Cat. Birds Brit. Mus. Vol. 17, p. 63 (1892).

Merops congener Linnæus, Syst. Nat. Vol. 1, p. 183 (1766) (« Europa australi »).

Merops apiarius Stephens, in Shaw, Gen. Zool. Vol. 13, Pt. 2, p. 73 (1825) (« Britain » etc.).

Merops hungariae Brehm, Vög. Deutschl. p. 146 (1831) (Ungarn).

Merops elegans Brehm, Vogelfang, p. 50 (1855).

Fig. notab. Albin, Nat. Hist. Birds, Vol. 2, pl. 44 (1738); Montbeillard, Hist. Nat. Ois. Vol. 6, p. 23 (1779); Levaillant, Hist. Nat. Parad. et Guép. Vol. 3, pls. 1, 2 (1807); Naumann, Vög. Deutschl. Vol. 5, pl. 143 (1826); Werner, Atl. Alcyons, pl. 2 (1827); Gould, Birds Europ. Vol. 2, p. 59 (1837); Sundevall, Svensk. Fogl. pl. 70 f. 1 (1856); Fritsch, Vög. Europ. pl. 14, f. 3 (1870); Dresser, Monogr. Merop. pl. 18 (1884); Birds Europ. pl. 295 (1877); Naumann, Naturg. Vögel. Mitteleur. Vol. 4, pl. 37.

Hab. Southern Europe, extending to Central Asia, north to the Altai-mountains, south to the North-west Provinces of India, occurring in winter throughout the whole of Africa; it is also said to breed on the Cape of Good Hope and is common as a summer migrant in Morocco, Algeria and Tunisia.

4. *Merops americanus americanus* P. L. S. Müller.

Merops americanus P. L. S. Müller, Syst. Nat. Suppl. p. 95 (1776) (ex Buff. Daubenton, Isle de France; locality erroneous).

Merops bicolor Boddaert, Tabl. Enl. p. 15 (1783) (ex Daubenton, same locality; cf. Sharpe, Cat. Birds Brit. Mus. Vol. 17, p. 60 (1892)).

Merops badius Gmelin, Syst. Nat. Vol. 1, p. 462 (1788) (ex Brisson et Daubenton : Franciæ insula, ad fluv. Senegal), partim.

Merops castaneus Latham, Ind. Ornith. Vol. 1, p. 273 (1790) (ex Brisson et Daubenton : same locality), partim.

Merops hypoglaucus Reichenbach, Handb. Merop. p. 76 (1852) (« angebl. aus Ostindien »), juv.

Fig. notab. Daubenton, Pl. Enl. pl. 252; Brisson, Ornith. Vol. 4, p. 43, f. 2 (1760) « Petit Guespier des Philippines »; Dresser, Monogr. Merop. pl. 7 (1884).

Hab. Confined to the Philippine Archipelago.

5. *Merops americanus sumatranus* Raffles.

Merops sumatranus Raffles, Trans. Linn. Soc. Lond. Vol. 13, p. 294 (1821) (Sumatra); cf. Sharpe, Cat. Birds Brit. Mus. Vol. 17, p. 61 (1892).

Merops cyanopygius Lesson, Traité d'Ornith. p. 238 (1831) (Patr. non indic.; ex « Sumatra and Java », fide Pucheran, Rev. Mag. Zool. p. 391 (1853)).

Merops rochechouardi Heude, Ann. Sc. Nat. Zool. p. 39 (1873) (teste Dresser).

Fig. Walden, Trans. Zool. Soc. Lond. Vol. 9, pl. 26, f. 2 (1875); Dresser, Monogr. Merop. pl. 6 (1884).

Hab. From Southern China to Cochin China and Siam, the Malay Peninsula, Java, Sumatra and Borneo.

6. *Merops ornatus ornatus* Latham.

Merops ornatus Latham, Ind. Ornith. Suppl. p. XXXV (1801) (Nova Hollandia; cf. Sharpe, Cat. Birds Brit. Mus. Vol. 17, p. 74 (1894)).

Merops tenuipennis ou *M. Thonini* Dumont, Dict. Sc. Nat. (Levrault), Vol. 20, p. 52 (1821) (ex Levaillant, local, correct. : « Aux Terres Australes »).

Merops melanurus Vigors & Horsfield, Trans. Linn. Soc. Lond. Vol. 15, p. 208 (1826) (« Conflux of Grose and Hawkesbury Rivers, Australia »).

Merops modestus Oustalet, Bull. Assoc. Fr. p. 248 (1878).

Fig. Latham, Gen. Syn. Suppl. 2 pl. 128 (1801); Levaillant, Hist. Nat. Guép. pl. 4 (1807); Lewin, Nat. Hist. Birds N. S. Wales, pl. 2 (1822); Gould, Birds Austr. Vol. 2, pl. 16 (1840); Reichenbach, Handb. Merop. pl. 446, ff. 3233, 3234 (ca. 1852); Dresser, Monogr. Merop. pl. 14 (1884); Meyer & Wieglesworth, Birds Celebes, pl. 8, f. 13 (tail).

Hab. Australia, the Papuan Islands and Moluccas to Celebes, Timor, Flores and Sumba 1).

7. *Merops superciliosus superciliosus* Linnæus.

Merops superciliosus Linnæus, Syst. Nat. Vol. 1, p. 183 (1766) (Madagascar; cf. Sharpe Cat. Birds Brit. Mus. Vol. 17, p. 70 (1892)).

Merops ruficapillus Vieillot, Nouv. Dict. Hist. Nat. Vol. 14, p. 23 (1817) (« passe par la Caffrérie »).

Merops vaillantii Bonaparte, Consp. Gen. Avium, Vol. 1, p. 161 (1950) (ex Madagascar).

Fig. notab. Brisson, Ornith. pl. 62, fig. (1760); Daubenton, Pl. Enl. pl. 259; Levaillant, Hist. Nat. Guép. Vol. 3, pl. 19 (1807); Dresser, Monogr. Merop. pl. 17 (1884).

Hab. Madagascar and adjacent islands; occurring also in various parts of the African continent.

8. *Merops superciliosus donaldsoni* Oberholser.

Merops superciliosus donaldsoni Oberholser, Proc. U. S. Nat. Mus. Vol. 27, p. 737 (1904) (Somali Land).

Hab. Somali Land (Fanole, Dawa River, Umfudu) and British East Africa.

9. *Merops superciliosus persicus* Pallas.

Merops persicus Pallas (part. Synon. *M. superciliosus*), Reise Russ. Reichs, Vol. 2, Anhang, p. 708 (1773) (mare Casp., Gurjevac); cf. Sharpe, Cat. Birds Brit. Mus. Vol. 17, p. 66 (1892).

Merops aegyptius Forskål, Descr. Animal. Aves p. 2 (1775) (Egypten).

Merops ruficollis Vieillot, Nouv. Dict. Hist. Nat. Vol. 14, p. 22 (1817) (« Egypte »).

1) The form *M. sumbaensis* A. B. Meyer (Sitzungsber. Ges. Isis Dresden, 1884, pp. 6, 19), typ. local. : Sumba, cannot be maintained on account of the colour-differences mentioned by its describer (viz. more bluish on the breast and less brownish suffusion on the head), but it seems that Australian specimens are rather larger. The species is, moreover, very likely to be only a winter visitor to the island of Sumba.

- ? *Merops savignyi* Audouin, Expl. Somm. Planch. d'Ois. de l'Egypte, par Savigny, p. 371 (1825) (« toute l'Afrique »).
 Fig. notab. Levaillant, Hist. Nat. Guép. pl. 6 et 6 bis. Sub-nom. : Guépier Savigny, Egypt.; Dresser, Birds Europe, Vol. 5, pl. 296 (1877); Monogr. Merop. pl. 16 (1884).
 Hab. North Africa (Egypt), South-Western Asia, Persia, to the north western provinces of India to the Caucasus and Turkestan, occasionally in South-Eastern Europe, occurring from Nubia (breeding?) to Damara Land, Natal and Cape Colony in winter.

10. ***Merops superciliosus saharæ* Neumann.**

- Merops persicus saharæ* Neumann, Ornith. Monatsb. 1908, p. 28, (Tora, Lake Tsad).
 ? *Merops longicauda* Vieillot, Nouv. Dict. Hist. Nat. Vol. 14, p. 15 (1817) (Malimbe).
 ? *Merops chrysocercus* Cabanis & Heine 1), Mus. Heinean. Vol. 2, p. 139 (1859-1860) (Senegal).
 Fig. Neumann, Journ. f. Ornith. 1899, pl. 16.
 Hab. Oases of the Sahara, from Biskra to Lake Tsad; occurring perhaps also in Senegambia and the Congo State.

11. ***Merops superciliosus philippinus* Linnæus.**

- Merops philippinus* Linnæus, Syst. Nat. ed. 13, Vol. 1, p. 183, no. 5 (1766) (in insul. Philippinis); cf. Sharpe, Cat. Birds Brit. Mus. Vol. 17, p. 71 (1892).
Merops javanicus Horsfield, Trans. Linn. Soc. Lond. Vol. 13, p. 171 (1820) (Java).
Merops philippensis Stephens in Shaw, Gen. Zool. Vol. 13, Pt. 2, p. 75 (1826) (Philippine Isles).
Merops daudin Cuvier, Règne Anim. Vol. 1, p. 442 (1829) (ex Levaillant : Philippines).
Merops cyanorrhos Temminck, in Mus. Leyd. fide Cabanis, Mus. Heinean. Vol. 2, p. 139 (1859-60).
Merops philippinus var. *celebensis* Blasius, Zeitschr. Ges. Ornith. Vol. 2, p. 239 (1885) (Celebes).
 Fig. Brisson, Ornith. Vol. 4, pl. 43, f. 1 (1760); Daubenton, Pl. Enl. Vol. 6, p. 57; Levaillant, Hist. Nat. Guép. pl. 14 (1807); Gould, Birds Asia, Vol. 1, pl. 36 (1855); Reichenbach, Handb. Merop. pl. 444, ff. 3227, 3228 (1852); Dresser, Monogr. Merop. pl. 15 (1884); Meyer & Wigglesworth, Birds Celebes, pl. 8, f. 2 (1898) (tail).
 Hab. Philippines, Moluccas, Malay Peninsula, Indian Peninsula, Indo-Chinese provinces, Ceylon, Celebes.

12. ***Merops superciliosus salvadorii* A. B. Meyer.**

- Merops salvadorii* Meyer, The Ibis, p. 293 (1891) (New Britain); cf. Sharpe, Cat. Birds Brit. Mus. Vol. 17, p. 72, note (1892).
 Fig. Meyer, Journ. f. Ornith. pl. 1, f. 1 (1901).
 Hab. New Britain, German New Guinea.

13. ***Merops viridis viridis* 2) Linnæus.**

- Merops viridis* Linnæus, Syst. Nat. Vol. 1, p. 182 (1766) (Java, Bengala); cf. Sharpe, Cat. Birds Brit. Mus. Vol. 17, p. 78 (1892) part.
Merops coromandus Latham, Ind. Ornith. Vol. 1, p. 272 (1790) (India, Coromandela).
Merops orientalis Latham, Ind. Ornith. Suppl. p. XXXIII (1801) (India).
Merops caeruleus Latham, ibidem, p. XXXIII (1801) (« Habitatio dubia »).
Merops lamark Cuvier, Règne Anim. Vol. 1, p. 442 (1829) (« grande partie de l'Inde et de l'Afrique »).
Merops indicus Jerdon, Madr. Journ. Vol. 2, p. 227 (1840) (« in numbers over all India »).
Merops luteus Reichenbach, Handb. Merop. p. 75 (1852) (Coromandel).
Merops ferrugiceps Hodgson in Gray's Zool. Miscell. p. 82 (1844). Nomen nudum.
Merops torquatus Hodgson, ibidem, p. 81 (1844). Nomen nudum.
 Fig. notab. Albin, Nat. Hist. Birds, Vol. 3, pl. 30 (1740); Edwards, Nat. Hist. Birds, Vol. 4, pl. 183 (1751); Gould, Birds Asia, Vol. 1, p. 35 (1855); Dresser, Monogr. Merop. pl. 9 (1886).
 Hab. Persia, Baluchistan, Indian Peninsula and Ceylon, eastwards through the Burmese countries to Cochin China.

14. ***Merops viridis viridissimus* Swainson.**

- Merops viridissimus* Swainson, Birds West Afr. Vol. 2, p. 82 (1837) (Senegal?).
Merops viridis Linnæus, cf. Sharpe, Cat. Birds Brit. Mus. Vol. 17, p. 78 (1892) part.
 Fig. notab. Brisson, Ornith. Vol. 4, pl. 42, f. 2 (1760); Daubenton, Pl. Enl. Vol. 6, pl. 740; Levaillant, Hist. Nat. Guép. pl. 10 (1807); Dresser, Birds Europe, Vol. 5, pl. 297 (1876); Dresser, Monogr. Merop. pl. 8 (1884).
 Hab. North-western Africa (Senegambia) and North-eastern Africa (Egypt, Sudan).

1) Probably winter- or immature plumage.

2) *M. viridis viridis* is probably to be subdivided into several forms. Birds from Ceylon are always smaller, those from Baluchistan are lighter.

15. ***Merops viridis reichenowi*** Parrot.

Merops viridis reichenowi Parrot, Ornith. Monatsber. Vol. 18, p. 13 (1910) (Salomona, Eritrea).
 Hab. Eritrea, Abyssinia, Nubia (Chartum, Shendi).

16. ***Merops viridis cyanophrys*** (Cabanis & Heine).

Plathyrus cyanophrys Cabanis & Heine, Mus. Heinean. Vol. 2, p. 137 (1860) (Arabien).
Merops cyanophrys Cabanis & Heine, cf. Sharpe, Cat. Birds Brit. Mus. Vol. 17, p. 83 (1892).
 Fig. Heuglin, Ornith. Nordost-Afr. Vol. 1, pl. 6 (1869).
 Hab. Southern Arabia.

17. ***Merops viridis muscatensis*** Sharpe.

Merops muscatensis Sharpe, The Ibis, 1886, pp. 15, 65 (Muscat, N. E. Arabia).
Merops muscatensis Sharpe, cf. Cat. Birds Brit. Mus. Vol. 17, p. 82 (1892).
 Fig. Dresser, Monogr. Merop. pl. 10 (1886).
 Hab. Neighbourhood of Muscat (Eastern Arabia).

18. ***Merops malimbicus*** Shaw.

Merops malimbicus Shaw, Nat. Miscell. Vol. 17, p. 701 (1806) (Malimba); cf. Sharpe, Cat. Birds Brit. Mus. Vol. 17, p. 86 (1892).
 Fig. Daudin, Ann. Mus. Hist. Nat. Vol. 2, pl. 62, f. 1 (1803); Levaillant, Hist. Nat. Guép. pl. 5 (1807); Reichenbach, Handb. Merop. pl. 452, ff. 3256, 3257 (1852); Dresser, Monogr. Merop. pl. 19 (1884).
 Hab. West Africa, from the Gold Coast to Loango.

19. ***Merops nubicus nubicus*** Gmelin.

Merops nubicus Gmelin, Syst. Nat. Vol. 1, p. 464 (1788) (Nubia); cf. Sharpe, Cat. Birds Brit. Mus. Vol. 17, p. 85 (1892).
Merops superbus Pennant, Ind. Zool. Suppl. p. 33 (1790).
Merops caeruleocephalus Latham, Ind. Ornith. Vol. 1, p. 274 (1790) (« in Nubia »).
 Fig. notab. Daubenton, Pl. Enl. pl. 649; Shaw & Nodder, Nat. Miscell. Vol. 3, pl. 78 (1791); Levaillant, Hist. Nat. Guép. pl. 3 (1807); Dresser, Monogr. Merop. pl. 20 (1884); Journ. f. Ornith. 1905, pl. 9.
 Hab. West Africa, from the Senegal to the Niger; East equatorial Africa, from Abyssinia to the Rufiji (Zanzibar district).

20. ***Merops nubicus nubicoides*** Des Murs & Pucheran.

Merops nubicoides Des Murs & Pucheran, Rev. Zool. 1846, p. 243 (Port Natal).
Merops natalensis Reichenbach, Handb. Merop. p. 78 (1852) (Port Natal); cf. Sharpe, Cat. Birds Brit. Mus. Vol. 17, p. 84 (1892).
 Fig. notab. Layard, Birds South Africa, pl. 4, f. 2 (1876); Dresser, Monogr. Merop. pl. 21 (1884).
 Hab. South Africa, from Natal to Niassa Land, and westwards, from Damara Land into the Upper Congo region.

2. GENUS **ÆROPS** REICHENBACH

Ærops Reichenbach, Handb. Merop. 1852, p. 82 (type : *Merops albicollis* Vieillot).

Characters. The first primary is much longer than the primary coverts, the second is shorter than the third, the two central rectrices are much elongated and attenuated at the end. Otherwise much like *Merops*.

These birds are also gregarious, frequenting both the forests and the steppes, and seem to be migrants or partial migrants. Three forms (two undoubtedly subspecies and one species) can be distinguished.

Geographical Distribution. The genus is confined to the Ethiopian region.

KEY TO THE FORMS

1. *General colour above pale green, upper throat white; crown, a broad stripe through the eye, and broad band across the throat black* 2.
 — *General colour above bright green, upper throat rufous buff like the crown and nape, a blackish terminal band on the tail* *ÆROPS BOEHMI*.
 2. *Smaller (wing 91-97 mm.), the band across the throat narrower.* *ÆROPS ALBICOLLIS ALBICOLLIS*.
 — *Larger (wing 98-108 mm.), the band across the throat rather broader* *ÆROPS ALBICOLLIS MAJOR* (♂).

1. *Ærops boehmi* (Reichenow).

Merops (Melittophagus) boehmi Reichenow, Journ. f. Ornith. 1882, p. 233 (Bumi district); cf. Sharpe, Cat. Birds Brit. Mus. Vol. 17, p. 83 (1892).

Merops dresseri Shelley, Proc. Zool. Soc. Lond. 1882, p. 303 (Rovuma River).

Fig. notab. Shelley, Journ. f. Ornith. 1882, pl. 2, f. 3; Proc. Zool. Soc. Lond. 1882, pl. 16; Dresser, Monogr. Merop. pl. 12 (1884).

Hab. East- and East Central Africa.

2. *Ærops albicollis albicollis* (Vieillot). (Plate, Figs. 2, 2a.)

Merops albicollis Vieillot, Nouv. Dict. Hist. Nat. Vol. 14, p. 15 (1817) (ex Levaillant, Hist. Nat. Guép. 1807, Senegal); cf. Sharpe, Cat. Birds Brit. Mus. Vol. 17, p. 76 (1892).

Merops cuvieri Lichtenstein, Verz. Doubl. Zool. Mus. Berl. p. 15 (1823) (Senegambia).

Fig. notab. Levaillant, Hist. Nat. Guép. pl. 9 (1807); Swainson, Zool. Ill. Vol. 2, pl. 76 (1821); Dresser, Monogr. Merop. pl. 13 (1884).

Hab. West Africa, from Senegambia to Gaboon (Western Senegal, Gambia, Sierra Leone, Liberia, Gold Coast, Togo, Nigeria, Cameroons); eastwards to Central Africa (« Congo », Stanley Falls) and East Central Africa (Unyoro, Lake Stephanie).

3. *Ærops albicollis major* Parrot.

Ærops albicollis major Parrot, Ornith. Monatsber. Vol. 15, p. 12 (1910) (Bagamoyo, East Africa).

Hab. Southern Arabia (Zahey); North-eastern Africa, south to the Zambesi River (Nubia, Kordofan, Eritrea, Abessinia, British East Africa, German East Africa), west to Central Africa (Uganda, Lado) and to the Upper and Lower Congo.

3. GENUS *DICROCERCUS* CABANIS & HEINE

Dicrocercus Cabanis & Heine, Mus. Heinean. Theil 2, p. 136 (type : *D. hirundineus*, Senegal); Sharpe, Cat. Birds Brit. Mus. Vol. 17, p. 41 (1892).

Characters. They are the same of those of the family, with the breast-plumes normal, but the tail deeply forked, the central rectrices not elongated; wings moderately long, pointed, the third primary longest; the second and fourth somewhat shorter and nearly equal in length; secondaries rather long, the elongated inner secondaries as long as the primaries. Feet small, tolerably stout, the lower portion of the tibia bare, the tarsus scutellate, toes moderately short; bill long, slender, acute; gape-line curved; nostrils roundish, nasal membrane short.

The swallow-tailed Bee-eaters are said to resemble *Merops apiaster* in habits, but they are more frequently found isolated or in pairs in the forests, flying high when in search of food, but also in localities near water.

Geographical Distribution. The genus, containing but one species with four subspecies, is confined to Africa.

KEY TO THE FORMS

1. Forehead and eyebrow blue, contrasting with colour of pileum, which is green. 2.
 — Forehead green like the pileum D. HIRUNDINEUS HIRUNDINEUS.
2. Throat band, abdomen and tail-coverts rich cobalt blue D. HIRUNDINEUS CHRYSOLAIMUS.
 — The blue of the belly, the tail-coverts and especially the throat band of a deeper tint D. HIRUNDINEUS HEUGLINI.
 — The blue colour still deeper; the belly and under tail-coverts pale ultramarine blue D. HIRUNDINEUS OMOENSIS.

1. *Dicrocercus hirundineus hirundineus* (Lichtenstein).

Merops hirundineus Lichtenstein, Cat. Rer. Nat. Rariss. p. 21 (1793; cf. Sharpe, Cat. Birds Brit. Mus. Vol. 17, p. 43 (1892).

Merops furcatus Stanley, in Salt's Voy. Abyss. Vol. 4, p. 57 (1814) (Mozambique?).

Merops hirundinaceus Vieillot, Nouv. Dict. Hist. Nat. Vol. 14, p. 21 (1817).

Melittophagus tarva Boie, Isis, 1828, p. 316 (« Rivière d'Orange, jusque sous le tropique »).

Merops faiva Cuvier, Règne Anim. Vol. 1, p. 442 (1829) (ex Levaillant, « Orange River »).

Merops hirundo Schalow, Journ. f. Ornith. 1886, p. 420.

Fig. notab. Levaillant, Hist. Nat. Guép. pl. 8; Sharpe, Cat. Birds Brit. Mus. Vol. 17, pl. 1, f. 1 (head) (1892); Dresser, Monogr. Merop. pl. 22.

Hab. South Africa, to the Zanzibar region on the east coast, and to Damara Land and Benguela on the west.

2. *Dicrocercus hirundineus chrysolaimus* (Jardine & Selby).

Merops chrysolaimus Jardine & Selby, Ill. Ornith. Vol. 2, pl. 99 (ca. 1829) (« Cape of Good Hope, Sierra Leone, Gambia »).

Dicrocercus furcatus Stanley, cf. Sharpe, Cat. Birds Brit. Mus. Vol. 17, p. 42 (1892).

Fig. Jardine & Selby, Ill. Ornith. Vol. 2, pl. 99 (ca. 1829); Sharpe, Cat. Birds Brit. Mus. Vol. 17, pl. 1, f. 2 (1892).

Hab. West Africa, from Senegambia to the Niger.

3. *Dicrocercus hirundineus heuglini* Neumann.

Dicrocercus hirundineus heuglini Neumann, Bull. Brit. Ornith. Club, Vol. 16, p. 113 (1906) (Bongo).

Merops azuror Lesson, Traité d'Ornith. p. 239 (1831).

Hab. North-eastern Africa : Upper White Nile and Gazelle River districts.

4. *Dicrocercus hirundineus omoensis* Neumann.

Dicrocercus hirundineus omoensis Neumann, Bull. Brit. Ornith. Club, Vol. 16, p. 114 (1906) (Koscha).

Hab. North-east Africa : Omo region.

4. GENUS MELITTOPHAGUS BOIE

Melittophagus Boie, Isis 1828, p. 316 (type : *M. pusillus* P. L. S. Müller).

Characters. The genus *Melittophagus* closely resembles *Merops*, but with the wings reaching to the middle of the tail and rounded, with the first quill much longer than the primary coverts, the second shorter than the third, the third longest; the secondaries are long, the inner ones much elongated; the tail is long, broad and nearly even, the outer feathers are slightly inclined outwards; the webs of the throat-feathers are dissolved, forming an indistinct barbe. The bill is long, rather slender, attenuated towards the tip, which is acute. The feet are small, rather stout; the lower part of the tibia is scantily feathered, the tarsus scutellate.

The species belonging to this genus are gregarious like their allies, but not so much as the true *Meropidae*; for they do not unite in such large flocks; looking out for prey they are sitting, as a rule, on the tops of lower bushes, sallying forth from there after flying insects. They are found in well-wooded plains, steppes or marshy localities, but some species, e. g. *M. gularis*, frequent dense forests, live in couples and seem to breed also in the holes of trees. Most of the species excavate their nest-holes in the banks of rivers.

Geographical Distribution. The Indian Peninsula and Ceylon, the Burmese countries, Siam, Malay Peninsula and Java, and the whole of tropical Africa, which is the proper home of the genus.

KEY TO THE SPECIES AND SUBSPECIES

1. Outer aspect of quills fawn-colour or chestnut, throat yellow or crimson 2.
- Outer aspect of quills green, throat yellow or white 11.
2. Outer aspect of quills fawn-colour; lateral tail-feathers fawn-coloured, with a black band at the end; throat yellow, with a black or blue band across its lower portion 3.
- Outer aspect of quills chestnut or blackish brown, tail-feathers black, throat crimson 9.
3. Size larger, wing more than 82 mm.; band on lower throat black, mostly narrowly bordered anteriorly with blue 4.
- Size smaller, wing less than 82 mm.; band on lower throat ultramarine-blue 7.
4. Forehead green like the crown 5.
- Forehead blue, a broad and long cobalt-blue superciliary stripe, the throat-band bordered anteriorly with a broad blue edging *M. PUSILLUS CYANOSTICTUS*.
5. Blue border to the throat-band absent or very narrow, the black terminal bar of the tail narrower 6.
- Blue border to the throat narrow, the black terminal bar of the tail broader, a distinct long azure-blue streak over the eye *M. PUSILLUS MERIDIONALIS*.
6. Eyebrow green *M. PUSILLUS PUSILLUS*.
- A tiny azure-blue streak over or behind the eye *M. PUSILLUS OCULARIS*.
7. Forehead green like the crown, the black bar of the tail narrower 8.
- Forehead and eyebrow blue, the black bar of the tail broader; size moderate *M. VARIEGATUS LAFRESNAYEI*.
8. A little blue over the eye, forming an indistinct eyebrow, the band on lower throat rich ultramarine-blue, under parts lighter; size small *M. VARIEGATUS VARIEGATUS*.
- A blue spot in front of, an indistinct blue streak over the eye, the band on lower throat bluish black, under parts darker; size large (♂) *M. VARIEGATUS OREOBATES*.
9. Central tail-feathers washed with ultramarine-blue, crown of the head and breast ultramarine-blue [*MEROPS MUELLERI* immat., see above.]
- Central tail-feathers washed with bright blue, crown of the head black; breast black, streaked with cobalt-blue 10.

10. *The forehead and a broad superciliary stripe bright cobalt-blue like the rump, the back glossy greenish black.* M. GULARIS GULARIS.
 — *The tips to the frontal feathers and an indistinct superciliary stripe dull bluish green, the blue stripes of the breast mixed with red; the black of the back deeper.* M. GULARIS AUSTRALIS.
11. *Throat yellow, with a black band across the foreneck; crown, nape and interscapular region bright chestnut red.* 12.
 — *Throat white or crimson* 13.
12. *With a shade of chestnut preceeding the black bar on the foreneck.* M. LESCHENAULTI SWINHOOE.
 — *No chestnut on the lower throat* M. LESCHENAULTI LESCHENAULTI.
13. *Throat and cheeks white, breast pale fawn-colour, a blue eyebrow.* M. REVOLUT.
 — *Throat bright crimson, breast golden buff.* 14.
14. *Of smaller size, wing 98-105 mm.; chin crimson, upper tail-coverts green, tail green with rufescent orange* 15.
 — *Of larger size, wing 110-123 mm.; chin, a cheek stripe and the forehead whitish, upper tail-coverts deep cobalt-blue, tail green with black.* M. BULLOCKI BULLOCKOIDES.
15. *A narrow blue line across the base of the forehead, a blue streak both below and above the eye and a cheek-stripe of brighter blue below the black ear-coverts* M. BULLOCKI FRENATUS.
 — *No blue on eyebrow or cheek-stripe* M. BULLOCKI BULLOCKI.

1. *Melittophagus pusillus pusillus* (P. L. S. Müller).

- Merops pusillus* P. L. S. Müller, Syst. Nat. Suppl. p. 95 (1776) (ex Buffon : Senegal); cf. Sharpe, Cat. Birds Brit. Mus. Vol. 17, p. 47 (1892).
Muscicapa bicolor Boddaert, Tabl. Pl. Enl. p. 19 (1783) (ex Daubenton).
Merops erythropterus, Gmelin, Syst. Nat. Vol. 1, p. 464 (1788) (« ad fluv. Senegal »).
Merops collaris Vieillot, Nouv. Dict. Hist. Nat. Vol. 14, p. 16 (1817) (Senegal).
Merops minutus Bonnaterre & Vieillot, Encycl. Méthod. Vol. 1, p. 392 (1823) (ex Levaillant : Senegal et « grande partie de l'Afrique méridionale »).
Merops minutus Cuvier, Règne Anim. Vol. 1, p. 442 (1829) (ex Levaillant, same locality).
 Fig. Daubenton, Pl. Enl. p. 318; Levaillant, Hist. Nat. Guép. p. 53, no. 17 (1807); Sharpe, Cat. Birds Brit. Mus. Vol. 17, pl. 1, f. 5; Dresser, Monogr. Merop. pl. 25 (1885, pt.).
 Hab. West Africa, from Senegambia to the Cameroons.

2. *Melittophagus pusillus ocularis* Reichenow.

- Melittophagus pusillus ocularis* Reichenow, Ornith. Monatsber. 1900, p. 86 (« Nordost-Afrika, von Nubien bis in das Gebiet des Gazellen-Flusses »).
 Fig. Dresser, Monogr. Merop. pl. 25; Sharpe, Cat. Birds Brit. Mus. Vol. 17, pl. 1, f. 5 (1892) (head sub-nom. : *M. pusillus*).
 Hab. North-eastern Africa, from Nubia to the Gazelle-River (Nubia, Eritrea, Danakil-coast, Abyssinia, Sudan); West Africa?

3. *Melittophagus pusillus meridionalis* Sharpe.

- Melittophagus meridionalis* Sharpe, Cat. Birds Brit. Mus. Vol. 17, p. 45 (1892).
 ? *Merops angolensis* Gmelin, Syst. Nat. Vol. 1, p. 463 (1788) (Angola).
 Fig. Sharpe, Cat. Birds Brit. Mus. Vol. 17, pl. 1, f. 4 (1892) (head).
 Hab. South-eastern Africa, from Natal to British East Africa (Uganda) and to Angola and the Lower Congo on the west; river Gambia (Brit. Mus.) [doubtful].

4. *Melittophagus pusillus cyanostictus* Cabanis.

- Melittophagus cyanostictus* Cabanis, von der Decken's Reisen O. Afr. Vol. 3, p. 34 (1869); Journ. f. Ornith. 1875 p. 340 (« Mombas, Ost-Afrika »); cf. Sharpe, Cat. Birds Brit. Mus. Vol. 17, p. 48 (1892).

Melittophagus pusillus sharpei Hartert, Novit. Zool. 7, p. 25 (1900).

Fig. Sharpe, Cat. Birds Brit. Mus. Vol. 17, pl. 1, f. 3 (1892); Kittlitz, Kupfertafeln Vögel, pl. 7, f. 2 (1832) (head).

Hab. East Africa, from the Zanzibar district (Pangani) north to Shoa (South Eastern Æthiopia, *Hawash*, *North Somaliland*).

5. **Melittophagus variegatus variegatus** (Vieillot). (Plate, Figs. 6, 6a)

Merops variegatus Vieillot, Nouv. Dict. Hist. Nat. Vol. 14, p. 25 (1817) (Malimbe); cf. Sharpe, Cat. Birds Brit. Mus. Vol. 17, p. 48 (1892).

Melittophagus sonnini Boie, Isis 1828, p. 316 ex Levaillant, « Molymbe ».

Melittophagus cyanipectus Verreaux, Rev. Mag. Zool. 1851, p. 269 (Gaboon).

Fig. notab. Levaillant, Hist. Nat. Guép. pl. 7 (1807); Dresser, Monogr. Merop. pl. 24 (1885); Journ. f. Ornith. pl. 10 (1905).

Hab. West Africa, from Gaboon to Angola, extending eastwards into Equatorial Africa (Victoria, Nyanza, Uganda).

6. **Melittophagus variegatus lafresnayei** Guérin.

Merops lafresnayei Guérin, Rev. Zool. 1843, p. 322 (Abyssinie); cf. Sharpe, Cat. Birds Brit. Mus. Vol. 17, p. 49 (1892).

Merops lefebvrei Des Murs, ibidem, 1846, p. 243 (Abyssinia, provincia Chirensi).

Fig. notab. Kittlitz, Kupfertafeln Vögel, pl. 7 (1832); Des Murs, in Lefebvre, Voy. Abyss. pl. 5 (1845); Guérin, in Ferret & Galinier, Voy. Abyss. Vol. 3, pl. 15 (1847); Dresser, Monogr. Merop. pl. 23 (1884).

Hab. North-eastern Africa, from Abyssinia to Shoa.

7. **Melittophagus variegatus oreobates** Sharpe.

Melittophagus oreobates Sharpe, The Ibis 1892, p. 320 (Mount Elgon).

Fig. Journ. f. Ornith. 1905, pl. 10.

Hab. Mountain forests 1) of German- and British East Africa (Elgon, Toro, Kagera, Kilimandjaro, Massai).

8. **Melittophagus gularis gularis** (Sharpe & Nodder).

Merops gularis Shaw & Nodder, Nat. Miscell. Vol. 9, p. 337 (1798) (Sierra Leone); cf. Sharpe, Cat. Birds Brit. Mus. Vol. 17, p. 50 (1892).

Fig. notab. Shaw & Nodder, Nat. Miscell. Vol. 9, pl. 337 (1798); Shaw, Gen. Zool. Vol. 8, pl. 23 (1811); Gray, Gen. of Birds, Vol. 1, pl. 30 (1846); Dresser, Monogr. Merop. pls. 28, 29 (1885).

Hab. West Africa (Upper Guinea), from Sierra Leone to the Gold Coast.

9. **Melittophagus gularis australis** (Reichenow). (Plate, Fig. 3.)

Meropiscus gularis australis Reichenow, Journ. f. Ornith. 1885, p. 222 (Angola, Congo).

Melittophagus gularis gabonensis Forbes & Robinson 2), Bull. Liverpool Mus. Vol. 2, p. 30 (1899) (Gaboon).

Hab. West Africa (Lower Guinea), from the Cameroons to Angola (Cuango River), and eastwards to the Semliki River.

10. **Melittophagus leschenaulti leschenaulti** (Vieillot).

Merops leschenaulti Vieillot, Nouv. Dict. Hist. Nat. Vol. 14, p. 17 (1817) (ex Levaillant : Java); cf. Sharpe, Cat. Birds Brit. Mus. Vol. 17, p. 55 (1892).

Merops urica Horsfield, Trans. Linn. Soc. Lond. Vol. 13, p. 172 (1821) (Java).

Merops quinticolor Vieillot, Nouv. Dict. Hist. Nat. Vol. 14, p. 21 (1817) (ex Levaillant : ile de Ceylan [loc. erron.]).

Fig. Dresser, Monogr. Merop. pl. 27 (1885).

Hab. Confined to Java.

11. **Melittophagus leschenaulti swinhoi** (Hume).

Merops swinhoi Hume, Nests and Eggs Ind. Birds, p. 102 (1873) (India); cf. Sharpe, Cat. Birds Brit. Mus. Vol. 17, p. 55 (1892).

1) It can not yet be decided, whether the « Formenkreis » *M. variegatus* is really distinct from *M. pusillus* or whether the various races of *variegatus* are merely subspecies of *pusillus*.

2) Specimens from Gaboon and from the Cameroons, as a rule, seem to have the superciliary stripe clearer.

? *Merops erythrocephalus* Gmelin, Syst. Nat. Vol. 1, p. 463 (1788) (India).

Fig. Swainson, Zool. Ill. p. 8 (1820); Dresser, Monogr. Merop. pl. 20 (1885).

Hab. Indian Peninsula and Ceylon, the Andaman and Nicobar islands, Burmese countries to Siam and Cochin China, Malay Peninsula.

12. **Melittophagus revoilii** Oustalet.

Merops (Melittophagus) revoilii Oustalet, in Revoil's Faune et Flor. Comalis, Ois. p. 5, pl. 1 (1882) (Somali Land); cf. Sharpe, Cat. Birds Brit. Mus. Vol. 17, p. 54 (1892).

Fig. Oustalet, in Revoil's Faune et Flor. Comalis, Ois. pl. 1 (1882); Dresser, Monogr. Merop. pl. 34 (1886).

Hab. Somali Land.

13. **Melittophagus bullocki bullocki** (Vieillot).

Merops bullocki Vieillot, Nouv. Dict. Hist. Nat. Vol. 14, p. 13 (1817) (ex Levaillant: Senegal); cf. Sharpe, Cat. Birds Brit. Mus. Vol. 17, p. 51 (1892).

Merops cyanogaster Swainson, Birds West Africa, p. 80 (1837).

Merops boleslawskii Pelzeln 11, Sitzungsber. Akad. Wissensch. Wien, Vol. 30, p. 320 (1858) (Blauer Nil).

Fig. Levaillant, Hist. Nat. Guép. pl. 20 (1807).

Hab. West Africa, from Senegambia to the Niger 2), occasionally in the Upper White Nile district.

14. **Melittophagus bullocki frenatus** (Hartlaub).

Merops frenatus Hartlaub, Journ. f. Ornith. 1854, p. 257 (Sennar); cf. Sharpe, Cat. Birds Brit. Mus. Vol. 17, p. 52 (1892).

Fig. Reichenbach, Handb. Merop. pl. 450, ff. 3250, 3251 (1852); Dresser, Monogr. Merop. pl. 32 (1886). Spec. from Senegal.

Hab. North-eastern Africa (North-eastern Abyssinia, Sennar, Blue Nile, Lado, Magois); Senegal.

15. **Melittophagus bullocki bullockoides** (A. Smith).

Merops bullockoides A. Smith, South Afr. Quart. Journ. (2), Vol. 2, p. 320 (1834) (South Africa).

Melittophagus albifrons Cabanis & Heine, Mus. Heinean. 2. Theil, p. 133 (1860) (Süd-Afrika); cf. Sharpe, Cat. Birds Brit. Mus. Vol. 17, p. 53 (1892).

Merops smithii Schlegel, Mus. Pays-Bas, Merops, p. 9 (1863) (Cafrière et Gabon).

Fig. notab. Dresser, Monogr. Merop. pl. 35 (1885).

Hab. South-western Africa, from the Congo to the Kunene; East Africa, from Lake Naivasha and from Kilima Ndjaro to the Upper Orange River; Senegal (doubtful) 3).

B. NYCTIORNINÆ

KEY TO THE GENERA OF THE NYCTIORNINÆ

1. *The central tail-feathers elongated* 1. Genus **MEROPOGON**.
2. *The tail square, the central rectrices not elongated* 2. Genus **NYCTIORNIS**.

1. GENUS MEROPOGON BONAPARTE

Meropogon Bonaparte, Consp. Gen. Avium, Vol. 1, p. 164 (1850) (type: *M. forsteni*); Sharpe, Cat. Birds Brit. Mus. Vol. 17, p. 87 (1892).

1) The *Melittophagus boleslawski*, known from specimens taken on the Blue Nile, above Khartoum, and in Southern and Eastern Sennar, is to be considered as an occasional aberration, in which the red throat is replaced by yellow.

2) Birds from the Guinea-coast have the head strongly suffused with blue and a blue edge before the black terminal band of the secondaries, but to a lesser degree than in the next form.

3) A specimen from there has the hind part of the cheeks and the superciliary stripe more suffused with light-blue than those from the Kilima Ndjaro.

Characters. Bill long, curved and pointed; culmen not grooved, but a shallow channel extends from the base of the maxilla, on both sides of the culmen, for two-thirds of its length; feet rather small. The elongated pectoral plumes as in *Nyctiornis*; the tail is truncated, but the central rectrices are elongated and attenuated at the end. In the structure of the wing it rather agrees with *Nyctiornis*. The first primary has half the length of the second and is decidedly longer than the primary coverts, the third and fourth are longest, the fifth is somewhat shorter, though longer than the second.

The genus *Meropogon* is a forest-haunting bird of sociable habits, living only at considerable altitudes above the sea.

Geographical Distribution. Celebes and South-western Africa. The genus consists only of two species.

KEY TO THE FORMS

1. *Crown of head, throat and upper breast deep ultramarine-blue* 3.
2. *Crown of head, throat and upper breast black* M. BREWERI.
3. *Brown of the nape, sides of neck and body shading into violet, the green of the upper parts darker* M. FORSTENI FORSTENI.
- *Brown of the nape, sides of neck and body clearer, the green of the upper parts brighter* M. FORSTENI CENTRALIS.

1. *Meropogon breweri* Cassin.

Meropogon breweri Cassin, Proc. Acad. Nat. Sc. Philad. 1859, p. 34 («Ogobai River, a branch of the Camma River, West Africa »); cf. Sharpe, Cat. Birds Brit. Mus. Vol. 17, p. 86 (1892).

Fig. Cassin, Journ. Acad. Nat. Sc. Philad. (2), Vol. 4, pl. 49, f. 1 (1860); Dresser, Monogr. Merop. pl. 5 (1884).

Hab. West Africa from Gaboon to Loango.

2. *Meropogon forsteni forsteni* Bonaparte. (Plate, Fig. 5.)

Meropogon forsteni Bonaparte, Consp. Gen. Avium, Vol. 1, p. 164 (1850) (Celebes); cf. Sharpe, Cat. Birds Brit. Mus. Vol. 17, p. 87 (1892).

Fig. Gould, Birds Asia, Pt. 25 (1873); Dresser, Monogr. Merop. pl. 4 (1884).

Hab. Northern Celebes (Rurû Kan, Minahassa).

3. *Meropogon forsteni centralis* A. B. Meyer.

Meropogon forsteni centralis A. B. Meyer, Notes Leyd. Mus. Vol. 23, p. 186 (1901-03) (Takala Mountains).

Hab. Central Celebes.

2. GENUS NYCTIORNIS

Nyctiornis Swainson, Zool. Illustr. (2), Vol. 2, text to pl. 56 (1831) (type : *Nyctiornis amictus*).

Characters. Bill long and curved, culmen pointed, rather flattened and grooved laterally for some distance from the base, compressed towards the tip. The rounded nostrils hidden by short, stiff feathers. Tarsi stout, anteriorly scutellate; toes rather long, the hind toe stout and padded beneath. Feathers of the crown slightly elongated, those of the throat much more so, pendent and somewhat attenuated towards the tip. Wings short and rounded, first quill

somewhat shorter than the secondaries, the fourth longest, the third slightly shorter than the latter. The rectrices long, broad, truncated, slightly emarginate.

The birds of this genus inhabit the dense jungles and vicinity of forests, are generally seen singly or in couples and feed on insects (bees, etc.) which they capture chiefly on the wing. These beautiful birds are at times very noisy, uttering repeatedly their hoarse note. Probably resident all the year, they breed in March and April; one species (*N. athertoni*) is said to lay its eggs in the holes of trees.

Geographical Distribution. The genus is confined to India and the Malay Archipelago.

KEY TO THE SPECIES

1. *Long throat-feathers blue, head bluish green* *N. ATHERTONI*.
2. *Long throat-feathers scarlet: fore part of the crown lilac* *N. AMICTUS*.

1. *Nyctiornis athertoni* Jardine & Selby. (Plate, Figs. 8, 8a.)

Nyctiornis athertoni Jardine & Selby, Ill. Ornith. Vol. 2, pl. 58 (1825-43) (« India »); cf. Sharpe, Cat. Birds Brit. Mus. Vol. 17, p. 88).

Bucia nipalensis Hodgson, Journ. Asiat. Soc. Beng. Vol. 5, p. 361 (1836) (Nepal).

Nyctiornis caeruleus Swainson, Classif. of Birds, Vol. 2, p. 333 (1837).

Nyctiornis amherstiana Royle, Himal. Bot. Vol. 1, p. 76 (1839).

Alcemerops paleazureus Lesson, Rev. Zool. 1840, p. 262.

Merops cyanogularis Jerdon, Madr. Journ. Vol. 11, p. 229 (1830) (« Coonoor Pass, Neilgherries « South-India »).

Fig. notab. Jardine & Selby, Ill. Ornith. Vol. 2, pl. 58; Gould, Birds Asia, Vol. 1, pl. 37; Dresser, Monogr. Merop. pl. 3 (1884).

Hab. Southern and Central India; Himalayas, from the Dhoon to Assam, south to Tenasserim, east to Siam and Cambodja.

2. *Nyctiornis amicta* (Temminck).

Merops amictus Temminck, Pl. Col. (livr. 52), pl. 310 (1824) (Sumatra 1); cf. Sharpe, Cat. Birds Brit. Mus. Vol. 17, p. 90 (1892).

Nyctiornis malaccensis Cabanis & Heine, Mus. Heinean. Vol. 2, p. 133 (1860) (Malacca).

Fig. notab. Temminck, Pl. Col. No. 310 (1824); Swainson, Zool. Ill. (2), Vol. 2, pl. 56 (1831); Gould, Birds Asia, Pt. 2, no. 3 (1850); Dresser, Monogr. Merop. pls. 1, 2 (1884).

Hab. Southern Tenasserim, Malay Peninsula, Sumatra, Borneo.

- 1) Some specimens from the mountains round Batang Koewis are distinguished by their very stout bills.

EXPLANATION OF PLATE

- Fig. 1. Wing of *Merops apiaster*.
— 1a. Bill of *Merops apiaster* (from above).
— 1b. Bill of *Merops apiaster* (from below).
— 1c. Foot of *Merops apiaster*.
— 1d. Tail of *Merops apiaster*.
— 2. Head of *Ærops albicollis major*.
— 2a. Wing of *Ærops albicollis*.
— 3. Head of *Melittophagus gularis australis*.
— 4. *Merops muelleri*.
— 5. *Meropogon forsteni*.
— 6. Foot of *Melittophagus variegatus*.
— 6a. Tail of *Melittophagus variegatus* ?).
— 7. Tail of *Dicrocercus hirundineus*.
— 8. Head of *Nyctiornis athertoni*.
— 8a. Foot of *Nyctiornis athertoni*.

The editors have much regret in announcing the death of Dr C. PARROT, which took place on January 28th, 1911. Owing to his untimely death the letter-press of this part could not be brought quite up-to-date.

Munich, 15th March 1910.

FAM. MEROPIDÆ

- 1, 1a, 1b, 1c. MEROPS APLASTER. 2. AEROPS ALBICOLLIS MAJOR. 2a. WING OF AEROPS ALBICOLLIS.
 3. MELITTOPHAGUS GULARIS AUSTRALIS.
 4. MEROPS MUELLERI. 5. MEROPOGON FORSTENI. 6. FOOT OF MELITTOPHAGUS VARIEGATUS.
 6a. TAIL OF MELITTOPHAGUS VARIEGATUS. 7. TAIL OF DICROCERCUS HIRUNDINEUS. 8, 8a. NYCTIORNIS ATHERTONI.

1871

GENERA AVIUM

CONDUCTED BY

P. WYTSMAN

WITH CONTRIBUTIONS BY MESSRS. A. DUBOIS, E. HARTERT,
C. E. HELLMAYR, W. R. OGILVIE-GRANT, Hon. W. ROTHSCHILD, T. SALVADORI,
P. L. SCLATER, &^a

PASSERES

FAM. CERTHIIDÆ

by C. E. HELLMAYR

WITH 1 COLOURED PLATE

1911

PRICE 6/11 (FR. 8.60)

FAM. CERTHIIDÆ

FAM. CERTHIIDÆ

BY C. E. HELLMAYR

THE members of this family, *The Tree-Creepers*, are « small, ten-primaried, slender-billed, scansorial acutiplantar Oscines » as defined by Robert Ridgway.

Characters. Bill variable as to relative length and degree of curvature, mostly longer, in one genus (*Climacteris*) slightly shorter than the head, with tip decurved, though in one genus (*Tichodroma*) but slightly so; culmen distinctly ridged; no subterminal notch; maxilla not uncinatate at tip; gonys straight or very nearly so. Nostrils wholly exposed, longitudinal, overhung by a distinct operculum. Rictal bristles obsolete. Wing rather long, rounded; third and fourth, or fourth and fifth, primaries longest; first primary considerably less than half the second. Tail variable as to relative length and shape of rectrices, either much shorter than wing, even or slightly rounded, with rectrices soft, broad and rounded at tip (*Salpornis*, *Tichodroma*, *Climacteris*, *Rhabdornis*), or equal to, or even slightly longer than wing, graduated, with rectrices stiffened and acuminate at tip (*Certhia*). Tarsus generally longer, in one genus, *Salpornis*, slightly shorter than middle toe without claw; acrotarsium either scutellate (*Certhia*, *Salpornis*) or booted (*Tichodroma*, *Climacteris*, *Rhabdornis*), though in *Climacteris* there are sometimes indistinct scutes to be seen; lateral toes very unequal in length, outer toe always decidedly longer than inner, but shorter than middle toe; hallux considerably shorter than middle toe; basal phalanx of middle toe adherent to outer toe for its whole length. Claws large, more or less strongly arched, that of hallux as long as, or longer than, the digit.

Coloration. Exceedingly variable. See under the various genera.

Geographical Distribution. Palaearctic, Nearctic and Ethiopian Regions; Indian Subregion; Australia; New Guinea.

Habits and Nidification. The members of this family frequent rocks and trees, climbing upwards in search of their food which consists of insects and their larvæ. The species of the genera *Certhia*, *Tichodroma* and *Climacteris* build a soft nest in cavities of trees or crevices of rocks (*Tichodroma*). The eggs (variable in number from three to nine) are white or flesh colour, speckled and blotched with reddish brown. *Salpornis* makes an exception to this rule (see below).

Bibliography. Gadow, Cat. Birds Brit. Mus. Vol. 8, pp. 322-340 (1883); Hellmayr, Tierreich. Livr. 18, pp. 204-229 (1903); Ridgway, Bull. U. S. Nat. Mus. no. 50, Pt. 3, pp. 459-473 (1904).

KEY TO THE GENERA OF CERTHIIDÆ

1. Tail shorter than wing, even or slightly rounded, with rectrices broad, soft and rounded at tip 2.
- Tail equal to, or slightly longer than wing, graduated, with rectrices rigid and acuminate at tip 1. GENUS *CERTHIA*.
2. Bill nearly twice as long as head, depressed; culmen almost straight with extreme tip but slightly decurved. Tongue divided at tip, without any bristles. A considerable amount of red on remiges and upper wing coverts 3. GENUS *TICHODROMA*.
- Bill about equal to, or but slightly longer than head; culmen, at least in terminal half, distinctly curved. Tongue with numerous bristles. No red on remiges nor on upper wing coverts 3.
3. First primary extremely small and narrow, not reaching beyond tip of primary coverts. 2. GENUS *SALPORNIS*.
- First primary well-developed, broad, somewhat shorter than half the second 4.
4. Bill decidedly shorter than head, with culmen curved for its whole length 4. GENUS *CLIMACTERIS*.
- Bill decidedly longer than head, with culmen nearly straight for its basal half. 5. GENUS *RHABDORNIS*.

1. GENUS *CERTHIA* LINNÆUS

Certhia Linnæus, Syst. Nat. ed. 10, p. 118 (1758) (Type by elimination: *Certhia familiaris* Linnæus).

Certhius Olphe-Galliard, Ornith. Eur. occid., fasc. 23, p. 41 (1888) (nom. emend.).

Characters. Bill variable as to relative length and degree of curvature, sometimes decidedly shorter than head and nearly straight, sometimes much longer than head and strongly curved, always laterally much compressed; culmen slightly ridged, ending in an acute point, gonys nearly straight or slightly concave; maxillary tomium without trace of subterminal notch. Nostrils basal, longitudinal, exposed, overhung by a broad operculum which anteriorly does not reach to anterior end of nasal fossa. Tongue long, narrow, corneous, terminating in about five bristles. Rictal bristles scarcely apparent. Wing moderately long, rounded; fourth and fifth primaries longest, sixth scarcely shorter; second primary falling between seventh and eighth; first primary somewhat less than half as long as second. Tail about as long as wing, sometimes very slightly longer, distinctly graduated, the rectrices with rigid and acuminate tips. Tarsus slender, somewhat shorter than middle toe with claw, the acetarsium distinctly scutellate; outer toe much longer than inner, but somewhat shorter than the middle one; hallux intermediate in length between outer and inner toes; basal phalanx

of middle toe adherent for entire length to lateral toes; claws long, strongly arched, much compressed, that of hallux equal to, or slightly longer than, the digit.

Wing about 56-72; tail 54-70 mm.

Coloration. Above brownish, conspicuously streaked with darker brown, dusky or blackish, and also marked with longitudinal stripes of whitish or buff; the wings dusky, varied with pale greyish or brownish, the inner webs of quills crossed by a broad band of buff or whitish; tail pale brown, sometimes narrowly barred with dusky. Under parts plain white, pale grey, pale brown or rufescent brown, flanks and under tail coverts tinged with fulvous or tawny. Sexes alike. Young not much different from adults.

Geographical Distribution. More northern portions of northern hemisphere, in the Nearctic Region south to Nicaragua, in the Old World south to Burma. Thirty species and subspecies, by far the greater number, in the Palæarctic Region.

Habits and Nidification. « The Tree-Creepers, somewhat resemble the Nuthatches, in habits, but climb only upward, or at least in upright position, usually ascending the trunks of trees in spirals, flying from the top of one trunk to the base of another in quest for insect-food lodged in crevices of the bark » (Ridgway). They build a soft nest in cavities of trees and lay a large number (five to nine) of eggs, on a white ground colour speckled with reddish brown.

KEY TO THE SPECIES AND SUBSPECIES OF CETHIA ¹⁾

1. *Rectrices with about twenty distinct, more or less regular, transverse bands of dusky* 2.
- *Rectrices either uniform or with mere traces of dusky cross-markings.* 4.
2. *General colour of upper parts ashy grey. Bill 22 mm. or more* . . . 30. *C. HIMALAYANA TENIURA.*
- *General colour of upper parts dark brown. Bill not more than 20 mm., mostly less.* 3.
3. *Upper parts lighter brown; pileum dark brown with narrow pale shaft-streaks* 28. *C. HIMALAYANA HIMALAYANA.*
- *Upper parts darker brown; pileum nearly blackish, scarcely streaked with greyish* 29. *C. HIMALAYANA YUNNANENSIS.*
4. *Under parts, at least anterior portion, white or whitish* 7.
- *Under parts without any white, the ground colour being pale fulvous, greyish brown or rufescent brown* 5.
5. *Under parts pale fulvous: lighter, more buff on chin and upper throat, deeper on flanks and under tail coverts* 16. *C. STOLICZKÆ.*
- *Under parts dull greyish earthy brown, flanks and under tail coverts tinged with fulvous* 6.
6. *Whole lower surface nearly uniform greyish earthy brown, only under tail coverts fulvous* 13. *C. DISCOLOR DISCOLOR.*
- *Chin, throat and chest dingy buff, belly earthy brown or greyish brown* 14. *C. DISCOLOR MANIPURENSIS.*

¹⁾ *C. familiaris persica*, unknown to the author, is not included in the key.

- Chin, throat and chest fulvous, belly rufescent brown 15. *C. DISCOLOR VICTORIÆ*.
7. Claw of hind toe long, but slightly arched. Feathers of forehead very distinctly streaked with whitish. General colour above lighter, more mixed with tobacco-yellow 8. (*C. FAMILIARIS*).
- Claw of hind toe short, strongly arched. Feathers of forehead very indistinctly streaked with greyish, this being sometimes even obsolete. General colour above darker, brown shades prevailing. 18. (*C. BRACHYDACTYLA*).
8. Outer web of fourth primary uniform dusky 9.
- Outer web of fourth primary like the following ones with a distinct buff spot 11.
9. Upper parts very dark, nearly blackish brown, rump and upper tail coverts deep rufous brown; flanks and under tail coverts brownish smoky grey. 10. *C. FAMILIARIS KHAMENSIS*.
- Upper parts lighter, brown, rump and upper tail coverts fulvous or rufescent brown; flanks not smoky grey 10.
10. Upper parts dark brown, with the pale shaft-streaks brownish or very dull whitish, rump deep rufescent brown; lower plumage white, flanks and under tail coverts fulvous brown 12. *C. FAMILIARIS NIPALENSIS*.
- Upper parts light rufescent brown with the whitish shaft stripes very distinct, rump clear rufescent; flanks scarcely shaded with buffy grey, under tail coverts slightly washed with pale fulvous buff 11. *C. FAMILIARIS HODGSONI*.
11. Pale markings on upper back larger, more sharply defined, distinctly whitish. 12.
- Pale markings on upper back less conspicuous, more restricted, more or less shaded with greyish or brownish 15.
12. Larger : wing of male averaging 66-69 mm. 9. *C. FAMILIARIS TIANSHANICA*.
- Smaller : wing of male averaging 63-67 mm. 13.
13. Ground colour of upper parts much darker brown, abruptly contrasted with white longitudinal stripes. 4. *C. FAMILIARIS JAPONICA*.
- Ground colour of upper parts lighter brown, less contrasted with pale longitudinal stripes. 14.
14. Lower surface purer white. Tail shorter : 62-65 mm. 1. *C. FAMILIARIS FAMILIARIS*.
- Lower surface dingy whitish. Tail longer : 65-72 mm. 3. *C. FAMILIARIS CAUCASICA*.
15. Larger : wing of male averaging 67-70 mm. 16.
- Smaller : wing of male averaging 60-65 mm. 17.
16. Rump paler ferruginous 7. *C. FAMILIARIS CORSA*.
- Rump darker ferruginous 8. *C. FAMILIARIS BIANCHII*.
17. Upper parts more brownish, rump clearer ferruginous 5. *C. FAMILIARIS MACRODACTYLA*.
- Upper parts more rufescent, rump deeper ferruginous 6. *C. FAMILIARIS BRITANNICA*.
18. Under parts decidedly white or but slightly shaded with dingy buffish on abdomen; flanks and under tail coverts only ashy, brownish or fulvous 20.
- Under parts darker, pale brownish grey, with chin and upper throat only white. 19.

19. Browner, the streaks of upper parts narrower and more brownish or buffy, on a more sooty ground 26. *C. BRACHYDACTYLA ALTICOLA*.
 — Less brownish, the streaks of upper parts more purely white, broader, on a clearer blackish ground 27. *C. BRACHYDACTYLA ALBESCENS*.
20. General colour above paler, with dark ground colour decidedly brown and with light stripes more abruptly contrasted. Bill generally longer 21. (European forms).
 — General colour above darker, with ground colour more sooty and with light stripes less abruptly contrasted. Bill generally shorter. Outer web of fourth primary always with a more or less well-marked buff spot 25. (American forms).
21. Fourth primary always with a more or less well-defined buff spot on outer web 22.
 — Fourth primary with outer web uniform dusky, without a buff spot. 23.
22. Paler, with ground colour of upper parts more greyish brown, and rump of a clearer tobacco fulvous 17. *C. BRACHYDACTYLA BRACHYDACTYLA*.
 — Darker, with ground colour of upper parts deep brown, and rump of a darker rufescent brown. 18. *C. BRACHYDACTYLA ULTRAMONTANA*.
23. Browner, with ground colour of upper parts deep rufous brown, the pale markings abruptly defined, the rump nearly chestnut. Abdomen dingy buffish, flanks rufescent 21. *C. BRACHYDACTYLA HARTERTI*.
 — Darker, more sooty, with ground colour of upper parts deep brown, nearly blackish; rump, however, paler, rufescent brown. Under parts pure white, flanks only tinged with greyish or rufescent brown 24.
24. Upper tail coverts light fulvous brown like tail. Flanks strongly washed with rusty brown 19. *C. BRACHYDACTYLA MAURITANICA*.
 — Upper tail coverts greyish brown like tail. Flanks washed with greyish brown 20. *C. BRACHYDACTYLA DOROTHEÆ*.
25. Larger : wing averaging more than 65 mm. in male, more than 62 mm. in female 26.
 — Smaller : wing averaging less than 64 mm. in male, less than 61 mm. in female 27.
26. Browner above, with streaks more buffy, and less purely white beneath; bill shorter, averaging in male 14, in female 13 mm. 22. *C. BRACHYDACTYLA AMERICANA*.
 — Less brownish above, with streaks purer or more greyish white, and more purely white beneath; bill longer, averaging in male 16,5, in female 15 mm. 23. *C. BRACHYDACTYLA MONTANA*.
27. Less tawny above, purer white beneath; larger : wing averaging in male 63,5, in female 60,5 mm. 24. *C. BRACHYDACTYLA ZELOTES*.
 — More tawny above, more buffy white below; smaller : wing averaging in male 62, in female 60 mm. 25. *C. BRACHYDACTYLA OCCIDENTALIS*.

1. *Certhia familiaris familiaris* Linnæus. (Plate, Figs. 1, 1a, 1b.)

Certhia familiaris Linnæus, Syst. Nat. ed. 10, p. 118 (1758) (Europa. We fix Sweden as type-locality : ex Faun. Suec. no. 213).

Motacilla scolopacina Ström, N. Saml. Norske Selsk. Skr. Vol. 2, p. 367 tab. (1788) (Norway).

Certhia scandulaca Pallas, Zoogr. Rosso-Asiat. Vol. 1, p. 432 (1827) (new name for *Certhia familiaris* Linnæus : « in sylvestribus Rossia et Sibiria »).

Certhia septentrionalis Brehm, Handb. Naturg. Vög. Deutschl. p. 210 (1831) (« bewohnt die von Deutschland nördlich liegenden Walder, kommt im Winter bis Kiel, selten ins mittlere Deutschland herab »).

Certhia longicauda Reichenbach, Handb. Scansoriae, p. 263 (1853) (ex Brandt MS., Jenissey, Siberia : « in keinem Punkte von *C. costae* zu unterscheiden »).

Certhia fasciata David, Nouv. Arch. Mus. Paris, Vol. 3, Bull. p. 36 (1867) (Peking).

Certhia familiaris candida Hartert, Mitt. Ornith. Ver. Wien, Vol. 11, p. 161 (1887) (East Prussia).

Hab. Scandinavia, Russia, eastern provinces of Germany (West- and East Prussia), Poland, in Europe southwards to the Carpathian Mountains, Roumania and to the north side of the Caucasus; eastwards through Siberia as far as Amoorland and the shores of the Okhotsk Sea, also in Manchooria, North China (Peking), Sakhalin, Corea and North Japan (Kuril Isl., Yezo); the northern limit of its range coinciding with the timber-line.

Obs. The East-Asiatic birds not having been sufficiently studied, there may be one or two more races to be distinguished. Specimens from Peking etc. are said to be small and of pale coloration, while those from Yezo do not appear to be quite typical either.

2. *Certhia familiaris persica* Sarudny & Loudon.

Certhia familiaris persica Sarudny & Loudon, Ornith. Monatsber. Vol. 13, p. 106 (1905) (« bewohnt die dem Kaspi (sic) angrenzenden Provinzen Persiens [Ghilan, Masanderom (sic) und Aserabad (sic)] »).

Hab. North Persia : Elburz Mts. in the provinces of Ghilan, Mazanderan and Asterabad. (Unknown to the author.)

3. *Certhia familiaris caucasica* Buturlin.

Certhia familiaris caucasica Buturlin, Ornith. Monatsber. Vol. 15, p. 8 (1907) (« Kaukasus und Transkaukasien »).

Hab. Caucasus Mts. and Transcaucasia.

4. *Certhia familiaris japonica* Hartert.

Certhia familiaris japonica Hartert, Novit. Zool. Vol. 4, p. 138 (1897) (Hondo, Japan).

Hab. South Japan (Hondo).

5. *Certhia familiaris macrodactyla* Brehm.

Certhia macrodactyla Brehm, Handb. Naturg. Vög. Deutschl. p. 208 (1831) (« bewohnt die Nadelwälder, ist im Sommer selten im mittleren Deutschland »).

Certhia nattereri Bonaparte, Consp. Gen. Avium, Vol. 1, p. 224 (1850) (part. description rather uncertain : « ex Sabaudia, Helvetia »).

Certhia costa Bailly, Mém. Soc. Roy. Acad. Savoie, Vol. 13, p. — (Description d'une nouv. esp. de Grimpereaux, sep. p. 2) (1847) (Savoy).

Certhia brachyrhynchos Brehm, Naumannia 1855, p. 274 (1855) (new name for *C. costae* auct.); ibidem, Vol. 6, 1856, p. 358 (Witten, Görlitz etc.).

Certhia familiaris vera Brehm, ibidem, Vol. 6, p. 357 (1856) (« aus Pommern, . . . aus Kiel und Galizien, und fand ihn hier [i. e. Renthendorf] brütend »).

Certhia familiaris pusilla Brehm, ibidem, p. 358 (1856) (« ich bekam ihn aus Dalmatien, und erlegte ihn ein einziges Mal in der hiesigen Gegend » [i. e. Renthendorf]).

Certhia rhenana Kleinschmidt, Ornith. Monatsber. Vol. 8, p. 169 (1900) (« am Rhein »).

Fig. Naumann, Naturg. Vög. Deutschl. Vol. 5, 1826, pl. 140, f. 1, 2.

Hab. Germany (except West- and East Prussia), Belgium, France, Pyrenees, Switzerland, Austria, Hungary, Bosnia and Hercegovina, and Northern Italy.

6. *Certhia familiaris brittanica* Ridgway.

Certhia brittanica Ridgway, Proc. U. S. Nat. Mus. Vol. 5, p. 113 (1882) (England).

Fig. Dresser, Birds Europe, Vol. 3, pl. 122.

Hab. Great Britain, Isle of Man, Ireland.

7. *Certhia familiaris corsa* Hartert.

Certhia familiaris corsa Hartert, Vög. paläarkt. Fauna, Lief. 3, p. 320 (1905) (Corsica).

Hab. Mountain forests of Corsica.

8. *Certhia familiaris bianchii* Hartert.

Certhia familiaris bianchii Hartert, Vög. paläarkt. Fauna, Lief. 3, p. 321 (1905) (Southern Tetung Mts., Kansu, N. W. China).

Hab. Western China : Mountains of Kansu (Nan-shan) and Northern Szechuen.

9. ***Certhia familiaris tianschanica*** Hartert.

Certhia familiaris tianschanica Hartert, Vög. paläarkt. Fauna, Lief. 3, p. 321 (1905) (Ak-su, south. Tian-shan).

Certhia familiaris albomaculata Johansen, Ornith. Jahrb. Vol. 18, p. 202 (1907) (Djarkent, Turkestan).

Hab. Central Asia : Tian-shan-range.

10. ***Certhia familiaris khamensis*** Bianchi.

Certhia khamensis Bianchi in Sharpe, Hand-List Birds, Vol. 4, pp. 355, 360 (1903) («W. China [Kansu, Szechuen], S. E. Tibet [Upper Mekong]»). The two first-named localities are erroneous; terra typica : Kham, Upper Mekong).

Hab. Kham district, Upper Mekong, S. E. Tibet.

11. ***Certhia familiaris hodgsoni*** Brooks.

Certhia hodgsoni Brooks, Journ. Asiat. Soc. Bengal, Vol. 41, II, p. 74 (1872) (Kashmir).

Hab. Kashmir : pine forests near the timber-line in Astor and Gilgit, at elevations of 10,000 feet.

12. ***Certhia familiaris nipalensis*** Blyth.

Certhia nipalensis Blyth, Journ. Asiat. Soc. Bengal, Vol. 14, II, p. 581 (1845) (Nepal).

Certhia mandellii Brooks, ibidem, Vol. 42, II, p. 256 (1873) (Sikkim).

Fig. Gould, Birds Asia, Vol. 4, pl. 57, fig. sup.

Hab. Nepal, Sikkim, Bhutan : pine forests at altitudes of from 8,000 to 13,000 feet.

13. ***Certhia discolor discolor*** Blyth.

Certhia discolor Blyth, Journ. Asiat. Soc. Bengal, Vol. 14, II, p. 580 (1845) (Darjeeling).

Fig. Gould, Birds Asia, Vol. 4, pl. 57, fig. inf.

Hab. Himalaya in Nepal, Sikkim and Bhutan, as far east as the Daffa Hills (Darrang).

14. ***Certhia discolor manipurensis*** Hume.

Certhia manipurensis Hume, Stray Feath. Vol. 10, p. 151 (1881) (Eastern Hills of Manipur).

Hab. Hill-ranges south of the Brahmapootra River : Manipur, Naga Hills.

15. ***Certhia discolor victoriae*** Rippon.

Certhia victoriae Rippon, Bull. Brit. Ornith. Club, Vol. 16, p. 87 (1906) (Mount Victoria, S. Chin Hills, Burma).

Hab. Mountains of Upper Burma (Mt. Victoria, in the Southern Chin Hills; Southern Shan States : Karennee, Mawmai State, Loi Pang, near Mekong R.).

16. ***Certhia stoliczkae*** Brooks.

Certhia stoliczkae Brooks, Journ. Asiat. Soc. Bengal, Vol. 42, II, p. 256 (1873) (Sikkim).

Hab. Eastern Himalaya : Sikkim and Bhutan, at elevations of from 10,000 to 11,000 feet.

17. ***Certhia brachydactyla brachydactyla*** Brehm 1). (Plate, Fig. 2.)

Certhia brachydactyla Brehm, Beitr. z. Vögelk. Vol. 1, p. 570 (1820) (Roda-valley, Germany).

Certhia longirostris Brehm, ibidem, Vol. 2, p. 709 (1822) (new name for *C. brachydactyla*).

Certhia megarhynchos Brehm, Handb. Naturg. Vög. Deutschl. p. 211 (1831) («bewohnt das westliche Deutschland, namentlich Westphalen »).

Certhia paradoxa Brehm, Vogelfang, p. 76 (1855) («verirrt sich aus Ungarn sehr selten nach Deutschland »).

Certhia brachydactyla vera und *C. b. media* Brehm, Naumannia, Vol. 6, p. 359 (1856) («bewohnt die mit laubtragenden Bäumen besetzten Orte von ganz Deutschland »).

Fig. New edition of Naumann's Vög. Deutschl. Vol. 2, pl. 25, f. 2 (1897).

Hab. Germany, very rare in the eastern provinces, common in the central and western parts, Holland, Belgium, France, parts of Switzerland, widely distributed in Austria.

18. ***Certhia brachydactyla ultramontana*** Hartert.

Certhia brachydactyla ultramontana Hartert, Vög. paläarkt. Fauna, Lief. 3, p. 324 (1905) (Panzano, Chianti, Italy).

Hab. Southern Europe, south of the Alps : Italy, Spain, S. Dalmatia, Balkan Peninsula.

1) A curious variety is *Certhia rufi-dorsalis* Brehm (Naumannia, Vol. 6, p. 359, 1856, «Westphalen») with the upper parts strongly ferruginous. Cf. Hartert, Vög. paläarkt. Fauna, Lief. 3, p. 323 (1905).

19. ***Certhia brachydactyla mauritanica* Witherby.**

Certhia brachydactyla mauritanica Witherby, Bull. Brit. Ornith. Club, Vol. 15, p. 35 (1905) (Am-Draham, Tunis).
Hab. Woods of Tunis and Algeria.

20. ***Certhia brachydactyla dorotheae* Hartert.**

Certhia brachydactyla dorotheae Hartert, Bull. Brit. Ornith. Club, Vol. 14, p. 50 (1904) (Cyprus).
Hab. Pine forests of the Troödos Mountains, Cyprus.

21. ***Certhia brachydactyla harterti* Hellmayr.**

Certhia familiaris harterti Hellmayr, Journ. f. Ornith. Vol. 49, p. 189 (1901) (Asia Minor).
Hab. Mountains of Asia Minor (Smyrna, Alum-dagh).

22. ***Certhia brachydactyla americana* Bonaparte.**

Certhia americana Bonaparte, Comp. List Birds Europe and North America, p. 11 (1838) (based on *C. familiaris* Audubon, Ornith. Biogr. Vol. 5, pl. 419 : North America).
Certhia rufa Coues, Proc. Acad. Nat. Sc. Philad. 1875, p. 347 (1875) (ex « *Certhia rufa* » Bartram, Travels Florida, p. 289bis).
Certhia fusca (nec Gmelin 1788) Barton, Fragments Nat. Hist. Pennsylv. p. 11 (1799) (Pennsylvania).
Hab. Eastern North America : north to Ontario, Manitoba etc., west to eastern portion of the Great Plains; breeding southward to Massachusetts, New York, northern Indiana, S. E. Dakota, S. E. Missouri, and along higher Alleghenies to mountains of North Carolina; in winter southward to Florida and Texas.

23. ***Certhia brachydactyla montana* Ridgway.**

Certhia familiaris montana Ridgway, Proc. U. S. Nat. Mus. Vol. 5, p. 114 (1882) (Apache, Arizona).
Hab. Rocky Mountain district, breeding from New Mexico and Central Arizona to Cook Inlet, Alaska; migrating southward to S. E. California etc.

24. ***Certhia brachydactyla zelotes* Osgood.**

Certhia familiaris zelotes Osgood, Auk, Vol. 18, p. 182 (1901) (Battle Creek, Tehama Co., California).
Hab. California (except northern coast district), through Central Oregon and Washington to Central British Columbia, breeding southward to Mount Whitney, Tejon Mountains and Los Angeles County; northwards along coast to Marin County, California.

25. ***Certhia brachydactyla occidentalis* Ridgway.**

(*Certhia familiaris*) *occidentalis* Ridgway, Proc. U. S. Nat. Mus. Vol. 5, p. 115 (1882) (Simiahmoo, Washington).
Hab. Humid coast slope, from North California (Marin County) to Southern Alaska (Sitka).

26. ***Certhia brachydactyla alticola* Miller.**

Certhia mexicana (nec Gmelin, 1788), Gloger, Handb. Naturg. Vög. Eur. p. 381 footnote (1834) (Mexico).
* *Certhia familiaris alticola* G. Miller, Auk, Vol. 12, p. 186, part. (1895) (new name for *C. mexicana*, preoccupied).
Hab. Mountains of South Mexico : States of Hidalgo, Vera Cruz, Puebla, Mexico, Michoacan, S. E. Jalisco, Oaxaca and Chiapas; and high mountains of Guatemala, also recorded from northern Nicaragua (Matagalpa).

27. ***Certhia brachydactyla albescens* Berlepsch.**

Certhia mexicana albescens Berlepsch, Auk, Vol. 5, p. 450 (1888) (Durango, Durango).
Hab. Mountains of N. W. Mexico : Tepic, Jalisco (Guadalajara), Zacatecas, Durango, Chihuahua, Sonora and southern Arizona (Santa Catalina, Santa Rita, Huachuca and Chiricahua Mts. etc.).

28. ***Certhia himalayana himalayana* Vigors.**

Certhia himalayana Vigors, Proc. Comm. Zool. Soc. Vol. 1, p. 174 (1832) (Himalayan Mountains).
Certhia asiatica Swainson, Anim. in Menag. p. 353 (1838) (India).
Fig. Gould, Birds Asia, Vol. 2, pl. 17.
Hab. N. W. Himalayas from Chitral and Gilgit, east to Kumaon, and the adjoining parts of Afghanistan. The records from Assam most probably refer to the next form.

29. ***Certhia himalayana yunnanensis* Sharpe.**

Certhia yunnanensis Sharpe, Bull. Brit. Ornith. Club, Vol. 13, p. 11 (1902) (Shayang, Chütung Road, W. Yunnan).
Fig. David & Oustalet, Ois. Chine, pl. 14.
Hab. S. W. China : Western Yunnan and W. Szechuen; Kansu?

30. *Certhia himalayana tæniura* Severtzow.

Certhia tæniura Severtzow, Izv. Obshch. Moskov., Vol. 8, no. 2, p. 138 (1873) (Turkestan); Zeitschr. Ges. Ornith. Vol. 4, 1888, p. 109 (transl.).

Hab. Mountains of Turkestan (Djimbent, Zarefshan etc.).

2. GENUS *SALPORNIS* G. R. GRAY

Salpornis G. R. Gray, Proc. Zool. Soc. Lond. Vol. 15, 1847, p. 7 (Sp. un. : *Certhia spilonota* Franklin).

Hylypsornis Bocage, Journ. Acad. Lisboa, Vol. 6, p. 198, 211 (1878) (Sp. un. : *H. Salvadori* Barboza du Bocage).

Hypsilornis Salvin & Sclater, The Ibis (4), Vol. 6, p. 334 (1882) (nom. emend.).

Characters. Bill longer than head, more robust than in the genus *Certhia*, at base rather broadened, at terminal portion slightly compressed laterally; culmen distinctly ridged, strongly curved for its entire length, with acute tip; gonys slightly concave; maxillary tomium without trace of subterminal notch. Nostrils basal, lateral, longitudinal, exposed, situated in a large fossa, overhung by a coriaceous operculum. Tongue terminally ending in five bristles, lateral borders smooth. No rictal bristles. Wing long and pointed, falling a little short of the tail; third and fourth primaries longest, fifth scarcely shorter; second primary nearly as long as third; first primary spurious, narrow, extremely short, not exceeding primary coverts; secondaries broad, short, only two-thirds of the whole wing. Tail very much shorter than wing, slightly emarginate, with rectrices soft and distinctly rounded at tip. Tarsus robust, somewhat shorter than middle toe without claw; acrotarsium covered with large scutes; toes long and stout, outer toe much longer than inner, the latter at base adherent to middle toe, hallux slightly shorter than middle toe; claws strongly arched, that of hallux much shorter than the digit. Wing 86-92, tail 52-60, tarsus 14-16, bill 17-25 mm.

Coloration. Above dark brown, variegated and spotted with whitish. Crown distinctly streaked with whitish or buff. Wing dusky, varied with pale grey, buff and white. Tail ashy or greyish brown, more or less banded with black. Under parts whitish or buff, throat and foreneck streaked, breast and abdomen banded with blackish or dusky. Feet black. Sexes alike.

Geographical Distribution. Tropical Africa and Indian Peninsula. Four subspecies, three of which are African.

Habits and Nidification. In habits *Salpornis* appears to resemble the true Tree-creepers, running round the stems in all directions and flying with a steady flight from one tree to the base of another. In mode of nidification, however, it (at least the Indian form) entirely differs from all other members of the family, for it is said to build a cup-shaped nest on a horizontal bough of a tree. The nest is composed of bits of leaf-stalk and leaves, chips of bark, and the dung of caterpillars, bound together by cobwebs, and forms a very firm, elastic structure. The eggs (three in number) are greenish white, with a ring of blackish brown specks round the larger end and a few specks over the remainder of the shell (Cleveland).

KEY TO THE SUBSPECIES OF THE GENUS *SALPORNIS*

1. Bill longer, about 25 mm. With a distinct white superciliary stripe. Median

rectrices ashy, with black and whitish marginal spots 1. *S. SPILONOTA SPILONOTA*.

- Bill shorter, not more than 22 mm. No distinct white superciliary stripe.
Median rectrices regularly banded with greyish brown and black 2.
2. Marginal spots on the outer web of the quills obsolete, dull ashy; pale streaks of pileum smaller, on the forehead indistinct and rather greyish; black markings of the lower parts coarser, more bar-like 4. *S. SPILONOTA EMINI*.
- Marginal spots on the outer web of the quills well-defined, pure white; pale streaks on upper part of the head very distinct, nearly pure white; black markings of lower parts smaller, more spot-like 3.
3. Bill longer : 19-21 mm. General colour above and below more greyish. 2. *S. SPILONOTA SALVADORI*.
- Bill shorter : 17-17,5 mm. General colour above and below more rufescent 3. *S. SPILONOTA ERLANGERI*.

1. **Salpornis spilonota spilonota** (J. Franklin).

Certhia spilonota J. Franklin, Proc. Comm. Zool. Soc. Lond. Vol. 1, p. 121 (Oct. 1831) («on the Ganges between Calcutta and Benares» or «in the Vindhyan Hills»).

Fig. Gray, Gen. of Birds, pl. 44, f. 1; Gould, Birds Asia, Vol. 2, pl. 56.

Hab. Plains of India from the foot of the Himalayas southwards to near the Kistna River; the western limits of its range appear to be Gurgaon, Sambhar, Ajmere and Abu.

2. **Salpornis spilonota salvadori** (Barboza du Bocage). (Plate, Fig. 6.)

Hylypsornis salvadori Barboza du Bocage, Journ. Acad. Lisboa, Vol. 6, pp. 198, 211 (1878) (Caconda, Benguella).

Fig. Barboza du Bocage, Ornith. Angola, pl. 10, f. 2.

Hab. Central South Africa from Angola and Benguella in the west, eastwards to N. E. Mashonaland (Salisbury, Ganyani), British Central (Zomba, Fort Hill, Ikawa) and German East Africa, and southern part of British East Africa (Mount Elgon).

3. **Salpornis spilonota erlangeri** Neumann.

Salpornis spilonota erlangeri Neumann, Ornith. Monatsber. Vol. 15, p. 52 (1907) (Anderatcha in Kaffa, South Ethiopia).

Hab. South Ethiopia (Kaffa, Djamdjam), N. E. Africa.

4. **Salpornis spilonota emini** Hartlaub.

Salpornis emini Hartlaub, Proc. Zool. Soc. Lond. 1884, p. 415, pl. 37 (1884) (Langomeri, Æquatorial province).

Salpornis salvadori orientalis Hartlaub, Journ. f. Ornith. Vol. 37, p. 116 (1889) (new name for *S. emini* Hartlaub).

Salpornis maclaudi (Oustalet MS.) Maclaud, Mammif. et Ois. de l'Afr. occid. p. 141 (1906) (Kouyeya [Kinsam] in southern Fouta-Djalon : nom. nud.).

Salpornis riggenbachi Reichenow, Ornith. Monatsber. Vol. 17, p. 140 (1909) (Banjo, N. W. Cameroons 1).

Fig. Proc. Zool. Soc. Lond. 1884, pl. 37.

Hab. From the upper White Nile (Ladô, Langomeri, Tobbo, Macracra) westwards to North Cameroons (Banjo, Gold Coast (Gambaga, Sekwi) and French Guinea (Kouyeya, Fouta-Djalon).

3. GENUS TICHODROMA ILLIGER

Tichodroma Illiger, Prodr. Mann. Avium, p. 210 (1811) (Sp. un. : *Certhia muraria* Linnæus).

Petrodroma Vieillot, Anal. Ornith. pp. 45, 70 (1816) (Sp. un. : «Grimpereau de Muraille»).

Tichodromas Olphe-Galliard, Ornith. Eur. occid., fasc. 23, p. 31 (nom. emend. pro *Tichodroma* Illiger).

Characters. Bill much longer than head, somewhat depressed at base, and laterally much compressed in terminal portion; culmen distinctly ridged on basal third, nearly straight, with the extreme tip slightly decurved; gonys straight. Nostrils longitudinal, entirely exposed, overhung by a distinct operculum, forming a long, narrow slit-like opening on lower portion

1) According to Prof. Neumann (in litt.), who has compared the two types, *S. riggenbachi* is based upon a very worn example of *S. s. emini*.

of nasal groove. No rectal bristles. Tongue long, extremely thin, divided at tip, but without any bristles. Wing long, much rounded; fourth, fifth and sixth primaries longest, third but a little shorter; second about equal to eighth; first primary considerably shorter than half of the second. Secondaries broad, about four-fifths of the length of the wing. Tail nearly square, the outermost rectrix being scarcely 2-3 mm. shorter than the longest, somewhat less than two-thirds of the wing; rectrices rather broad, soft, rounded at tip with the shafts not stiffened. Under tail coverts very long, covering two-thirds of the tail. Tarsus slender, about as long as middle toe with claw; acrotarsium covered in front with a single long lamina; middle toe slightly longer than outer toe, inner toe much shorter than the outer one; claws slender, much compressed, strongly arched; hallux about as long as inner toe, but much stouter; its claw fully as long as the digit, and stronger than the other claws.

Wing 95-105, tail 55-65, tarsus 20-22, bill 27-33 mm.

Coloration. Plumage soft and copious. Double (a complete autumn- and a partial spring) moult. In breeding plumage: head above and back clear ashy grey, upper tail coverts darker, more slate grey. Wings blackish; first primary uniform; second, third, fourth and fifth, sometimes also the sixth, with two large white spots on the inner web; secondaries and primaries following the third with basal half of outer web beautiful carmine-red. Upper wing coverts blackish with wide carmine-red edges. Tail feathers black, the two outer ones with long white, the remaining with ashy grey tips. Cheeks, ear coverts, throat and foreneck black, rest of lower surface slate grey, under tail coverts with slight white ends. In winter plumage the cheeks, ear coverts, throat and foreneck are white, the breast and abdomen paler grey, and the pileum washed with pale brownish. Sexes alike, but female generally smaller.

Geographical Distribution. Alpine districts of Central and South Europe (Alpes, Pyrenees, Sierra Nevada, Apennins, Carpathians, Balkan), Palæartic Asia (Caucasus, North Persia, Afghanistan, Turkestan, Tibet, Mongolia) and Himalaya Range (as far east as Bhutan). Said to breed also in North Africa (Atlas and Abyssinia).

Habits and Nidification. The single species of the genus exclusively inhabits high mountains, where it climbs up on the cliffs and rocks. The nest, placed in crevices of rocks, is a bulky structure of moss, grass and other soft materials and contains three eggs which are oval-shaped, dull or slightly glossy white with small, brownish red freckles, chiefly round the larger end, and some secondary shell-marks of bluish grey.

1. *Tichodroma muraria* (Linnæus). (Plate, Fig. 5.)

Certhia muraria Linnæus, Syst. Nat. ed. 12, Vol. 1, p. 184 (1766) (South Europe).

Metacilla (lapsu) *longirostra* Gmelin, Reise Russl. Vol. 3, p. 100, pl. 19, f. 2 (1774) (Mountains of Persia).

Tichodroma alpina C. L. Koch, Syst. Baier. Zool. p. 80 (1816) (« Hochgebirge »).

Tichodroma phoenicoptera Temminck, Man. d'Ornith. ed. 2, Vol. 1, p. 412 (1820) (new name for *Certhia muraria*).

Tichodroma europaea Stephens in Shaw, Gen. Zool. Vol. 14, 1, p. 187 (1826) (new name for *Certhia muraria*).

Tichodroma brachyrhynchus Brehm, Handb. Naturg. Vög. Deutschl. p. 213 (1831) (« Alpen Tyrols and Kärnthens »).

Tichodroma macrorhynchus Brehm, ibidem, p. 213 (1831) (« Alpen der Schweiz und Salzburg, wahrscheinlich nicht in Tyrol »).

Tichodroma phoenicoptera? var. *subhimalayana* Hodgson in Gray, Zool. Misc. p. 82 (1844) (nom. nud.).

Tichodroma nepalensis Bonaparte, Consp. Gen. Avium, Vol. 1, p. 225 (1850) (« ex Asia centr. »).

Tichodroma hoffmeisteri Reichenbach, Handb. Ornith. Scansoriæ. p. 271 (1853) (Namgiah in India).

Tichodroma media Brehm, Vogelfang, p. 77 (1855) (« Tyrol und Kärnthens bei Salzburg n. s. w. »).

Tichodroma muralis David & Oustalet, Ois. Chine, p. 88 (1877) (ex Brisson).

Fig. Dresser, Birds Eur. Vol. 3, pl. 123.

Hab. The same as that of the genus.

4. GENUS CLIMACTERIS TEMMINCK

Climacteris Temminck, Man. d'Ornith. ed. 2, Vol. 1, p. LXXXV (1820) (Species : *Certhia scandens* and *C. picumnus*).

Characters. Bill shorter than head, decidedly compressed for its terminal half, somewhat broadened at base; culmen distinctly ridged, gradually curved from base to tip; gonys nearly straight. Tongue not divided at tip, covered all over with short bristles. Nostrils basal, longitudinal, distinctly operculate, exposed. No rictal bristles. Wing very much longer than tail, rather pointed; third and fourth primaries longest, fifth but little shorter; first primary considerably shorter than half the length of the second; second about equal to sixth. Secondaries rather short, less than two-thirds of the length of the wing. Tail short, slightly rounded; rectrices broad, of nearly equal width and much rounded at tip. Tarsus robust, rather short, though slightly longer than middle toe without claw; acrotarsium booted; middle toe much longer than the lateral ones; outer toe adherent to middle toe for its basal phalanx; hallux long, though distinctly shorter than middle toe, its claw very long and strongly arched.

Coloration. Variable, above either blackish rufescent- or olive brown, pileum sometimes paler, sometimes darker than black; rump and upper tail coverts often strongly contrasted with colour of mantle. Under parts, at least sides and flanks in most species streaked with white. A broad buff or pale rufous band across the wings always present. Sexes nearly alike, the differences restricted to markings on foreneck, chest or malar region. In most of the species, the females have the feathers of the chest edged with ferruginous or light chestnut, these edges being absent in the males. In *C. melanota* and *C. picumnus*, the male has the foreneck spotted with dusky, the female with light chestnut. The females of *C. placens* and *C. scandens* show a distinct golden- or orange yellow or rufous patch on the cheeks, below the ear coverts, which does not exist in the males.

Geographical Distribution. Australia and New Guinea.

Habits. The Tree-Creepers inhabit the White-gum and Eucalyptus forests as well as the flats studded with apple-trees. Habits and food resemble those of *Certhia*. The nest is placed in holes of trees and very often composed of hairs of the Opossum. The two eggs are reddish flesh-colour, thickly blotched all over with reddish brown.

KEY TO THE SPECIES AND SUBSPECIES OF CLIMACTERIS ¹⁾

1. All the upper parts black or blackish brown	2.
— Anterior upper parts olive-, rufescent- or rufous brown, pileum sometimes darker than back, rump and under tail coverts sometimes ashy grey	7.
2. With a broad, buff superciliary stripe.	3. (<i>C. MELANOTA</i>).
— No superciliary stripe	4.
3. Spots on foreneck blackish	3. <i>C. MELANOTA</i> ♂.

¹⁾ *C. rufa obscura*, unknown to the author, is not included in the key.

- Spots on foreneck light chestnut. 3. *C. MELANOTA* ♀.
4. Ground colour of under parts rufous brown 5.
- Ground colour of under parts chestnut. 6.
5. Throat feathers white, broadly margined with black; no chestnut on chest 1. *C. MELANURA* ♂.
- Chin and throat uniform white; chest feathers edged with clear chestnut 1. *C. MELANURA* ♀.
6. Throat feathers white broadly, margined with black. 2. *C. WELLSI* ♂.
- Chin and throat uniform white. 2. *C. WELLSI* ♀.
7. Sides of head and under parts mainly ferruginous 8. (*C. RUFA*).
- Lores and a large patch surrounding the eye only ferruginous; under parts not ferruginous: chin and throat being dingy white, feathers of breast and abdomen white, streaked with dark brown and edged with pale brownish. Rump and upper tail coverts ashy grey. 9. (*C. ERYTHROPS*).
- Sides of head and under parts without any ferruginous (except a small patch on the cheeks in the females of several species). 10.
8. Feathers of the foreneck with a white central streak, laterally bordered with dusky 6. *C. RUFA RUFA* ♂.
- Feathers of the foreneck with a narrower whitish central streak, but not bordered with dusky. 6. *C. RUFA RUFA* ♀.
9. Breast and abdomen greyish brown, each feather with a broad central stripe of white, bordered on either side by a dusky streak 12. *C. ERYTHROPS* ♂.
- Feathers of chest clear ferruginous with a central stripe of white, lower breast and abdomen greyish brown, each feather with a white streak, bordered with dusky 12. *C. ERYTHROPS* ♀.
10. Rump and upper tail coverts uniform with back 11.
- Upper back brown, contrasted with the deep rufous brown or chestnut rump and upper tail coverts. 16.
- Upper back brown, rump and upper tail coverts ashy grey 18.
11. Pileum and nape uniform ashy brown. Chin and throat pale buff. Larger: wing 90-98 mm. 12. (*C. PICUMNUS*).
- Feathers of the pileum dark brown, with rufous or chestnut tips. Chin, throat and foreneck pale olive grey. Smaller: wing 77-80 mm. 13.
12. Foreneck spotted with blackish 8. *C. PICUMNUS* ♂.
- Foreneck spotted with clear rufous 8. *C. PICUMNUS* ♀.
13. Tips to the crown feathers pale rufous. 14.
- Tips to the crown feathers darker chestnut 15.
14. Cheeks and malar region olive brown 5. *C. PLACENS MERIDIONALIS* ♂.
- Cheeks and malar region rufous 5. *C. PLACENS MERIDIONALIS* ♀.
15. Cheeks and malar region olive brown 4. *C. PLACENS PLACENS* ♂.
- Cheeks and malar region chestnut 4. *C. PLACENS PLACENS* ♀.
16. Larger: wing 86-88 mm. 17.
- Smaller: wing 75 mm. 9. *C. SCANDENS MINOR* juv.
17. Cheeks and malar region dark brown 10. *C. SCANDENS SCANDENS* ♂ juv.
- With a rufous patch below the ear coverts 10. *C. SCANDENS SCANDENS* ♀ juv.
18. With a broad whitish superciliary stripe. 19.
- No superciliary stripe 20.

19. *Chest uniform brownish grey* 11. *C. SUPERCILIOSA* ♂.
 — *Chest feathers edged with clear ferruginous* 11. *C. SUPERCILIOSA* ♀.
 20. *Larger : wing 85 mm. or more* 21.
 — *Smaller : wing 80 mm. or less* 22.
 21. *A dull orange yellow patch below the ear coverts* 10. *C. SCANDENS SCANDENS* ♀ ad.
 — *No orange patch below the ear coverts* 10. *C. SCANDENS SCANDENS* ♂ ad.
 22. *A dull orange yellow patch below the ear coverts* 9. *C. SCANDENS MINOR* ♀ ad.
 — *No orange patch below the ear coverts* 9. *C. SCANDENS MINOR* ♂ ad.

1. ***Climacteris melanura* Gould.**

Climacteris melanura Gould, Proc. Zool. Soc. Lond. Vol. 10, 1842, p. 138 (Febr. 1843) (« North-west coast of Australia »).

Fig. Gould, Birds Austr. Vol. 4, pl. 97.

Hab. N. W. Australia, Northern Territory and Northern Queensland.

2. ***Climacteris wellsi* Ogilvie-Grant.**

Climacteris wellsi Ogilvie-Grant, The Ibis (9), Vol. 3, p. 664 (1909) (Clifton Dawns, Gascoyne River, W. Australia).

Hab. West Australia : Clifton Dawns, Gascoyne River.

3. ***Climacteris melanota* Gould.**

Climacteris melanota Gould, Proc. Zool. Soc. Lond. Vol. 14, 1846, p. 106 (Jan. 1847) (« The neighbourhood of the river Lynd, in the interior of Australia »).

Climacteris melanota Gadow, Cat. Birds Brit. Mus. Vol. 8, p. 334 (1883) (nom. emend.).

Fig. Gould, Birds Austr. Vol. 4, pl. 96.

Hab. Northern Territory and North Queensland : districts bordering the gulf of Carpentaria.

4. ***Climacteris placens placens* Slater.**

Climacteris placens Slater, Proc. Zool. Soc. Lond. 1873, p. 693 (1874) (« Atam, apud montes Papuanos Arfak »).

Fig. Gould, Birds New Guinea, Vol. 1, pl. 8.

Hab. North western peninsula of Dutch New Guinea : Arfak mountains.

5. ***Climacteris placens meridionalis* Hartert.**

Climacteris placens meridionalis Hartert, Bull. Brit. Ornith. Club, Vol. 21, p. 27 (1907) (Owgarra, Angabunga River, Brit. New Guinea).

Hab. Mountains of British New Guinea : Owgarra, Angabunga River, Bihagi, Mambare River.

6. ***Climacteris rufa rufa* Gould.**

Climacteris rufa Gould, Proc. Zool. Soc. Lond. Vol. 8, p. 140, 1840 (July 1841) (« Western Australia »).

Fig. Gould, Birds Austr. Vol. 4, pl. 94.

Hab. Southern and Central portions of West Australia.

7. ***Climacteris rufa obscura* Carter.**

Climacteris rufa obscura Carter, Bull. Brit. Ornith. Club, Vol. 27, p. 16 (1910) (Warren Rives, S. W. Australia).

Hab. S. W. Australia.

8. ***Climacteris picumnus picumnus* Temminck, (Plate, Figs. 3, 3a, 3b.)**

Climacteris picumnus Temminck, Rec. Pl. Col. pl. 281, fig. 1 (1824) (« à Timor, à Célèbes (erreur!) et à la côte sept. de la Nouvelle-Hollande »).

Glyciphila? ocularis Gould, Proc. Zool. Soc. Lond. Vol. 5, 1837, p. 154. (Déc. 1838) (« in terrâ Van Diemen »).

Climacteris leucophaea (erreur, nec *Certhia leucophaea* Latham 1801) Strickland, Ann. Nat. Hist. Vol. 11, p. 336 (1843) (Latham's name erroneously referred to the present species).

Fig. Gould, Birds Austr. Vol. 4, pl. 93 (s. n. *C. scandens*!).

Hab. East Australia (from Port Denison southwards) to Victoria, South Australia (Adelaide etc.), Tasmania.

9. ***Climacteris scandens minor* P. L. Ramsay.**

Climacteris leucophaea minor P. L. Ramsay, Tabular List of Austral. Birds, Addenda, p. 2 (1891) (Mount Bartle Frere, N. E. Queensland, descr. ad.).

Climacteris weiskei Reichenow, Ornith. Monatsber. Vol. 8, p. 187 (1900) (North Queensland; descr. ♀ juv.).

Hab. North Queensland.

10. *Climacteris scandens scandens* Temminck.*Climacteris scandens* Temminck, Rec. Pl. Col. pl. 281, f. 2 (1824) («sur les côtes orientales de la Nouvelle-Hollande»).*Climacteris pyrrhonota* Gould, Proc. Zool. Soc. Lond. 1867, p. 976 (1868) (Dobroyde, New South Wales; = juv. 11).Fig. Gould, Birds Austr. Vol. 4, pl. 98 (s. n. *C. picumnus*!).

Hab. Southern Queensland, New South Wales, Victoria, South Australia; Tasmania ?).

11. *Climacteris superciliosa* North.*Climacteris superciliosa* North, The Ibis (7), Vol. 1, p. 341 (1895) (Illara Creek, Central Australia).

Fig. Report Horn Exped. Central Austr. Vol. 2 (1896), pl. 7, f. 2.

Hab. S. Queensland, New South Wales, Victoria, S. Australia, Central Australia, West Australia (interior districts).

12. *Climacteris erythrope* Gould.*Climacteris erythrope* Gould, Proc. Zool. Soc. Lond. Vol. 8, 1840, p. 148 (July 1841) («New South Wales»).? *Climacteris affinis* 2) Blyth, Journ. Asiat. Soc. Bengal. Vol. 32, p. 453 (1863) («From the Melbourne Institution »).

Fig. Gould, Birds Austr. Vol. 4, pl. 95.

Hab. New South Wales, Victoria, Southern Queensland.

5. GENUS RHABDORNIS REICHENBACH

Rhabdornis Reichenbach, Handb. Ornith. Scansoriæ, pp. 221, 276 (1853) (Sp. un. : *Meliphaga mystacalis* Temminck).**Characters.** In structural characters nearly agreeing with *Climacteris*, but bill more lengthened, being decidedly longer than head. Culmen nearly straight for basal portion, slightly decurved terminally. Tongue corneous, depressed, divided at tip, slightly protractile, with bristles only on lateral borders. Wing 75-83, tail 42-52, bill 18-24 mm.**Coloration.** Above of various shades of brown, upper part of head often darker than back and streaked with white. Under parts white or buffy, feathers of flanks streaked with blackish or dark brown. Bill black.**Geographical Distribution.** Philippine Islands. Three forms.**Habits and Nidification** appear to be unknown.

KEY TO THE SPECIES AND SUBSPECIES OF RHABDORNIS

1. Head above and nape blackish with white shaf.-streaks. Ear coverts blackish brown 2.
- Head above and nape dark brown with whitish shaft-streaks. Ear coverts earthy brown 3.
- Head above and nape uniform greyish brown. Ear coverts blackish brown . . . 3. *R. INORNATA* ♂ 3).
2. Back dark greyish brown. Larger : wing about 80 mm. 1. *R. MYSTACALIS MYSTACALIS* ♂.
- Back light rufescent brown. Smaller : wing about 75 mm. 2. *R. MYSTACALIS MINOR* ♂.
3. Back dark rufous brown. Larger : wing about 78, bill 24 mm. 1. *R. MYSTACALIS MYSTACALIS* ♀.
- Back light rufescent brown. Smaller : wing about 75, bill 20 mm. 2. *R. MYSTACALIS MINOR* ♀.

1) Cfr. North, Nests and Eggs Birds Australia etc. Vol. 2, 1906, p. 44-45.

2) Though commonly referred to the above species it is by no means certain that Blyth's name might not have been based upon an example of some other species, e. g. *C. picumnus picumnus* Temminck, ♀. In any case, the description is too incomplete to enable one to make out the species.3) The female of *R. inornata* is unknown to the author.

1. **Rhabdornis mystacalis mystacalis** (Temminck). (**Plate, Fig. 4.**)

Meliphaga mystacalis Temminck, Rec. Pl. Col. t. 335, f. 2 (1825) (« à l'île de Luzon, aux environs de Manille »).
Climacteris striolata Kittlitz, Kupfertafeln Naturg. Vogel, pl. 6, f. 2 (1832) (Luzon).

Hab. Philippine Islands : Luzon, Masbate, Negros, Panay.

2. **Rhabdornis mystacalis minor** Ogilvie-Grant.

Rhabdornis minor Ogilvie-Grant, Bull. Brit. Ornith. Club, Vol. 6, p. 17 (1896) (Samar).

Hab. Philippine Islands : Samar, Mindanao, Leyte, Dinagat, Basilan, Bohol.

3. **Rhabdornis inornata** Ogilvie-Grant.

Rhabdornis inornata Ogilvie-Grant, Bull. Brit. Ornith. Club, Vol. 6, p. 18 (1896) (Samar).

Fig. The Ibis (7), Vol. 3, pl. 6, f. 2 (1897).

Hab. Philippine Islands : Samar, Mindanao.

EXPLANATION OF PLATE

- Fig. 1. Head of *Certhia familiaris*.
 -- 1a. Tail of *Certhia familiaris*.
 -- 1b. Foot of *Certhia familiaris*.
 -- 2. Head of *Certhia brachydactyla*.
 -- 3. Head of *Climacteris picumnus*.
 -- 3a. Foot of *Climacteris picumnus*.
 -- 3b. Tail of *Climacteris picumnus*.
 -- 4. Head of *Rhabdornis mystacalis*.
 -- 5. Head of *Tichodroma muraria*.
 -- 6. *Salpornis salvadori* (entire figure).

Munich, 15th May 1911.

FAM. CERTHIIDÆ

1, 1a, 1b. CERTHIA FAMILIARIS. 2. C. BRACHYDACTYLA. 3, 3a, 3b. CLIMACTERIS PICUMNUS. 4. RHABDORNIS MYSTACALIS.
5. TICHODROMA MURARIA. 6. SALPORNIS SALVADORI.

GENERA AVIUM

CONDUCTED BY

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P. L. SCLATER, &^a

PASSERES

FAM. SITTIDÆ

by C. E. HELLMAYR

WITH 1 COLOURED PLATE

1911

PRICE 7/10 (FR. 8.60)

FAM. SITTIDÆ

FAM. SITTIDÆ

BY C. E. HELLMAYR

THE Nuthatches are small, scansorial ten-primaried Oscines with the bill straight, subulate, not uncinatè, either wholly unnotched or with a very slight subterminal notch near end of maxillary tomium (*Neositta*); tail much shorter than wing, even or very slightly rounded; rectrices broad, with rounded tip; first primary less than one-third as long as second.

Characters. Bill straight, shorter than, or nearly as long as, head; culmen rounded or slightly ridged, very little, if anything, decurved terminally; gonys more or less ascending terminally. Nostrils roundish, or oval, either non-operculate (*Sitta*, *Callisitta*), or distinctly operculate (*Neositta*, *Daphaenositta*), in the former case sometimes (*Sitta*) partly concealed by antrorse, latero-frontal plumules, in the latter entirely exposed. Rictal bristles either obsolete, or if distinct, short and rather soft. Wing long, rather pointed; third and fourth, or third, fourth, and fifth primaries longest; second primary equal to, or slightly longer than, seventh (*Sitta*, *Callisitta*), or equal to fifth (*Neositta*); first primary very small, never one-third as long as second, sometimes scarcely exceeding primary coverts; wing-tip conspicuously longer than tarsus. Tail about half as long as wing, sometimes slightly longer, sometimes much shorter, even or slightly rounded; rectrices broad with rounded tip, shafts never projecting nor acuminate. Tarsus sometimes longer, sometimes shorter than middle toe (without claw); the acrotarsium either distinctly scutellate (*Sitta*, *Callisitta*), or booted (*Neositta*); lateral toes very unequal, the inner (without claw) reaching only to second joint of middle toe, the outer reaching to middle of penultimate phalanx of middle toe; basal phalanx of middle toe united to outer toe for greater part of its length, to inner toe for a less distance; hallux (without claw) equal to outer toe (without claw), its claw decidedly shorter than the digit.

Coloration variable. In the subfamily *Sittinae* above plain bluish grey or blue; pileum and hindneck, at least partly, sometimes black or brown; the rectrices (except in the so-called Rock-Nuthatches : genus *Sitta*, nos. 40-46) partly black and white; under parts white, buff, greyish, cinnamomeous, chestnut or vinaceous, or parti-coloured. In the subfamily *Neosittinae* above grey or brown, streaked with dusky or blackish (*Neositta*), or black (*Daphaenositta*); rump and upper tail coverts mostly white (*Neositta*) or spotted with rosy red (*Daphaenositta*); pileum white, dark grey or black; beneath white in *Neositta*, either uniform, or with dusky streaks, black in *Daphaenositta*; wings blackish, inner web of quills with middle portion cinnamon-rufous or white (except in the two Papuan species of *Neositta*), rectrices blackish, the outer ones tipped with white (*Neositta*) or pink (*Daphaenositta*).

Geographical Distribution. Palæarctic, Nearctic, Indo-Malayan and Australian Regions.

Habits and Nidification. The Nuthatches are expert climbers, running up and down the trunks of trees or the faces of cliffs and rocks, often head downward, which the Tree-creepers are unable to do. The members of the genera *Sitta* and *Callisitta* build their nest, a loose, bulky structure, in holes of trees or crevices of rocks, the clutch consists of from five to nine eggs, which are white, more or less speckled and blotched with reddish. The species of *Neositta*, on the other hand, place their large, smoothly made nest in a dead fork of an eucalyptus-tree; the eggs, three or four in number, are greenish or bluish white with dark brown spots.

Observations. It is somewhat difficult to draw a line between the *Sittidae* and *Certhiidae*, certain genera of the latter group (*Tichodroma*, *Climacteris*) being decidedly intermediate, though more nearly related to *Certhia* than to *Sitta*. From the osteological investigations of Mr. F. A. Lucas it would seem that the *Sittidae* are, however, quite distinct from the *Paridae*, with which they have been associated by several authors. The osteological characters of the *Sittidae* having been given in full in the « Tierreich » I need not dwell again on this subject.

Bibliography. Gadow, Cat. Birds Brit. Mus. Vol. 8, 1883, p. 340-365; Hellmayr, Tierreich, Livr. 18, 1903, p. 168-201; Ridgway, Bull. U. S. Nat. Mus. no. 50, Part 3, 1904, p. 436-459.

KEY TO THE SUBFAMILIES AND GENERA OF SITTIDÆ

1. Bill rather broad at base, where its depth about equals its width, not compressed or very slightly so in terminal portion. Nostrils non-operculate or with operculum very indistinct, posteriorly more or less concealed by antrorse latero-frontal plumules. Second primary about equal to seventh 2. (Subfam. SITTINÆ).
- Bill extremely slender, much compressed laterally, at base much deeper than wide. Nostrils distinctly operculate, entirely exposed. Second primary equal to fifth 3. (Subfam. NEOSITTINÆ).
2. Bill strong, not compressed terminally, nearly or fully as long as head or tarsus. Nostrils almost completely hidden by dense, antrorse latero-frontal plumules 1. Genus *SITTA*.
- Bill slender, distinctly compressed terminally, decidedly shorter than head or tarsus. Nostrils partly exposed, only posteriorly concealed by a few bristly feathers. 2. Genus *CALLISITTA*.

3. Bill relatively longer, with gonys decidedly ascending terminally. Without any rosy red colour on face and rump, the latter being, like upper tail coverts, mostly white. 3. Genus NEOSITTA.
- Bill relatively shorter, with gonys nearly straight. Forehead, chin and a few spots on rump rosy red 4. Genus DAPHÆNOSITTA.

1. GENUS SITTA LINNÆUS

Sitta Linnæus, Syst. Nat., Ed. 10, p. 115 (1758) (sp. type : *Sitta europaea* Linnæus).

Sittella Rafinesque, Anal. Nat. p. 68 (1815) (nom. emend. pro *Sitta* Linnæus).

Rupisitta Buturlin, Mitteil. Kauk. Mus. Vol. 3, p. 64 (1907) (types : « Rock-Nuthatches »).

Characters. Bill robust, nearly as long as head, about equal to length of tarsus, at base somewhat wider than deep; culmen quite or nearly straight, rounded above; gonys more or less ascending terminally. Nostrils roundish or oval, non-operculate, or with operculum very indistinct, almost completely concealed by antrorse, bristly latero-frontal plumules. Rictal bristles conspicuous, though soft and rather short. Wing long, rather pointed; third, fourth and fifth primaries longest, fourth usually slightly exceeding the two others; second primary about equal to seventh or very slightly longer; first primary very small, less than one-third of second, sometimes scarcely longer than primary coverts; secondaries short, about three-fourths of whole wing, broadly rounded at tip; wing-tip decidedly longer than bill or tarsus. Tail short, generally slightly more, sometimes much less, than half as long as wing, even or very slightly rounded; the rectrices broad, with rounded tip. Tarsus decidedly longer than middle toe without claw; acrotarsium distinctly scutellate; middle toe much the longest, lateral toes very unequal, the inner (without claw) reaching only to second joint of middle toe, the outer reaching to middle of penultimate phalanx of middle toe; basal phalanx of middle toe united to outer toe for nearly the whole of its length, to inner toe less so; hallux equal to outer toe, but much stouter with claw much stronger and more decidedly curved, though distinctly shorter than the digit. Size extremely variable, length of wing varying from about 60 (*S. pygmaea*, *S. pusilla*) to 115 (*S. magna*), that of tail from 30 to 70 mm.

Coloration. Sexes not or very little different. Above plain bluish, slaty or whitish grey, pileum and hindneck sometimes wholly or partly black or brown; the rectrices often partly black and white; in most of the old-world species a more or less distinct blackish stripe through the eye from nasal feathers to sides of neck; under parts white, buff, cinnamomeous, greyish, vinaceous, or chestnut, or with a mixture of two or more of these colours. Bill blackish, base of lower mandible more or less yellowish.

Geographical Distribution. Palæarctic, Nearctic and Indo-Malayan Regions. Forty-six species and subspecies.

Habits and Nidification. The large majority of the species inhabits forests, gardens, parks etc., while the so-called Rock-Nuthatches (nos. 40-46) exclusively frequent rocks and cliffs. The Nuthatches are the most perfect climbers, running up and down the trees and rocks, often head downward. In winter, they associate with Tits, Gold-crests and Woodpeckers to small flocks wandering about in search of food. Their nest, a voluminous, careless structure, is

placed in holes of trees or crevices of rocks and contains in April or May from six to nine eggs, which are white, speckled or blotched with reddish. Their food consists of insects and their larvæ, as well as of various seeds, nuts etc.

KEY TO THE SPECIES AND SUBSPECIES OF SITTA¹⁾

1. Pileum and hindneck brown or olive, strongly contrasted with bluish grey of back. Wing never more than 70 mm 2
- Pileum and hindneck never brown or olive, being either bluish grey or black 4.
2. Pileum and hindneck brown, the posterior median portion with a large white spot; no white patch on middle rectrices 37. *S. pusilla*.
- Pileum and hindneck olive, the latter without large whitish median spot; middle rectrices with basal half or more of inner web white. 38. (*S. pygmæa*).
3. Smaller, with pileum and hindneck more deeply olive, the latter with whitish or buffy median spot obsolete or indistinct; back more bluish grey; adult male averaging wing 65, tail 34 mm. 38. *S. pygmæa pygmæa*.
- Larger, with pileum and hindneck paler or less decidedly olive, the latter with whitish or pale buffy median spot well developed; back less bluish grey; adult male averaging wing 67, tail 37 mm. 39. *S. pygmæa leuconucha*.
4. Pileum either wholly black, or at least hindneck and nape black, contrasting with bluish grey of back 5.
- Head above without any black, being bluish grey like back, or slightly darker grey than the latter 17.
5. With a distinct black streak from the lores through the eye to the auricular region 10.
- Whole sides of head white without any black 10.
6. A large chestnut patch on chest. 28. *S. krüperi*.
- No chestnut patch on chest 7.
7. Pileum and nape glossy black; black stripe behind the eye broad and very distinct; under parts brighter; throat buffy white, deepening to tawny buff or dull ochraceous buff on posterior parts, darkest on flanks 27. *S. canadensis canadensis* ♂.
- Pileum only dull black; dusky stripe behind eye narrower, dull blackish and sometimes mixed with whitish; under parts buff or greyish buff, throat whitish 8.
8. Under parts dull greyish buff. Wing about 72, tail about 40 mm. 24. *S. canadensis whiteheadi* ♂.
- Under parts clear buff, without any greyish tinge. Wing not over 70, tail averaging 35-38 mm. 9.
9. Larger: wing 67-70 mm.; under parts deep buff or ochraceous buff 25. *S. canadensis villosa* ♂.
- Smaller: wing about 63 mm.; under parts very pale, creamy 26. *S. canadensis corea* ♂.
10. Under parts paler or darker buff, passing into whitish on chin and throat; flanks and under tail coverts uniform chestnut. (Both sexes with entire crown black.). 11. (*S. leucopsis*).

1) *S. yunnanensis* Ogilvie-Grant, unknown to the author, could not be included in the key.

- Under parts white or greyish white; flanks tinged with brownish; under tail coverts white, edged and tipped with light chestnut 12. (*S. CAROLINENSIS*).
11. Under parts paler, clear buff. Larger: wing 76-81, tail 42-45 mm. 29. *S. LEUCOPSIS LEUCOPSIS*.
- Under parts darker, deep ochraceous buff. Smaller: wing 70-73, tail 40-43 mm. 30. *S. LEUCOPSIS PRZEWALSKII*.
12. Black markings on greater upper wing coverts and tertials larger, more sharply defined, deeper black, more conspicuously contrasted with the clear bluish grey of marginal and terminal portions, the black space on outer web of third tertial with its posterior extremity broadly rounded 13.
- Black markings on greater upper wing coverts and tertials less sharply defined, duller black, less conspicuously contrasted with the duller grey of marginal and terminal portions, the black area on outer web of third tertial with its posterior extremity narrowly pointed or acuminate 14.
13. Slightly larger, with bill relatively shorter and stouter; black central spaces of greater wing coverts and black areas on tertials more restricted; under parts more purely white, the sides and flanks faintly, if at all, tinged with grey; adult female with pileum usually bluish grey, strongly contrasted with black of hindneck 31. *S. CAROLINENSIS CAROLINENSIS*.
- Slightly smaller, with bill relatively longer and narrower; black central spaces of greater wing coverts and black areas on tertials more extended; under parts duller or more greyish white, the sides and flanks strongly greyish; adult female with pileum often glossy black like hindneck 32. *S. CAROLINENSIS ATKINSI*.
14. Smaller: wing averaging less than 90 mm., with under parts more purely white 15.
- Larger: wing averaging more than 90 mm., with under parts less purely, more greyish white 16.
15. Larger, especially the feet; bill proportionately more slender; grey tip and white subterminal patch of lateral rectrices averaging broader; adult male averaging wing 87, tail 46 mm. 33. *S. CAROLINENSIS ACULEATA*.
- Smaller, especially the feet; bill relatively stouter; grey tip and white subterminal patch of lateral rectrices averaging narrower; adult male averaging wing 86, tail 44 mm. 34. *S. CAROLINENSIS LAGUNE*.
16. Under parts paler, sides and flanks more faintly tinged with grey; bill averaging longer, about 19-20 mm. 35. *S. CAROLINENSIS NELSONI*.
- Under parts darker, sides and flanks nearly so dark grey as back; bill averaging shorter, about 17-18 mm. 36. *S. CAROLINENSIS MEXICANA*.
17. Under tail coverts with more or less chestnut 18.
- Under tail coverts without chestnut 38.
18. Under parts deep cinnamomeous or chestnut, sometimes paler, or even whitish, on chin and throat 19.
- Under parts never cinnamomeous or chestnut, being either white, buff, ochraceous, or greyish, often parti-coloured of two of these tints. Under tail coverts merely edged or tipped with chestnut 22.
19. Under tail coverts grey with a large, white subterminal spot surrounded by a distinct chestnut or ferruginous margin 20.

- Under tail coverts grey, broadly tipped and edged with chestnut, without any white 21.
20. Throat buff, gradually darkening into the chestnut of breast and abdomen 20. *S. NEGLECTA*.
- Chin whitish, remainder of lower plumage uniform chestnut 21. *S. CINNAMOVENTRIS*.
21. Chestnut of lower parts somewhat paler. Size larger : wing 81-85 mm. 22. *S. CASHMIRENSIS*.
- Chestnut of lower parts somewhat deeper. Size smaller : wing 69-76 mm. 23. *S. CASTANEOVENTRIS*.
22. Size larger : wing more than 110, tail more than 60 mm. (Sides of head, except a black stripe through the eye from lores to sides of neck, chin and throat white, breast and abdomen smoky grey 18. *S. MAGNA*.
- Size smaller : wing considerably under 100, tail never more than 50 mm. 23. (*S. EUROPEA*).
23. Ear coverts deep ochraceous, or dingy grey slightly shaded with buff, like under parts. Size smaller : wing 73-77 mm. 24.
- Ear coverts white, or very slightly tinged with pale buffy posteriorly. Size larger : wing 80-88, very rarely 78 mm. 26.
24. Ear coverts, sides of neck, and under parts plain deep ochraceous. 14. *S. EUROPEA SINENSIS*.
- Ear coverts, sides of neck, and under parts dingy grey, with a buffy tinge, middle of abdomen more purely ochraceous 25.
25. General tone of under parts greyer, with very little, if any, buffy suffusion. 16. *S. EUROPEA NAGAENSIS*.
- General tone of under parts less purely grey, with more decided ochraceous or buffy suffusion. 15. *S. EUROPEA MONTIUM*.
26. Under parts, at least anterior portion (throat, foreneck and chest) pure white 27.
- Under parts (except chin and upper throat) deep ochraceous 33.
27. Abdomen, sometimes also lower breast, clear ochraceous buff, abruptly contrasted with white of chest and throat 28.
- Abdomen either white like breast, or, if slightly washed with pale buffy, not abruptly contrasted with white of breast 29.
28. Upper parts clearer, more of a bluish grey; abdomen clear ochraceous buff, paler, more creamy along middle line. 6. *S. EUROPEA AMURENSIS*.
- Upper parts darker, more slate grey; abdomen deeper ochraceous buff, scarcely paler in the middle. 7. *S. EUROPEA BEDFORDI*.
29. Abdomen more or less decidedly washed with pale buff or creamy 2. *S. EUROPEA HOMEYERI*.
- Abdomen pure white like breast. 30.
30. Two outer pairs of rectrices only with a large, white subterminal patch 5. *S. EUROPEA ARCTICA*.
- Three outer pairs of rectrices with some white, the first and second with a large subterminal patch, the third with a distinct apical spot 31.
31. A very distinct frontal band and narrow apical margins to greater upper wing coverts white 4. *S. EUROPEA ALBIFRONS*.
- Only an ill defined, narrow frontal edge white. Greater upper wing coverts without, or with very indistinct, whitish apical fringes. 32.
32. Larger, with longer, stouter bill : wing averaging 86, bill about 18.5-20 mm. 1. *S. EUROPEA EUROPEA*.
- Smaller, with shorter, slenderer bill : wing averaging 81, bill about 16-18.5 mm 3. *S. EUROPEA URALENSIS*.
33. Under parts paler, buff or light ochraceous buff 34.
- Under parts darker, deep ochraceous 35.

34. *Smaller, with shorter, much slenderer bill, under parts paler, buff, and bluish grey of upper parts clearer. Wing 79,5-82, bill 16,5-18 mm.* 12. *S. EUROPEA PERSICA.*
- *Larger, with stronger, as well as longer bill, under parts darker, light ochraceous, and bluish grey of upper parts darker. Wing 81-86, bill 18-20 mm.* 9. *S. EUROPEA BRITANNICA.*
35. *Larger, with long, powerful bill. Under parts very deep ochraceous. Wing 87, bill 21 mm.* 11. *S. EUROPEA RUBIGINOSA.*
- *Smaller, with shorter, slenderer bill. Under parts paler ochraceous. Wing never more than 85, generally less; bill 16-19,5 mm.* 36.
36. *With larger, longer bill: 17-19,5 mm. Whitish frontal edge indistinct.* 8. *S. EUROPEA CÆSIA.*
- *With shorter bill: 16-17,5 mm. Whitish frontal edge more or less distinct.* 37.
37. *Bill stout, strong: 16-17,5 mm. Under parts more deeply ochraceous* . 10. *S. EUROPEA CAUCASICA.*
- *Bill slender: 17-19 mm. Under parts less deeply ochraceous* 13. *S. EUROPEA LEVANTINA.*
38. *With a broad, well-defined white superciliary stripe from base of bill to sides of neck. Pileum deeper bluish grey than the back, forming a kind of indistinct dusky cap* 39.
- *No well-defined white superciliary stripe. Pileum of exactly the same shade of bluish grey as the back* 41.
39. *Breast and abdomen very pale greyish buff* 24. *S. CANADENSIS WHITEHEADI ♀.*
- *Breast and abdomen pure buff, without any greyish admixture* 40.
40. *Blackish postocular streak well-defined; abdomen deeper, tawny buff or ochraceous buff* 27. *S. CANADENSIS CANADENSIS ♀.*
- *Blackish postocular streak obsolete; abdomen paler, clear buff* 25. *S. CANADENSIS VILLOSA ♀.*
41. *Black eye stripes united on forehead; central pair of rectrices with a white spot near base. Abdomen and under tail coverts uniform deep fulvous.* 19. *S. HIMALAYENSIS.*
- *Black eye stripes not united on forehead; central pair of rectrices without any white at base. Abdomen and under tail coverts rufescent buff or isabelline rufous* 42.
42. *Bill extremely short and slender: 16-18,5, its depth at base not more than 4,5 mm.; wing about 73-75 mm.; with an indistinct dusky loreal streak and a narrow dusky border along upper margin of ear coverts.* 46. *S. TSCHITSCHERINI.*
- *Bill stout and longer, more than 19 mm., its depth at base 5-7 mm.; wing more than 75 mm.; a very broad, deep black stripe running from base of bill through eye to sides of neck.* 43.
43. *Smaller: wing 75-82 mm.; bill slender, shorter, 19-22 mm., its depth at base about 5-5,5 mm.* 44.
- *Larger: wing 83-92 mm.; bill stouter, longer, 22-25 mm., its depth at base about 6-7 mm.* 47.
44. *Upper parts darker, decidedly bluish grey; bill stronger and stouter* 45.
- *Upper parts paler, more whitish grey; bill slenderer* 46.
45. *Larger: wing 78-82, tail 46-52, bill 20-22 mm., with rufous buff of abdomen slightly darker.* 40. *S. NEUMAYER NEUMAYER.*
- *Smaller: wing 75-77, tail 43-47, bill 19-20 mm., with rufous buff of abdomen slightly paler* 41. *S. NEUMAYER ZARUDNYI.*
46. *Larger: with slightly stouter bill (wing 81, bill 22 mm.), and rufous buff of abdomen rather deeper* 42. *S. NEUMAYER SYRIACA.*

- *Smaller* : with slenderer bill (wing 78-80, bill 20-21 mm.), and rufous buff of abdomen slightly paler 43. *S. NEUMAYER RUPICOLA*.
47. *Larger* : wing 88-92 mm., with upper parts paler, clear cinereous, and black eye stripe exceedingly broad 45. *S. NEUMAYER DRESSERI*.
- *Smaller* : wing 83-85 mm., with upper parts darker, decidedly bluish grey, and black eye-stripe narrower 44. *S. NEUMAYER TEPHRONOTA*.

1. ***Sitta europæa europæa* Linnæus. (Plate, Figs. 2, 2a, 2b.)**

Sitta europæa Linné, Syst. Nat. ed. 10, p. 115 (1758) (Europa, America, the latter locality erroneous. Sweden fixed as typ. locality).

Sitta suecica Brehm, Vogelfang, p. 74 (1855) (Scandinavia).

Hab. Sweden, Norway, Northern Russia, and the Danish Islands south to Funen and Fano.

2. ***Sitta europæa homeyeri* Hartert.**

Sitta caesia homeyeri Seebohm, Birds Japanese Emp. p. 92 (1890) (nom. nud.).

Sitta caesia homeyeri Hartert, The Ibis 1892, p. 364 (1892) (East Prussia).

Fig. Naumann, New edit. Vol. 2, pl. 23, f. 3.

Hab. Western Russia (Livland, Esthland, Poland etc.) and East Prussia; also said to occur in Crimea.

3. ***Sitta europæa uralensis* Gloger.**

« *Sitta europæa* var. *sibirica* P., *S. uralensis* Licht. », Gloger, Vollst. Handb. Naturg. Vög. Eur. p. 378 (1834) (« im ganzen aussereuropäischen Russland ». We fix Ural Mount. as typ. locality).

Sitta Asiatica Gould, Birds Europe, Vol. 3, pl. 236 (1837) (« Russia »).

Sitta baicalensis Taczanowski, Bull. Soc. Zool. Fr. Vol. 7, p. 386 (1882) (Irkutsk, Lake Baikal, Dauria).

Sitta amurensis clara Stejneger, Proc. U. S. Nat. Mus. Vol. 9, p. 390, 392 (1886) (Yezo).

Sitta bifasciata Madarász, Ornith. Monatsber. Vol. 12, p. 183 (1904) (Krasnojarsk, W. Siberia; type examined).

Sitta biedermani Reichenow, Journ. f. Ornith. Vol. 55, p. 312 (1907) (Lake Telezky, Altai, Siberia; cotype examined).

Hab. Southern and central parts of Siberia, from the Ural Mountains eastward to the shores of the Okhotsk-Sea, Sakhalin, and the island of Yezo, Japan.

4. ***Sitta europæa albifrons* Taczanowski.**

Sitta albifrons Taczanowski, Bull. Soc. Zool. Fr. Vol. 7, p. 385 (1882) (Kamtschatka).

Hab. Kamtschatka, and Kuril Islands (Iterup etc.).

5. ***Sitta europæa arctica* Buturlin.**

Sitta arctica Buturlin, Ornith. Monatsber. Vol. 15, p. 79 (1907) (Werchojansk, N. Siberia).

Hab. N. E. Siberia : Jakutsk region between 60 and 68° n. lat. and from 130 to 156° east. long.

6. ***Sitta europæa amurensis* Swinhoe.**

? *Sitta roseilia* Bonaparte, Consp. Gen. Avium, Vol. 1, p. 227 (1850) (Japonia).

Sitta amurensis Swinhoe, Proc. Zool. Soc. Lond. 1871, p. 350 (1871) (Amoorland).

Fig. Aves Przewalsk. pl. 9, f. 3.

Hab. Amoorland, Ussuri, Manchوريا, Corea, and Isl. of Hondo (Japan).

7. ***Sitta europæa bedfordi* Ogilvie-Grant.**

Sitta bedfordi Ogilvie-Grant, Bull. Brit. Ornith. Club. Vol. 23, p. 59 (1909) (Quelpart Isl., S. Corea).

Hab. Quelpart Isl., south of Corea.

8. ***Sitta europæa caesia* Wolf.**

Sitta caesia Wolf in : Meyer & Wolf, Taschenb. Deutsch. Vögelk. Vol. 1, p. 128, pl. 15 (1810) (« in verschiedenen Gegenden Deutschlands, z. B. Thüringen, Franken, der Wetterau, Baiern u. s. w. »).

Sitta pinetorum C. L. Brehm, Handb. Naturg. Vög. Deutschl. p. 205 (1831) (« Deutsche Kiefernwälder »).

Sitta foliorum C. L. Brehm, ibidem, p. 206 (1831) (« in den deutschen Laubhölzern »).

Sitta septentrionalis C. L. Brehm, ibidem, p. 206 (1831) (« bewohnt den Norden, kommt im Winter bei Kiel vor »).

Sitta advena C. L. Brehm, ibidem, p. 207 (1831) (« zeigt sich nur zuweilen in den Wäldern des mittleren Deutschlands »).

Sitta affinis Blyth, Journ. Asiat. Soc. Bengal, Vol. 15, p. 289 (1846) (proposed as a new name for *S. europæa* of the Dictionnaire classique = *S. caesia* ex France).

Sitta coerulescens Brehm, Vogelfang, p. 74 (1855) (Germany).

? *Sitta caesia minor* A. E. Brehm, Allg. Deutsch. Naturhist. Zeitung 1857, p. 447 (1857) (Spain).

Sitta cinerea Doderlein, Giorn. Sc. Palermo, Vol. 5 (1), p. 192 (1869) (Sicily).

(*Sitta caesia*) var. *sordida* Reichenow, Journ. f. Ornith. Vol. 55, p. 312 (1907) (« Mark, Mecklenburg, Pommern, Schlesien, West- and Ostpreussen », in the latter province, however, *S. c. homeyeri* alone is found).

Hab. Europe, from Jutland south to the Pyrenees, Italy, Sardinia, Sicily, and east to the Balkan (common in Dalmatia, Bosnia, Serbia and Rumania, rare in Greece). In Spain perhaps represented by a different race, but a series should be examined.

9. ***Sitta europæa britannica* Hartert.**

Sitta europæa britannica Hartert, Novit. Zool. Vol. 7, p. 526 (1900) (Tring, England).

Hab. England, Scotland, but not in Ireland.

10. ***Sitta europæa caucasica* Reichenow.**

Sitta caesia caucasica Reichenow, Ornith. Monatsber. Vol. 9, p. 53 (1901) (Nalchikh in the Terek district, N. Caucasus).

Hab. Caucasus Mts.

11. ***Sitta europæa rubiginosa* Tschusi.**

Sitta europæa rubiginosa Tschusi, Ornith. Jahrb. Vol. 16, p. 140 (1905) (Asterabad, south shore of the Caspian Sea).

Hab. Elburz Mts., south shore of the Caspian Sea. N. Persia.

12. ***Sitta europæa persica* Witherby.**

Sitta europæa persica Witherby, The Ibis 1903, p. 531 (1903) (Oak-woods of S. W. Persia).

Hab. Oak-woods of S. W. Persia.

13. ***Sitta europæa levantina* Hartert.**

Sitta europæa levantina Hartert, Vög. paläarkt. Fauna, Livr. 3, p. 333 (1905) (Taurus, Asia Minor).

Hab. Asia Minor and Palestine.

14. ***Sitta europæa sinensis* J. Verreaux. (Plate, Fig. 4.)**

Sitta sinensis J. Verreaux, Nouv. Arch. Mus. Paris, Vol. 6, Bull. p. 34 (1870) (« dans les montagnes du Thibet chinois », viz. Kiukiang and Mupin, cfr. loc. cit. Vol. 7, Bull. pp. 28, 29. Although the examples from the latter locality belong to *S. e. montium*, the name may safely be retained for the present form, since the coloured figure (see below) undoubtedly represents the Kiukiang bird. Consequently *Kiukiang* is to be regarded as type locality).

Fig. J. Verreaux, Nouv. Arch. Mus. Paris, Vol. 9, Bull., tab. 4, f. 1.

Hab. Northern and central provinces of China (Tchi-li, Tchekiang, Hupeh, Shensi etc.); Isl. of Formosa.

15. ***Sitta europæa montium* La Touche.**

Sitta montium La Touche, The Ibis 1899, p. 404 (1899) (Kuatun, N. W. Fokien).

Hab. Southern and western provinces of China (Fokien, Kiangsi, Szechuen etc.).

16. ***Sitta europæa nagaensis* Godwin-Austen.**

Sitta nagaensis Godwin-Austen, Proc. Zool. Soc. Lond. 1874, p. 44 (1874) (Nagâ Hills, Assam).

Sitta victoriae Rippon, Bull. Brit. Ornith. Club, Vol. 14, p. 84 (1904) (Mt. Victoria, S. Chin Hills).

Fig. Journ. Asiat. Soc. Bengal, Vol. 43, II, pl. 4 (1874).

Hab. Assam (Nagâ Hills) and Burma (Chin Hills, Southern Shan States).

17. ***Sitta yunnanensis* Ogilvie-Grant.**

Sitta yunnanensis Ogilvie-Grant, Bull. Brit. Ornith. Club, Vol. 10, p. 37 (1900) (Wei-yuan, Southern Yunnan).

Hab. S. W. China : S. Yunnan. (Perhaps a subspecies of the preceding form.)

18. ***Sitta magna* W. Ramsay.**

Sitta magna W. Ramsay, Proc. Zool. Soc. Lond. 1876, p. 677, t. 43 (♀) (1877) (Karennee).

Fig. The Ibis 1897, tab. 1 (♂).

Hab. Burma (Karennee, south. Shan States) and S. W. China (South Yunnan).

19. ***Sitta himalayensis* Jardine & Selby.**

Sitta himalayensis Jardine & Selby, Illustr. Ornith. Vol. 3, pl. 144 (Dec. 1835) (Himalaya).

Sitta nipalensis Hodgson, Journ. Asiat. Soc. Bengal, Vol. 5, II p. 779 (1836) (Nepal).

Hab. Throughout the Himalayas, from Kangra to Bhutan and Sikkim, at elevations of from 5000 to 11,000 feet. Also obtained in the Manipur Hills (Godwin-Austen) and recorded from the southern Shan States (Bingham, The Ibis 1903, p. 594). (Specimens from these localities should be reexamined.)

20. ***Sitta neglecta*** Walden 1).

Sitta neglecta Walden, Ann. Mag. Nat. Hist. (4), Vol. 5, p. 218 (1870) (« Karen Hills of the Toungoo District, Burma »).

Hab. Burma (Karennee, south. Shan States, Pegu, Tenasserim).

21. ***Sitta cinnamoventris*** Blyth.

Sitta cinnamoventris Blyth, Journ. Asiat. Soc. Bengal, Vol. 11, 1, p. 459 (1842) (no locality).

Fig. Gould, Birds Asia, Vol. 2, pl. 44.

Hab. Himalayas, from Murree to Dibrugarh, at altitudes of from 2000 to 6000 feet. Also found in Assam (Khasia Hills), Manipur and Upper Burma.

22. ***Sitta cashmirensis*** W. Brooks.

Sitta cashmirensis W. Brooks, Proc. Asiat. Soc. Bengal 1871, p. 209 (1871) (Cashmeere).

Hab. Pine-forests of Kashmir and of the adjoining parts of Afghanistan.

23. ***Sitta castaneoventris*** Franklin.

Sitta castaneoventris Franklin, Proc. Comm. Zool. Soc. Lond. Vol. 1, p. 121 (1831) (« on the banks of the Ganges, and in the mountain chain of Upper Hindoostan », cfr. loc. cit. p. 114).

Fig. Gould, Birds Asia, Vol. 2, t. 45.

Hab. Greater portion of the continent of India, from the base of the Himalayas to the Wynaad.

24. ***Sitta canadensis whiteheadi*** Sharpe. (Plate, Fig. 1.)

Sitta whiteheadi Sharpe, Proc. Zool. Soc. Lond. 1884, pp. 233, 414, pl. 36 (1884) (Corsica).

Hab. Mountains of Corsica.

25. ***Sitta canadensis villosa*** J. Verreaux.

Sitta villosa J. Verreaux, Nouv. Arch. Mus. Paris, Vol. 1, Bull. p. 78, pl. 5, f. 1 (1865) (« de la Chine, au nord de Pékin »).

Sitta (sic) *pekinensis* David, ibidem, Vol. 3, Bull. p. 36 (1867) (Pékin).

Hab. Northern and north-western parts of China, Mongolia.

26. ***Sitta canadensis corea*** Ogilvie-Grant.

Sitta corea Ogilvie-Grant, Bull. Brit. Ornith. Club, Vol. 16, p. 87 (1906) (Séoul, Corea).

Hab. Near Séoul, Corea.

27. ***Sitta canadensis canadensis*** Linnæus.

Sitta canadensis Linnæus, Syst. Nat. ed. 12, Vol. 1, p. 177 (1766) (based on *S. canadensis* Brisson, Ornith. Vol. 3, p. 593, pl. 29, f. 4 : Canada).

Sitta varia Wilson, Amer. Ornith. Vol. 1, p. 40, pl. 2, f. 4 (1808) (based on *S. varia*, ventre rubro etc., Bartram, Travels, Dublin edit. p. 287).

Sitta stulta Vieillot, Nouv. Dict. Hist. Nat. Vol. 31, p. 332 (1819) (based on *Sitta varia* Wilson, loc. cit.).

Hab. « Forests of northern North America and higher mountains of United States » (Ridgway).

28. ***Sitta krüperi*** Pelzeln.

Sitta Krüperi Pelzeln, Sitzungsber. Akad. Wiss. Wien, Vol. 48, 1, p. 149 (1863) (Smyrna).

Fig. The Ibis 1865, pl. 7, and Dresser, Birds Europe, Vol. 3, pl. 121.

Hab. Asia Minor, east to the Caucasus.

29. ***Sitta leucopsis leucopsis*** Gould.

Sitta leucopsis Gould, Proc. Zool. Soc. Lond. Vol. 17, 1849, p. 113 (1850) (Himalaya Mount.).

Fig. Gould, Birds Asia, Vol. 3, p. 46.

Hab. N. W. Himalayas and adjoining parts of Afghanistan, at elevations of from 7000 to 10,000 feet.

30. ***Sitta leucopsis przewalskii*** Berezowski & Bianchi.

Sitta przewalskii Berezowski & Bianchi, Aves Exped. Potanin. p. 119 (1891) (Upper Chuanche); Deditius, Journ. f. Ornith. Vol. 45, p. 74 (1897) (transl.).

Fig. Pleske, Aves Przewalsk. Vol. 2, pl. 9, f. 4.

Hab. N. W. China : Kansu (Upper Chuanche), N. W. Hupeh (Patong).

1) Nos. 20-23 are most probably only geographical representatives of a single species.

31. ***Sitta carolinensis carolinensis* Latham.**

Sitta carolinensis Latham, Index Ornith. Vol. 1, p. 262 (1790) (based on *Sitta carolinensis* Brisson, Ornith. Vol. 3, pp. 596 etc.; « in America, Jamaica » [errore!]. We accept *Carolina* [ex Brisson] as typical habitat.).
Sitta melanocephala Vieillot, Nouv. Dict. Hist. Nat. Vol. 31, p. 336 (1819) (ex Latham etc.).

Hab. Eastern United States (except Florida and Gulf coast), and south-eastern British provinces.

32. ***Sitta carolinensis atkinsi* Scott.**

Sitta carolinensis atkinsi Scott, Auk, Vol. 7, p. 118 (1890) (Tarpon Springs, Florida).

Hab. Florida, and westward along Gulf coast to Mississippi (Bay St. Louis).

33. ***Sitta carolinensis aculeata* Cassin.**

Sitta aculeata Cassin, Proc. Acad. Nat. Sc. Philad. Vol. 8, p. 254 (1856) (California).

Hab. Pacific Coast district, from northern Lower California to British Columbia.

34. ***Sitta carolinensis lagunæ* Brewster.**

Sitta carolinensis lagunæ Brewster, Auk, Vol. 8, p. 149 (1891) (Sierra de la Laguna, southern Lower California).

Hab. Cape St. Lucas district of Lower California.

35. ***Sitta carolinensis nelsoni* Mearns.**

Sitta carolinensis nelsoni Mearns, Proc. U. S. Nat. Mus. Vol. 24, p. 918 (1902) (Huachuca Mts., Arizona).

Hab. Rocky Mountains and Great Plains districts, from eastern British Columbia and western Manitoba to Sonora, Chihuahua and western Texas.

36. ***Sitta carolinensis mexicana* Nelson & Palmer.**

Sitta carolinensis mexicana Nelson & Palmer, Auk, Vol. 11, p. 45 (1895) (Mount Orizaba, Puebla, Mexico).

Hab. Mountains of southern and central Mexico.

37. ***Sitta pusilla* Latham.**

Sitta pusilla Latham, Index Ornith. Vol. 1, p. 263 (1790) (« based on *Sitta carolinensis minor* Brisson, Ornith. Vol. 3, p. 598, pl. 5 : Carolina »).

Sitta minor Bechstein, Latham's Uebers. Vögel, Vol. 1, p. 533, footnote in text (1793) (based on *Sitta europæa* ♂ Gmelin, Syst. Nat. Vol. 1, I, p. 440).

Sitta pusilla caniceps O. Bangs, Auk, Vol. 15, p. 180 (1898) (Clear Water, Hillsboro Co., Florida).

Hab. Coast pine belt of south-eastern United States, from southern Maryland and southern Delaware to Florida and eastern Texas; Bahamas (Great Bahama Island).

38. ***Sitta pygmæa pygmæa* Vigors.**

Sitta pygmæa Vigors, Zoology, Voyage « Blossom », p. 25, pl. 4, f. 2 (1839) (Monterey, California).

Hab. Mountains of western North America and Mexico, in coniferous forests; north to British Columbia, south to states of Vera Cruz, Puebla, Mexico; east to Montana, Wyoming, Colorado, New Mexico etc.

39. ***Sitta pygmæa leuconucha* Anthony.**

Sitta pygmæa leuconucha Anthony, Proc. Calif. Acad. Sc. (2), Vol. 2, p. 77 (1889) (San Pedro Martir Mts., Lower California).

Sitta albinnucha Sharpe, Hand-list Birds, Vol. 4, p. 350 (1903) (nom. emend.).

Hab. San Pedro Martir Mountains, northern Lower California, and northward to mountains of San Diego County, California.

40. ***Sitta neumayer neumayer* Michahelles.**

Sitta Neumayer Michahelles, Isis, Vol. 23, p. 814 (1830) (Ragusa, in southern Dalmatia).

Sitta orientalis Brehm, Handb. Naturg. Vög. Deutschl. p. 207 (1831) (« im südlichen Dalmatien »).

Sitta rufescens Gould, Birds Europe, Vol. 3, pl. 235 (1837) (ex Temminck MS : Dalmatia).

Sitta saxatilis Schinz, Europ. Fauna, Vol. 1, p. 266 (1840) (Dalmatia).

Fig. Dresser, Birds Europe, Vol. 3, pl. 120.

Hab. South-eastern Europe, Balkan Peninsula; southern Dalmatia, Herzegovina, Montenegro, Bulgaria, western parts of Turkey and Greece. (The records of its occurrence in Croatia and Spain are not reliable.)

41. *Sitta neumayer zarudnyi* Buturlin.

Sitta zarudnyi Buturlin, Mitteil. Kaukas. Mus. Tiflis, Vol. 3, p. 70 (1907) (« Asia Minor : from Aidin to Taurus inclusive »).

Hab. Asia Minor Smyrna, Aidin, Ephesos etc., east to the Taurus Mountains to Cilicia¹.

42. *Sitta neumayer syriaca* Temminck.

Sitta syriaca (Ehrenberg MS.) Temminck, Man. d'Oraith. ed. 2: Vol. 3, p. 286 (1835) (« Syrie »).

Hab. Syria (Tannurin, Libanon, Antilibanon, Banias in the Jordan valley).

43. *Sitta neumayer rupicola* Blanford.

Sitta rupicola, Blanford, The Ibis (3), Vol. 3, p. 87 (1873) (« in montibus Persicis præsertim in Elburz », type ex Elburz Mts.)².

Sitta syriaca parva Buturlin, The Ibis (8), Vol. 6, p. 417 (1906) (Akhalzikh, Transcaucasia).

Fig. Blanford, Eastern Persia, Vol. 2, pl. 15, f. 2 (specimen in Tring Mus.).

Hab. North Persia : Elburz Mountains, south of the Caspian Sea; Transcaucasia, west to Adijaman³ (Kurdistan, Armenia). (Doubtfully separable from the preceding form.)

44. *Sitta neumayer tephronota* Sharpe.

Sitta tephronota Sharpe, Ann. Mag. Nat. Hist. (4), Vol. 10, p. 450 (1872) (type from Kokand, in Ferghana, Turkestan).

Sitta syriaca obscura Sarudny & Loudon⁴, Ornith. Monatsber. Vol. 13, p. 76 (1905) (« bewohnt das Gebirge zwischen dem persischen Meerbusen und dem Hochlande von Iruru, da sie sich nördlich kaum weiter als bis zum Breitengrade von Kaschan ausbreitet »).

Hab. Greater part of Persia (except south-western provinces and Elburz Range), from southern Azerbaijan, Baluchistan, Afghanistan (Candahar) and Turkestan (as far east as Tian-shan Mountains).

45. *Sitta neumayer dresseri* Sarudny & Buturlin.

Sitta dresseri Sarudny & Buturlin, Ornith. Monatsber. Vol. 14, p. 132 (1906) (no locality! but « Mountains of South-western Persia between highlands of Iran and lowlands of Mesopotamia » are to be regarded as terra typica; cfr. Buturlin, Mitteil. Kauk. Mus. Vol. 3, p. 66).

Hab. Mountains of South-western Persia (Luristan, Arabistan, Farsistan, Laristan).

46. *Sitta tschitscherini* Sarudny.

Sitta tschitscherini Sarudny, Ornith. Jahrb. Vol. 15, p. 218 (1904) (Ispahan, South Persia).

Hab. Mountains of South-western Persia, north to Ispahan and southern parts of Zagros-Range.

2. GENUS CALLISITTA BONAPARTE

Dendrophila (nec Hodgson, April 1837, Phasianidæ) Swainson, Classif. of Birds, Vol. 2, p. 318 (July 1837) (Species : *D. flavipes* Swainson and *D. frontalis* Swainson).

Callisitta Bonaparte, Consp. Gen. Avium, Vol. 1, p. 226 (1850) (Sp. typ. : *Sitta formosa* Blyth).

Characters. — Bill slender, decidedly shorter than head or tarsus, slightly compressed in terminal portion, its depth at base equal to width; culmen less rounded than in *Sitta*, with

1) Specimens obtained by Danford in Tring Museum, examined by me.

2) Buturlin considers Blanford's name untenable, but this view is erroneous. Even if Blanford's description of *S. rupicola* were a mixtum compositum his name would, by elimination, become available for the Rock-Nuthatch of the Elburz-range. However, Blanford primarily based *rupicola* on the four specimens from the latter locality, and the others from Kohrud and Shiraz were only incidentally mentioned. Moreover, one of the Lura valley examples, now in the Tring Museum, bears, on the label, a note from Dr. Blanford's own hand « type, Ibis 1873 p. 87, specimen figured Zoology of Persia ». *Parva* Buturlin thus becomes a synonym of *rupicola*, Transcaucasian skins being practically identical with Blanford's type. The specimen from Shiraz, also in Tring Museum, is referable to *S. n. dresseri*, while that from Kohrud, which I have not seen, may belong to *S. tschitscherini*.

3) Specimen in Liverpool Museum (ex coll. Tristram) examined.

4) After examining more than fifty specimens from Persia, Baluchistan, Afghanistan and Turkestan, I am unable to separate *S. s. obscura* from *S. n. tephronota*, for the alleged colour-differences are not connected with distinct geographical areas.

tip conspicuously, though slightly inclined downwards; gonys terminally more strongly ascending. Rictal bristles obsolete. Nostrils large, oval, almost entirely exposed, there being but a few, rather elongated bristles reaching to anterior end of nasal fossa. Wing long, rather pointed; third, fourth and fifth primaries nearly equal and longest; second falling between sixth and seventh; first primary very small, less than one-third of second, but conspicuously longer than primary coverts. Tail short, little more than half as long as wing, slightly rounded; the rectrices broad, with rounded tip. Tarsus about equal to, or slightly shorter than, middle toe without claw; acrotarsium distinctly scutellate; proportions of toes exactly as in *Sitta*. Legs and feet much more slender and gracile than in the last-named genus. Size variable, length of wing varying from about 70 to 100, that of tail from about 36 to 60 mm.

Coloration. — Sexes alike or very little different. Upper parts with more or less bright blue colours; either pileum and back etc. uniform azure blue (*Callisitta frontalis*), with forehead and lores only velvety black; cheeks and ear coverts vinous brownish; or top and sides of head as well as nape black (*C. azurea*); or head above and mantle black, spotted and streaked with light blue, and rump uniform Nile-blue (*C. formosa*). Under parts either ochraceous (*C. formosa*) or vinaceous buff, more or less shaded with lilac; in one species, *C. azurea*, belly black. Rectrices partly black with greyish or whitish tips. Bill greenish or red in life, with extreme tip of upper mandible black, in *C. formosa* uniform dark horn-colour.

Geographical Distribution. — Indo-Malayan Region. Nine species and subspecies.

Habits and Nidification apparently not different from *Sitta*.

OBSERVATIONS. — The above generic characters have been taken from *C. frontalis* and *C. azurea*, which may or may not be congeneric with *C. formosa*, the type of the genus. It is possible that the latter be nearer to *Sitta*; in this case a new generic name would have to be created for the species nos. 2-9, which are easily distinguished from true *Sitta* by several striking structural characters.

KEY TO THE SPECIES AND SUBSPECIES OF CALLISITTA

1. Larger, wing about 100, tail about 60 mm. Head above and mantle black with spots and streaks of azure and pale blue; rump and shoulders light Nile-blue. Chin and throat whitish, remainder of under parts deep ochraceous, palest on under tail coverts 1. *C. FORMOSA*.
- Smaller, wing not exceeding 80, tail not more than 40 mm. Back azure or violaceous blue, its upper portion sometimes varied with black 2.
2. Head above, nape and sides of head black, chin, throat and breast pale buff, belly black. 2. *C. AZUREA*.
- Head above blue like the back; no black whatever on under parts. Males with a broad black superciliary stripe, absent in females 3.
3. Bill red in life, yellow in skins. Lores entirely black 4.
- Bill greenish. Lores with a distinct white spot 7.
4. Legs and feet red 3. *C. FRONTALIS CORALLIPES*.
- Legs and feet dark brown or dusky olive 5.

5. Chin and upper throat vinous brownish like remainder of under parts. 6. *C. FRONTALIS PALAWANA*.
 — Chin and upper throat whitish, distinctly paler than chest and abdomen 6.
 6. Under parts paler, creamy buff, shaded with pale vinaceous or lilac on flanks 4. *C. FRONTALIS FRONTALIS*.
 — Under parts darker, strongly washed with deep lilac 5. *C. FRONTALIS SATURATION*.
 7. With a conspicuous whitish nuchal patch 8. *C. FRONTALIS MESOLEUCA*.
 — No whitish nuchal patch 8.
 8. Under parts pale brownish buff, flanks slightly shaded with pale lilac 7. *C. FRONTALIS OENOCHLAMYS*.
 — Under parts strongly washed all over (except on throat) with deep lilac 9. *C. FRONTALIS LILACEA*.

1. ***Callisitta formosa* (Blyth). (Plate, Fig. 5.)**

Sitta formosa Blyth, Journ. Asiat. Soc. Bengal, Vol. 12, II, p. 638 (1843) (Darjeeling, Sikkim).

Hab. Eastern Himalayas (Sikkim, Daphla Hills); Assam (Khasia Hills); Burma (Shan States).

2. ***Callisitta azurea* (Lesson).**

Sitta azurea Lesson, Traité d'Ornith. p. 316 (1830) (no locality).

Dendrophila flavipes Swainson, Anim. in Menag. p. 323 (1838) (« India »).

Fig. Gray, Genera Birds, Vol. 3, pl. 45.

Hab. Java, Timor, and Mountains of the Malay Peninsula (Gunong Jjau, G. Tahan, Semangko Pass etc.).

3. ***Callisitta frontalis corallipes* (Sharpe).**

Dendrophila corallipes Sharpe, The Ibis (5), Vol. 2, p. 470 (1888) (Kina Balu, N. Borneo).

Hab. Mountains of North Borneo (Kina Balu).

4. ***Callisitta frontalis frontalis* (Swainson). (Plate, Figs. 3, 3a.)**

Sitta frontalis Swainson, Zool. Illustr. Vol. 1, pl. 2 (1820-21) (Ceylon).

Sitta corallina Hodgson, Journ. Asiat. Soc. Bengal, Vol. 5, II, p. 779 (1836) (Nepal).

Sitta velata Temminck, Pl. Col. pl. 72, f. 3 (1821) (Sumatra and Java).

Sitta frontalis hageni Parrot, Abhandl. Bay. Akad. Wissensch. 2. Kl. Vol. 24 (1907), p. 244 (1907) (Simpang, island of Bangka).

Hab. Throughout the greater portion of India, including Ceylon; in the Himalayas, from Kumaon to Dibrugarh, up to 5000 feet; Assam, and thence down to Tenasserim, the Malay Peninsula, and to the islands of Java, Sumatra and Bangka.

5. ***Callisitta frontalis saturation* (Hartert).**

Sitta frontalis saturation Hartert, Novit. Zool. Vol. 9, p. 573 (1902) (Gunong Tahan, Malay Peninsula).

Hab. Mountains of the Malay Peninsula (Gunong Tahan etc.), at elevations of from 3300 to 7000 feet.

N. B. A doubtful form whose range is very imperfectly known. It is rather difficult to understand why Gunong Tahan should be inhabited by a peculiar race, while *C. f. frontalis* has an apparently uninterrupted range from the Himalayas to the Sunda Islands.

6. ***Callisitta frontalis palawana* (Hartert).**

Sitta frontalis palawana Hartert, Bull. Brit. Ornith. Club, Vol. 16, p. 11 (1905) (Palawan).

Hab. Philippine Islands : Palawan and Balabac.

7. ***Callisitta frontalis oenochlamys* (Sharpe).**

Dendrophila oenochlamys Sharpe, Trans. Linn. Soc. Lond. 2. Vol. 1, p. 338, pl. 53, f. 3 (1876) (Island of Guimaras, Philippine Islands).

Hab. Philippine Islands : Cebu, Guimaras, Luzon, Mindanao, Negros, Panay.

8. ***Callisitta frontalis mesoleuca* (Ogilvie-Grant).**

Dendrophila mesoleuca Ogilvie-Grant, Bull. Brit. Ornith. Club, Vol. 3, p. 49 (1894) (Mountains of North Luzon).

Hab. High Mountains of North Luzon, Philippine Islands.

9. ***Callisitta frontalis lilacea* (Whitehead).**

Dendrophila lilacea Whitehead, Bull. Brit. Ornith. Club, Vol. 6, p. 49 (1897) (Samar).

Hab. Philippine Islands : Samar, Leyte, Basilan.

3. GENUS NEOSITTA HELLMAYR

Sittella (nec Rafinesque 1815!) Swainson, *Classif. of Birds*, Vol. 2, p. 317 (1837) (Sp. typ. : *S. chrysoptera* Latham).

Neositta Hellmayr, *Journ. f. Ornith.* Vol. 49, p. 187 (1901) (nom. emend. pro *Sittella* præoccupied).

Characters. — Bill extremely slender, decidedly shorter than head or tarsus, much compressed, at base much deeper than wide; culmen slightly ridged, nearly straight, its tip decidedly decurved, maxillary tomium with a very slight subterminal notch; gonys nearly straight for basal half, distinctly ascending terminally. Rictal bristles obsolete. Nostrils large, oval, operculate, entirely exposed, the slit-like nasal opening situated near lower edge of nasal fossa. Wing long, rather pointed; third and fourth primaries longest, fifth slightly shorter; second about equal to fifth; first primary exceedingly small and narrow, equal to, or scarcely longer than, primary coverts; secondaries short, about two-thirds of whole wing, broadly rounded at tip; wing-tip much longer than tarsus. Tail about half as long as wing, very slightly rounded; rectrices with rounded tips. Tarsus decidedly shorter than middle toe without claw; acrotarsium booted, sometimes very indistinctly scutellate; proportion of toes exactly as in *Sitta* and *Callisitta*, but much slenderer and shorter. Size small, length of wing varying from 75 to 88, that of tail from 32 to 45 mm.

Coloration. Above either light grey streaked with dusky (Australian species) or brown, streaked with blackish (New Guinean species); the rump and upper tail coverts mostly white; the pileum white, dark grey, or black; beneath whitish, either uniform, or with dusky streaks, especially on flanks; wings blackish, in the Australian species inner web of quills (except innermost secondaries) with middle portion cinnamon-rufous, buff or white, forming a broad transverse bar; rectrices blackish, the outer ones broadly tipped with white. Sexes different, in the black-headed species the female with much more black about the head than the male. Bill brownish horn colour, or yellow with black tip. Feet yellow.

Geographical Distribution. Australia and New Guinea. Ten species and subspecies, two of which are Papuan.

Habits and Nidification. Habits exactly like those of *Sitta*. The nest of the « Tree-runners », as they are called in Australia, is placed « like a filling of rubbish in an upright fork of a branch of an Eucalyptus tree, usually about 2 inches in thickness, and is built of bits of lichens, smoothly finished outside with little flakes of bark, glued on with mucus, to resemble natural bark ». The eggs, three or four in number, are light grey-green in colour with bold black blotches.

KEY TO THE SPECIES AND SUBSPECIES OF NEOSITTA

1. *Wings uniform dusky or nearly so, the third, fourth and fifth primaries only with a narrow white edge to the inner web* 2.
- *Wings with a broad white or pale rufous cross-band, the second third of the inner web of the primaries and secondaries being of that colour for the whole of their width.* 4.

2. *Breast and abdomen sooty brown, some of the feathers with narrow white edges. Head all round and throat white.* 9. *N. PAPUENSIS* ♂ (?).
- *Under parts white, with blackish shaft-streaks. Pileum black.* 9. *N. PAPUENSIS* ♀ (?).
- *Breast and abdomen pure white* 3.
3. *Head all round, nape and throat ashy white, most feathers with a more or less distinct grey shaft-line* 10. *N. ALBIFRONS* ♀.
- *Top of the head blackish grey, with hoary whitish margins, throat and jugulum blackish grey, with broad white edges to the feathers* 10. *N. ALBIFRONS* ♂.
4. *Feathers of lower parts with distinct dusky longitudinal streaks* 5.
- *Lower parts without trace of dusky streaks* 12. (*N. PILEATA*).
5. *Bill entirely horn-brown. Top and sides of the head dusky; throat only white, streaked with dusky in female. (Wing bar rufous.)* 6. (*N. CHRYSOPTERA*).
- *Bill partly, at base, yellow* 7.
6. *Pileum and sides of head dark smoky, throat and foreneck immaculate white.* 1. *N. CHRYSOPTERA* ♂ ad.
- *Pileum and sides of head brown, throat and foreneck distinctly streaked with dusky* 1. *N. CHRYSOPTERA* ♀.
7. *Head above black in both sexes* 8. (*N. STRIATA*).
- *Head above white in male, pale grey in female* 11. (*N. LEUCOCEPHALA*).
8. *Bill for its basal half yellow* 9. (*N. STRIATA STRIATA*).
- *Bill only at extreme base, about one-fourth of whole length, yellow* 10. (*N. STRIATA MAGNIROSTRIS*).
9. *Head all round and throat black* 4. *N. STRIATA STRIATA* ♀.
- *Head above and nape only black, sides of head dusky, throat white.* 4. *N. STRIATA STRIATA* ♂.
10. *Head all round, including throat, black* 5. *N. STRIATA MAGNIROSTRIS* ♀.
- *Head above and nape only black, sides of head dusky, throat white.* 5. *N. STRIATA MAGNIROSTRIS* ♂.
11. *Wing-band rufous. (Head all round, including throat, pure white in male; top and sides of head pale grey, throat white, narrowly streaked with dusky in female)* 2. *N. LEUCOCEPHALA LEUCOCEPHALA*.
- *Wing-band pure white (sexual differences as above)* 3. *N. LEUCOCEPHALA ALBATA*.
12. *Upper part of head only black; frontal edge, lores, superciliary stripe, cheeks and ear coverts white.* 13. (Males).
- *Top and sides of head uniform black* 15. (Females).
13. *Wing-band pure white* 8. *N. PILEATA LEUCOPTERA*.
- *Wing-band wholly or partly rufous* 14.
14. *Bill shorter, stout. Wing-band uniform rufous* 6. *N. PILEATA PILEATA*.
- *Bill longer, slender. Wing-band partly rusty, partly white (?)* 7. *N. PILEATA TENUIROSTRIS*.
15. *Wing-band pure white* 8. *N. PILEATA LEUCOPTERA*.
- *Wing-band wholly or partly rufous* 16.
16. *Bill shorter, stout. Wing-band uniform rufous* 6. *N. PILEATA PILEATA*.
- *Bill longer, slender. Wing-band partly rusty, partly white (?)* 7. *N. PILEATA TENUIROSTRIS*.

1. *Neositta chrysoptera* (Latham).

Sitta chrysoptera Latham, Index Ornith. Suppl. p. 32 (1801) (Nova Hollandia).

Fig. Gould, Birds Australia, Vol. 4, pl. 101.

Hab. Coast districts of Southern and Eastern Australia (South Australia, Victoria, New South Wales and Queensland, northward to Port Denison).

2. **Neositta leucocephala leucocephala** (Gould).

Sittella leucocephala Gould, Proc. Zool. Soc. Lond. Vol. 5, 1837, p. 152 (Dec. 1838) (« in Australiâ »).

Fig. Gould, Birds Australia, Vol. 4, pl. 102.

Hab. Parts of New South Wales, and southern districts of Queensland (Moreton Bay etc.).

3. **Neositta leucocephala albata** (P. Ramsay).

Sittella albata P. Ramsay, Proc. Zool. Soc. Lond. 1877, p. 351 (1877) (neighbourhood of Port Denison).

Fig. Gould, Birds New Guinea, Vol. 3, pl. 28.

Hab. Northern districts of Queensland (Rockingham Bay etc.).

4. **Neositta striata striata** (Gould).

Sittella striata Gould, Ann. Mag. Nat. Hist. (4) Vol. 4, p. 110 (1869) (Cape York Peninsula).

Fig. Gould, Birds Australia, Suppl. pl. 54.

Hab. N. E. Queensland : Cape York Peninsula (southward to the Gulf of Carpentaria and to about Rockingham Bay).

5. **Neositta striata magnirostris** Ingram.

Neositta magnirostris Ingram, Bull. Brit. Ornith. Club, Vol. 21, p. 99 (1908) (Inkerman District, North Queensland).

Fig. The Ibis (9), Vol. 2, 1908, p. 473, pl. 9.

Hab. Northern Queensland : Inkerman Station, south-west of Townsville, in North Kennedy.

6. **Neositta pileata pileata** (Gould).

Sittella pileata Gould, Proc. Zool. Soc. Lond. Vol. 5, 1837, p. 151 (Dec. 1838) (« in Australiâ, apud flumen Cygnorum »; = ♂).

Sittella melanocephala Gould, ibidem, p. 152 (Dec. 1838) (« in Australiâ, apud flumen Cygnorum »; = ♀).

Fig. Gould, Birds Australia, Vol. 4, pl. 104.

Hab. South-western portion of New South Wales, Victoria, South Australia, and West Australia (north to the Gascoyne River, in the south as far inland as Kalgoorlie).

7. **Neositta pileata tenuirostris** (Gould).

Sittella tenuirostris Gould, Handbook Birds Austr. Vol. 1, p. 610 (1865) (Interior of South Australia?; exact locality unknown).

Hab. Appears to represent the preceding form in the interior districts of New South Wales and West Australia (East Murchison, Laverton, Mt. Margaret). (This imperfectly described form is unknown to the author).

8. **Neositta pileata leucoptera** (Gould).

Sittella leucoptera Gould, Proc. Zool. Soc. Lond. Vol. 7, 1839, p. 152 (March 1840) (« North-west coast of Australia »).

Fig. Gould, Birds Australia, Vol. 4, pl. 103.

Hab. North Australia (Port Essington, Cobourg Peninsula, Kimberley, Arnhems Land etc.).

9. **Neositta papuensis** (Schlegel).

Sitta papuensis Schlegel, Nederl. Tijdschr. Dierk. Vol. 4, p. 47 (1871) (N. W. New Guinea).

Hab. Mountains of N. W. Dutch New Guinea (Arfak Mts., Hatam).

10. **Neositta albifrons** (P. Ramsay). (Plate, Figs. 6, 7.)

Sittella albifrons P. Ramsay, Proc. Linn. Soc. N. S. Wales, Vol. 8, p. 24 (1883) (S. E. New Guinea : tableland of Astrolabe Mts.).

Sittella griseiceps 1) De Vis, Report Brit. New Guinea, p. 102 (1894) (probably from Mount Manæao, Brit. New Guinea; = ♀).

Hab. Mountain Ranges of Brit. New Guinea (Astrolabe Mts., Owgarra, Angabunga R., Bihagi, Owen Stanley Mts.).

4. GENUS DAPHŒNOSITTA DE VIS

Daphŕenositta De Vis, The Ibis (7), Vol. 3, p. 380 (1897) (Sp. typ. : *D. miranda* De Vis).

Characters. — Agrees with the genus *Neositta* in having the nostrils distinctly operculate and wholly exposed (not concealed by the latero-frontal plumules), but the bill is much

1) *S. griseiceps* was apparently based on a female of *N. albifrons*, though the description is by no means clear.

shorter, with culmen straight, and with gonys likewise straight, not ascending. Rictal bristles obsolete. Wing rather long, somewhat pointed; third, fourth and fifth primaries longest; first primary narrow, short, not reaching beyond tip of primary coverts; secondaries short. Tail about half as long as wing, much rounded, with rectrices broad and distinctly rounded at tip. Tarsus about as long as hind toe with claw, and longer than middle toe; claw of hallux equal in length to digit. Wing 83, tail 44, tarsus 15, bill 18.5 mm.

Coloration. — Plumage soft. Sexes slightly different. The adult female is coloured as follows: Forehead, chin and a few feathers on ear coverts bright rosy red; general colour of upper and under parts black, the feathers with broad plumbeous margins; on the lower rump a number of rosy-red spots. Quills dusky, the inner webs of primaries and outer secondaries with a broad white band, as in some species of *Neositta*. Rectrices dusky, the four outer pairs with broad, pink tips. The male differs by having a broad band across forehead and the sides of the head crimson, and the throat-feathers also crimson with white bases. Young males have the forehead and throat cinnamon; back and breast are mottled, secondaries and rectrices tipped with cinnamon. Bill black, feet yellow.

Geographical Distribution. — New Guinea. *Monotypic*.

Habits and Nidification unknown.

1. *Daphoenositta miranda* De Vis.

Daphoenositta miranda De Vis, The Ibis (7), Vol. 3, p. 380 (1877) (Mount Scratchley, Brit. New Guinea; = ♀).

Daphoenositta miranda frontalis Oort, Notes Leyd. Mus. Vol. 32, n° 4, p. 214 (Dec. 1910) (Hellwig Mts., S.W. New Guinea; = ♂).

Fig. The Ibis (7), Vol. 4, 1898, p. 208, pl. 4.

Hab. Mount Scratchley in British New Guinea, at elevations of 12,000 feet; southern Dutch New Guinea (Hellwig Mts.)

EXPLANATION OF PLATE

- Fig. 1. Head of *Sitta canadensis whiteheadi*, ♂.
 — 2. Head of *Sitta europæa europæa*.
 — 2a. Foot of *Sitta europæa europæa*.
 — 2b. Tail of *Sitta europæa europæa*.
 — 3. Head of *Callisitta frontalis frontalis*, ♂.
 — 3a. Foot of *Callisitta frontalis frontalis*, ♂.
 — 4. Head of *Sitta europæa sinensis*.
 — 5. *Callisitta formosa*.
 — 6. Head of *Neositta albifrons*, ♂.
 — 7. Head of *Neositta albifrons*, ♀.

Munich, 1st June 1911.

FAM. SITTIDÆ

1. SITTÀ CANADENSIS WHITEHEADI ♂. 2, 2a, 2b. SITTÀ EUROPÆA EUROPÆA. 3, 3a. CALLISITTÀ FRONTALIS FRONTALIS ♂. 4. SITTÀ EUROPÆA SINENSIS. 5. CALLISITTÀ FORMOSA. 6. NEOSITTÀ ALBIFRONS ♂.

FAM. REGULIDÆ

FAM. REGULIDÆ

BY C. E. HELLMAYR

Subfam. **Regulinæ** Gadow, Cat. Birds Brit. Mus. Vol. 8, 1883, pp. 79-87.

Subfam. **Regulinæ** and **Poliophtilinæ** Hellmayr, Tierreich, Lief. 18, 1903, pp. 2-29.

Subfam. **Sylviinæ** (part.) and **Poliophtilinæ** Ridgway, Birds Middle- and North America, Pt. 3 (= Bull. U. S. Nat. Mus. no. 50), 1904, pp. 698-736.

Characters. Bill, though variable in length, always shorter than head, slender, rather broad and depressed at base, where it is wider than deep; culmen distinctly ridged, straight for about one-third or half of its length, decidedly decurved terminally; commissure straight, with or without subterminal notch; gonys slightly convex or nearly straight, slightly ascending terminally. Nostrils wholly or partly exposed, longitudinal, operculate, sometimes partly covered by antrorse bristly latero-frontal plumules. Rictal bristles moderately developed, rather soft. Wings rather long, but rounded at tip; fourth and fifth, or fourth, fifth and sixth primaries longest; first primary one-third or half as long as second. Tail variable in length and shape, the rectrices usually rounded, in one genus, *Regulus*, with somewhat pointed tips. Tarsus longer than middle toe with claw, acrotarsium scutellate or booted; lateral toes about equal in length; hallux equal in length to lateral toes, but stouter, with the claw more strongly arched; basal phalanx of middle toe coherent for most of its length to outer toe.

Coloration very variable. Above olive-green, grey or bluish grey (wings and tail, sometimes also crown, black in *Poliophtila*; the crown with a red, orange or yellow patch in *Regulus*, or at least different from colour of back, in *Leptopoeile* and *Lophobasileus*, in both of which the lower rump is light blue); under parts whitish, yellowish or pale greyish, with vinaceous and pale blue tints on throat, chest and sides in *Leptopoeile* and *Lophobasileus*. Sexes not very different, young generally like the females, never spotted or streaked.

Geographical Distribution. Northern Hemisphere in general and greater part of Neotropical Region (*Polioptila*).

Four genera with about fifty species and subspecies.

Observations. Under the above heading I propose to unite the genera *Leptopoecile*, *Lophobasileus*, *Regulus* and *Polioptila*. In external characters they closely agree with some of the genera generally included in the family *Sylviidae*, while in habits they are more like the members of the *Paridae*. Until a thorough study of their anatomy be made, the proper systematic position of these birds cannot be considered as satisfactorily established. However, this question does not fall within the scope of *Genera Avium*, whose principal aim consists of giving a condensed synopsis of the various species of the different families of birds.

KEY TO THE GENERA OF REGULIDÆ

1. *Acrotarsium* booted. Rectrices rather broadened subterminally, with pointed tip. General colour above olive green or greyish olive, crown in adults (except females of *R. calendula*) with a bright yellow, orange or red patch. Tail slightly emarginate. 3. Genus *REGULUS*.
- *Acrotarsium* distinctly scutellate. Rectrices broadly rounded at tip. General colour above never olive green or greyish olive, crown never with a bright coloured patch. 2.
2. Tail much rounded, the outermost rectrix being from 7 to 10 mm. shorter than the median. No crest. 3.
- Tail nearly even, the outermost rectrix being scarcely 2 mm. shorter than the longest. With a long, full, white, occipital crest. 2. Genus *LOPHOBASILEUS*.
3. Nostrils wholly exposed, not covered by plumules. General colour above blue grey or slate grey. 4. Genus *POLIOPTILA*.
- Nostrils posteriorly half concealed by the antrorse, bristly latero-frontal plumules. General colour above olive grey or sandy grey, with crown reddish brown and rump pale blue and vinaceous. 1. Genus *LEPTOPOECILE*.

1. GENUS LEPTOPOECILE SEVERTZOW

Leptopoecile Severtzow, *Izv. Obsheh. Moskov.* Vol. 8, no. 2, p. 66 (1873) (Sp. un. : *Leptopoecile sophiae* Severtzow).

Stoliczkana Hume, *Stray Feathers*, Vol. 2, p. 513 (1874) (Sp. un. : *S. stoliczkae* Hume).

Characters. Bill shorter than head, slender, acute; culmen slightly ridged, at base somewhat depressed and but faintly decurved terminally, no subterminal notch; gonys straight. Nostrils longitudinal, with a well-developed coriaceous operculum, posteriorly half concealed by the very fine, bristle-like latero-frontal plumules. Rictus with but few, soft bristles. Wing much rounded, the tip formed by the fourth, fifth and sixth primaries, which are nearly equal in length; first primary about half as long as second. Tail longer than wing, distinctly rounded, the outermost rectrix being from 7 to 10 mm. shorter than the longest. Tarsus relatively strong, in front distinctly scutellate, more than twice as long as hind toe without claw. Plumage soft and lax.

Coloration. Sexes dissimilar. Adult males have the crown feathers reddish walnut-brown tipped with greyish, the mantle olive grey or greyish sand colour, the feathers of the rump, throat, foreneck and sides bright vinaceous with long pale blue tips. Wings dusky with pale brown edges. Rectrices blackish, exteriorly edged with greenish blue, the lateral pair with outer web buffy white. Frontal band and broad superciliary stripe delicate creamy buff. In the females the crown is duller reddish, the mantle paler grey, the rump less extensively vinaceous and blue, the sides of the head pale greyish, the under parts greyish white, more buffy on abdomen, with a limited patch of pale vinaceous on flanks. Wing 49-52, tail 51-56 mm.

Geographical Distribution. Central Asia, from Turkestan and Gilgit to Western China.

Habits. The species of *Leptopoeile* are inhabitants of mountains at elevations of from 3000 to 14,000 feet, living in bushes, thickets etc. A nest found by Przewalski stood about 7 feet above the ground and was constructed of mosses and sheep-wool, lined inside with soft feathers of *Crossoptilon*. The clutch consists of five eggs, which are white speckled and spotted with dark reddish brown, resembling those of the Chiff-chaff (*Phylloscopus collybita* Vieillot).

KEY TO THE SUBSPECIES OF LEPTOPOECILE

1. Feathers of throat, chest and sides bright vinaceous with long light blue tips.
Rectrices blackish with distinct edges of greenish blue (♂♂) 2.
- Throat, foreneck and sides dingy or pale greyish buff, lower flanks with only a limited patch of pale vinaceous. Rectrices greyish brown, edged with greyish olive (♀♀) 4.
2. Middle of lower breast and abdomen deep buff, strongly contrasted with colour of chest and sides, which are vinaceous mixed with pale blue 3.
- Lower parts nearly uniform coppery vinaceous with pale blue tips to the feathers; if anything, but a narrow line along centre of abdomen buff . . . 3. *L. SOPHIÆ OBSCURA* ♂.
3. Back darker, olive grey 1. *L. SOPHIÆ SOPHIÆ* ♂.
- Back paler, greyish sand colour 2. *L. SOPHIÆ DESERTICOLA* ♂.
4. Back greyish sand colour 2. *L. SOPHIÆ DESERTICOLA* ♀.
- Back light grey, shaded with olive 1. *L. SOPHIÆ SOPHIÆ* ♀.
- Back dark olive grey 3. *L. SOPHIÆ OBSCURA* ♀.

1. *Leptopoeile sophiæ sophiæ* Severtzow. (Plate, Figs. 1, 1a.)

Leptopoeile sophiæ Severtzow, Izv. Obshch. Moskov. Vol. 8, no. 2, p. 135, pl. 8, ff. 8, 9 (♂ ♀) (1873) (Issyk-kul, Tian shan); Zeitschr. ges. Ornith. Vol. 4, 1888, p. 99 (transl.).

Stoliczka stoliczkæ Hume, Stray Feath. Vol. 2, p. 513 (1874) (no exact locality. The types came from the Karakash-valley, 11,000 to 14,000 feet; type in Brit. Mus. examined).

Leptopoeile sophiæ major Menzbier, The Ibis (5), Vol. 3, p. 353 (1885) («on the Taushkan-Darja about Ush-turfan»; type in Brit. Mus. examined).

Fig. Gould, Birds Asia, Vol. 2, 1876, pl. 62 (♀), Pleske, Aves Przewalsk. pl. 2, ff. 3 (♂), 4 (♀); Sharpe, Res. Second Yarkand Miss. Aves, pl. 8.

Hab. Turkestan (Dsharkent, Tian shan), East to Kansu, N. W. China. South to Gilgit. Inhabits mountains at altitudes of from 3000 to 14,000 feet.

2. *Leptopoeile sophiæ deserticola* Hartert.

Leptopoeile sophiæ deserticola Hartert, Vög. paläarkt. Fauna, Vol. 4, p. 401 (1907) (no type-locality specified. Range given as: «Gebirge am Südrande des Tarim-Beckens und der Wüste Gobi»; type in Tring Museum examined).

Hab. Mountains south of the Gobi-Desert: Russian Range, Altyn-tagh, Nan-shan, Tsaidam, Naidjin-gol.

3. *Leptopocile sophiæ obscura* Przewalski.

Leptopocile obscura Przewalski, Zapiski Akad. Nauk St. Petersburg. Vol. 55, p. 86 (1887) Mountain-forests of N. E. Tibet, on the upper Ditshu); Journ. f. Ornith. Vol. 35, 1887, p. 277 (transl.).

Leptopocile henrici Oustalet, Ann. Sc. Nat. Zool. (7), Vol. 12, p. 287, pl. 10, f. 1 (1891) « Plateaux du Tibet », 5000 mètr.; type in Paris Museum examined.

Fig. Pleske, Aves Przewalsk. pl. 6, f. 5.

Hab. Mountain forests of the Upper Yangtze-kiang and its tributaries, west through the plateau of Tibet to Gyantse, north of Sikkim.

2. GENUS LOPHOBASILEUS PLESKE

Lophobasileus Pleske, Wissensch. Result. von Przewalski's Reisen, Vol. 2, 1890, p. 95 (Sp. un. : *Leptopocile elegans* Przewalski).

Characters. Very nearly allied to *Leptopocile*, but differing in the following details : Bill finer, longer and terminally even less curved, but more distinctly ridged than in the preceding genus. Wing narrower, the innermost secondaries (tertials) being shorter. Tail decidedly shorter than the wing, almost square, the lateral rectrices being scarcely 2 mm. shorter than the median ones. Occiput with a full, pendant crest. In other respects the single species closely resembles *Leptopocile*. Nostrils with a well-developed coriaceous operculum and partly hidden by the latero-frontal plumules. First primary half as long as second, tip of wing formed by fourth, fifth and sixth primaries.

Coloration. Sexes dissimilar. The adult male is a lovely, most delicately-coloured creature. Pileum lilac grey, passing into whitish on frontal edge and on the sides; occiput with a long, pure white crest. Lores and short superciliary streak black, sides of head and neck, as well as nape, bright chestnut brown. Back dull blue, somewhat glossed with violet, uropygium and upper tail coverts turquoise-blue. Upper wing coverts greenish olive brown, quills and rectrices dusky with dull greenish or bluish edges. Under parts vinaceous cinnamon, middle of abdomen paler, flanks reddish violet. Under wing coverts, axillaries and quill-lining whitish. The female is darker and duller throughout, with the crest much shorter, the rump mixed with greenish; the sides of the head and under parts are dingy whitish, with a vinaceous-cinnamon patch on the flanks. Wing 52-56, tail 44-47 mm.

Geographical Distribution. North-western China, on the upper Chuanche.

Habits. Inhabits coniferous forests of mountains at altitudes of from 7500 to 11,000 feet. Nothing is known about its nidification.

1. *Lophobasileus elegans* (Przewalski). (Plate, Figs. 2, 2a.)

Leptopocile elegans Przewalski, Zapiski Akad. Nauk St. Petersburg. Vol. 55, p. 77 (1887) (upper Chuanche); Journ. f. Ornith. Vol. 35, 1887, p. 275 (transl.).

Fig. Pleske, Aves Przewalsk. Vol. 2, pl. 6, ff. 1, 2 (♂ & ♀).

Hab. North-western China : mountains on the upper Chuanche.

3. GENUS REGULUS VIEILLLOT

Regulus Vieillot, Ois. Amér. sept. Vol. 2, 1807, p. 49 (Type : *Regulus cristatus* Vieillot).

Corthylio Cabanis, Journ. f. Ornith. Vol. 1, 1853, p. 83 (Type : *Motacilla calendula* Linnaeus).

Characters. Bill small and slender; culmen much shorter than head, depressed at base, where its width considerably exceeds its depth; culmen straight, only extreme tip distinctly decurved, with a slight subterminal notch; gonys straight. Nostrils longitudinal, small, overhung by a distinct operculum, partly covered either by numerous, bristle-like plumules or by a single well-developed feather. Rictal bristles soft, moderately developed. Wing rather long, rounded at tip; fourth and fifth primaries longest, third and sixth but little shorter and nearly equal; first primary about one-third as long as second, but never attaining half its length. Tail about three-fourths as long as wing, distinctly emarginate, the rectrices becoming somewhat broader terminally, with pointed tip. Tarsus long and slender, about one-third as long as wing, much longer than middle toe with claw; acrotarsium booted; claws strongly curved; basal phalanx of middle toe coherent to outer toe for most of its length, to inner toe for about half its length. Plumage copious and lax.

Coloration. Olive-green or olive-greyish above, rump in one species (*R. goodfellowi*) bright canary yellow. Wings dusky with pale edgings and two whitish bands; crown with a half-concealed patch of yellow, orange or red, this patch margined with yellow and inclosed between two stripes of black, except in *R. calendula*; adult females also with a brightly-coloured crown-patch (except in *R. calendula*). Young similar to adults, but without black, yellow, orange or red on crown.

Geographical Distribution. Nearctic and Palæarctic Region, ranging southwards to the Himalayas, mountains of tropical China, and the island of Formosa.

Habits. In habits, the Gold-crests closely resemble the Tits, inhabit principally coniferous forests and feed on insects. The nest is a very bulky, more or less pensile, structure, attached to small twigs in spruce or other coniferous trees, composed of delicate plant fibers, mosses and various soft materials. The eggs are minutely spotted or flecked with brown on a white or buffy ground colour. The clutch consists of from five to ten eggs.

KEY TO THE SPECIES AND SUBSPECIES OF REGULUS

1. Nostrils covered by numerous, small, bristle-like plumules. No white superciliary stripe. Adult males with a large, vermilion-red patch on crown 2.
- Nostrils covered by a single, rather stiff, well-developed feather. With a distinct whitish superciliary stripe. Both sexes with a brightly-coloured crown patch 5.
2. Paler, with longer wing and shorter bill: wing more than 58 mm. in male, more than 56 mm. in female 3.
- Darker, with shorter wing and longer bill: wing less than 57 mm. in male, less than 55 mm. in female 4.
3. General colour of upper parts more greenish olive 17. *R. CALENDULA CALENDULA*.
- General colour of upper parts more greyish olive 18. *R. CALENDULA CINERACEUS*.
4. Larger: wing of male 56, of female 54; bill 8.9 mm. 19. *R. CALENDULA GRINNELLII*.
- Smaller: wing of male 54.5, of female 50; bill 10 mm. 20. *R. CALENDULA OBSCURUS*.
5. Lower back and upper tail coverts bright canary yellow, strongly con-

- trasted with the yellowish olive-green of the mantle. Flanks light canary-yellow.* 16. R. GOODFELLOWI.
- *Lower back and upper tail coverts greenish olive or yellowish green, not conspicuously different from colour of upper back. Flanks not canary-yellow.* 6.
6. *Sides of the neck with a large patch of bright olive-yellow.* 7.
- *No olive-yellow patch on sides of the neck* 8.
7. *No ashy band across hindneck; frontal edge buffy; with a distinct blackish postocular streak.* 14. R. IGNICAPILLUS IGNICAPILLUS.
- *A distinct ashy band round hindneck; frontal edge white; no blackish postocular streak.* 15. R. IGNICAPILLUS MADEIRENSIS.
8. *Crown patch vermillion-red as in R. calendula. (Forehead and lores black; a black postocular stripe; whitish superciliary stripes connected anteriorly.)* 13. R. CUVIERI.
- *Crown patch yellow or orange* 9.
9. *Blackish stripes bordering the yellow crown patch connected anteriorly* 10.
- *Blackish stripes bordering the yellow crown patch not connected anteriorly, sometimes nearly obsolete.* 13.
10. *Without a dusky postocular streak.* 8. R. REGULUS TENERIFFE.
- *With a more or less distinct dusky postocular streak.* 11.
11. *General colour of upper parts duller, greyish olive. Larger: wing of male 56.5-60 mm.* 10. R. REGULUS SATRAPA.
- *General colour of upper parts brighter, greenish olive. Smaller: wing of male 53-57 mm.* 12.
12. *Back duller olive-green; grey nuchal collar very broad.* 11. R. REGULUS OLIVACEUS.
- *Back brighter olive-green; grey nuchal collar much narrower.* 12. R. REGULUS CLARUS.
13. *Dusky stripes along lateral borders of yellow crown patch but slightly indicated or nearly obsolete.* 9. R. REGULUS TRISTIS.
- *Black stripes along lateral borders of yellow crown patch broad and strongly marked.* 14.
14. *Sides of occiput, hindneck and nape distinctly ashy-grey, strongly contrasted with olive-green back.* 15.
- *Sides of occiput and nape olive-greenish or greyish olive, gradually shading into colour of back.* 16.
15. *Whitish apical spots on median and greater upper wing coverts broader and more distinct. Crown patch reddish orange.* 7. R. REGULUS JAPONENSIS.
- *Whitish apical spots on median and greater upper wing coverts smaller. Crown patch paler, orange-yellow.* 3. R. REGULUS INTERNI.
16. *Bill longer and more slender: 12-13 mm.* 4. R. REGULUS AZORICUS.
- *Bill shorter: 10-11 mm.* 17.
17. *Posterior sides of head and nape greenish or brownish olive. Smaller: wing 50-55 mm.* 18.
- *Posterior sides of head and nape slightly shaded with greyish. Larger: wing 55-58.5 mm.* 19.
18. *Upper parts paler, yellowish olive-green, lower parts paler buffy.* 1. R. REGULUS REGULUS.

- Upper parts darker, dull greenish olive, lower parts more strongly washed
with brownish buff 2. *R. REGULUS ANGLORUM*.
19. Upper parts bright olive-green, under parts dingy brownish buff 5. *R. REGULUS HIMALAYENSIS*.
- Upper parts dull greenish olive, under parts dull greyish 6. *R. REGULUS YUNNANENSIS*.

1. ***Regulus regulus regulus* (Linnæus). (Plate, Fig. 7.)**

Motacilla Regulus Linnæus, Syst. Nat. ed. 10, p. 188 (1758) (« Habitat in Europa »; we fix Sweden as type-locality : ex Fauna Suec. n° 235).

Regulus cristatus (nec *R. cristatus* Vieillot 1807) 1) Koch, Syst. Baier. Zool. p. 199 (1816) (Bavaria).

Regulus vulgaris Leach, Cat. Mamm. and Birds Brit. Mus. p. 25 (1816) (nom. nud.).

Regulus aureocapillus Meyer in Meyer & Wolf, Taschenb. deutsch. Vögelk. Vol. 3, p. 108 (1822) (new name for *M. regulus* of Linnæus).

Regulus crocecephalus Brehm, Beitr. Vögelkunde, Vol. 2, p. 120 (1822) (new name for *M. regulus* of Linnæus).

Regulus flavicapillus Naumann, Vög. Deutschl. Vol. 3, p. 968, pl. 93, ff. 1-3 (1823) (new name for *M. regulus* of Linnæus).

Regulus septentrionalis Brehm, Handb. Naturg. Vög. Deutschl. p. 479 (1831). (« Es bewohnt die nordeuropäischen Wälder, namentlich Skandinavien »).

Regulus chrysocephalus Brehm, ibidem, p. 481 (1831). (« Wandert im Oktober durch Mitteldeutschland »).

Regulus auricapillus Selby, Ill. Brit. Ornith., ed. 2, Vol. 1, p. 229 (1833). (New name for *M. regulus* of Linnæus. « It is found throughout Europe, and as far northward as the Arctic Circle »).

Regulus Linnæi Malm, Göteborg. Bohusl. Fauna, p. 170 (1877) (Bohus).

Hab. Breeds in Europe as far north as the Arctic Circle, southwards down to the Pyrenees, in Italy and Greece to the shores of the Mediterranean, also in Asia Minor and the Caucasus Mountains. In autumn and winter likewise found in England, Spain, Portugal etc.

2. ***Regulus regulus anglorum* Hartert.**

Regulus regulus anglorum Hartert, Bull. Brit. Ornith. Club, Vol. 16, p. 11 (1905) (Tring, England).

Hab. Great Britain, from the Isle of Wight to Scotland; Ireland.

3. ***Regulus regulus interni* Hartert.**

Regulus regulus interni Hartert, Bull. Brit. Ornith. Club, Vol. 16, p. 45 (1906) (Sassari, Sardinia).

Hab. Corsica and Sardinia.

4. ***Regulus regulus azoricus* Seebohm.**

Regulus cristatus var. *azoricus* Seebohm, Hist. Brit. Birds, Vol. 1, p. 454 (1883) (Azores).

Hab. Azores : Santa Maria, San Miguel, Terceira, San Jorge, Pico, Fayal and Flores Islands.

5. ***Regulus regulus himalayensis* Jerdon.**

Regulus himalayensis (Blyth MS.) Jerdon, Birds India, Vol. 2, p. 206 (1863) (N. W. Himalayas).

Regulus cristatus orientalis Seebohm, Birds Japan Emp. p. 80 (1890) (part. : « a new trinomial for the Eastern race of the Gold-crest »).

Fig. Gould, Birds Asia, Vol. 4, pl. 60.

Hab. Himalayas, from Kashmir to Sikkim.

6. ***Regulus regulus yunnanensis* Rippon.**

Regulus himalayanus (errore!) A. David, Nouv. Arch. Mus. Hist. Nat. Paris, Vol. 7, Bull. pp. 7, 196 (1871) (nom. nud.; Szechuen).

Regulus yunnanensis Rippon, Bull. Brit. Ornith. Club, Vol. 19, p. 19 (1906) (Yangtze River, W. Yunnan).

Hab. S. W. China : W. Yunnan (Yangtzekiang), Szechuen; Kansu?

7. ***Regulus regulus japonensis* Blakiston.**

Regulus japonicus Bonaparte, Compte Rendu Acad. Sc. Paris, Vol. 42, p. 767 (1856) (nom. nud.).

Regulus japonensis Blakiston, The Ibis, Vol. 4, p. 320 (1862) (Hakodate, Yezo).

1) *Regulus cristatus* Vieillot, Ois. Amér. sept. Vol. 2, 1807, p. 50, pl. 106, cannot be used for any species of the genus, being a *mixtum compositum* of *R. r. regulus*, *R. r. satrapa* and *R. i. ignicapillus*. Plate and description seem to have been taken from an example of the last-named species, while the name *R. cristatus* is proposed as a substitute of Linné's term *regulus* employed by Vieillot in generic sense. Moreover, the author considered the North American form (*R. r. satrapa*) to be the same as the European one (*R. r. regulus*).

Regulus cristatus orientalis Seebohm, Birds Jap. Emp. p. 80 (1890) (part. : «a new trimonial for the Eastern race of the Gold-crest »).

Regulus cristatus coatsi Sushkin, Bull. Brit. Ornith. Club, Vol. 14, p. 44 (1904) («Jugi Sayan zona subalpina »).

Hab. Japan (Yezo, Hondo, Kiusiu), Corea, Sakhalin, Ussuriland, Manchooria, Eastern and Central Siberia as far west as Sayan Range and Tomsk, on the Obj River.

Obs. It is not impossible that the birds inhabiting the Asiatic continent be different from the typical Japanese race. In this case, their proper name would be *R. regulus coatsi* Sushkin.

8. *Regulus regulus teneriffæ* Seebohm.

Regulus teneriffæ Seebohm, Hist. Brit. Birds, Vol. 1, p. 459 (1883) (Canary Islands).

Regulus satelles Koenig, Journ. f. Ornith. Vol. 37, p. 263 (1889) (Canary Islands, type locality : Tenerife).

Fig. Journ. f. Ornith. Vol. 38, t. 5, f. 1.

Hab. Western Canary Islands : Tenerife, Grau Canaria, Gomera, Palma, Hierro.

9. *Regulus regulus tristis* Pleske. (Plate, Fig. 4.)

Regulus tristis Pleske, Bull. Acad. Sc. St. Petersb. (n. s.), Vol. 3, p. 146 (1892) (Transcaspia [Merw], W. Turkestan [Tshinas] and East. Turkestan [Ak-su, Jarkend-Darja]).

Hab. Transcaspia and Turkestan. (The locality Orenburg [fide Pleske] requires confirmation.)

10. *Regulus regulus satrapa* Lichtenstein.

Regulus satrapa Lichtenstein, Verz. Dubl. Berl. Mus. p. 35 (1823) (North America).

Regulus tricolor Nuttall, Man. Ornith. U. S. and Canada, Vol. 1, p. 420 (1832) (based on *Sylvia regulus* Wilson, Amer. Ornith. Vol. 1, 1808, p. 126, pl. 8, f. 2).

Regulus reguloides Jardine, ed. Wilson's Amer. Ornith. Vol. 1, p. 127 (1832) (North America).

Fig. Audubon, Ornith. Biogr. Vol. 2, 1834, pl. 186.

Hab. North America, east of the Rocky Mountains, north to Labrador, Keewatin etc., breeding southwards to Massachusetts, New York, N. Michigan, and along Allegheny Mountains to W. North Carolina; wintering southwards to N. Florida and west along Gulf Coast S. C. Texas.

11. *Regulus regulus olivaceus* Baird.

[*Regulus satrapa*] var. *olivaceus* Baird, Rev. Amer. Birds, Vol. 1, p. 65, in text (1864) (Simiahmoo, Washington).

Regulus satrapa aztecus (Lawrence MS.) Ridgway, Man. N. Amer. Birds, p. 591, in text (1887) (City of Mexico).

Hab. Western North America, from Rocky Mountains to the Pacific Coast, southwards in winter to highlands of Mexico; breeding from Colorado, eastern Oregon, Sierra Nevada, Mount Shasta etc., northward to Kenai Peninsula and Kadiak Island, Alaska.

12. *Regulus regulus clarus* Dearborn.

Regulus satrapa clarus Dearborn, Field Mus. Publ. no. 125, p. 134 (1907) (Sierra Santa Elena, near Tecpam, Guatemala).

Hab. Highlands of Guatemala.

13. *Regulus cuvierii* Audubon.

Regulus cuvierii Audubon, Ornith. Biogr. Vol. 1, p. 288, pl. 55 (1831) (Fatland Ford, on the Schuylkill River, Pennsylvania).

Hab. Fatland Ford, on the Schuylkill River, Pennsylvania.

Obs. Only one specimen, the type, known to have been obtained by Audubon on June 8, 1902. This alleged species is most probably a hybrid between *R. r. satrapa* and *R. c. calendula*.

14. *Regulus ignicapillus ignicapillus* (Temminck).

Sylvia ignicapilla (Brehm MS.) Temminck, Man. d'Ornith., ed. 2, Vol. 1, p. 231 (1820) («se montre très rarement en Allemagne et dans toutes les contrées orientales, tandis qu'il est très commun en France et dans les provinces belges »).

Regulus mystaceus Vieillot, Faune Franç. Oiseaux, p. 231, pl. 102, f. 3 (1822) (part. : descr. plate and hab : « Europe » — Amérique sept. errore!).

« *Regulus pyrocephalus* mihi (früher *Sylvia ignicapilla* mihi) » Brehm, Beitr. Vögelk. Vol. 2, p. 130 (1822) (Germany, Holland, France and [errore!] America).

Regulus Nilsonii Brehm, Handb. Naturg. Vög. Deutschl. p. 482 (1831) («scheint nordöstlich von hier zu wohnen, zieht im April... »).

Regulus ignicapillus minor Parrot, Ornith. Jahrb. Vol. 21, p. 156 (Dec. 1910) (Ajaccio, Corsica) 1).

1) I cannot appreciate any of the characters given by the describer of this form although further researches may prove it slightly different from continental birds.

Regulus brachyrhynchus Brehm, Handb. Naturg. Vög. Deutschl. p. 483 (1831) (« zieht im April und September durch die hiesige Gegend » i. e. Renthendorf).

Fig. Naumann, Vög. Deutschl. Vol. 3, pl. 93, ff. 4-6; Dresser, Birds Europe, Vol. 2, pl. 73, f. 1.

Hab. Central Europe and the countries bordering the Mediterranean : Germany east to Poland, Austria, Hungary, France, Spain, Algeria, Tunis, Italy, the whole Balkan Peninsula and Asia Minor.

15. ***Regulus ignicapillus madeirensis*** Harcourt.

Regulus madeirensis Harcourt, Sketch of Madeira, p. 118 (1851) Madeira).

Fig. Dresser, Birds of Europe, Vol. 2, pl. 73, f. 2.

Hab. Mountain forests of the island of Madeira.

16. ***Regulus goodfellowi*** Ogilvie-Grant.

Regulus goodfellowi Ogilvie-Grant, Bull. Brit. Ornith. Club, Vol. 16, p. 122 (1906) (Mount Morrison, Formosa, 9000 to 10,000 feet).

Fig. The Ibis (9), Vol. 1, 1907, pl. 3.

Hab. Island of Formosa : Mount Morrison at elevations of from 9000 to 10,000 feet.

17. ***Regulus calendula calendula*** (Linnæus). (Plate, Fig. 5.)

Motacilla calendula Linnæus, Syst. Nat. ed. 12, Vol. 1, p. 337 (1766) (based on « Le Poule ou Souci de Pensylvanie », Brisson, Ornith. Vol. 3, p. 584 : Pennsylvania).

Parus griseus Gmelin, Syst. Nat. Vol. 1, 11, p. 1010 (1789) (« Greenland », based on O. F. Müller, Zool. Dan. Prodr. 1776, p. 34 : « Parus griseus vertice rubro »).

Regulus rubineus Vieillot, Ois. Amér. sept. Vol. 2, p. 49, pls. 104, 105 (1807) (new name for *Motacilla calendula* Linnæus).

Fig. Audubon, Ornith. Biogr. Vol. 2, 1834, pl. 195.

Hab. North America, north to the limit of tree growth, in Labrador, Keewatin, Mackenzie, Yukon and Alaska; breeding southward to Quebec, North Michigan and High Mountains of New Mexico, Arizona and North California (Mount Shasta); in winter across United States and over tableland of Mexico south to highlands of Guatemala. Accidental in Greenland.

18. ***Regulus calendula cineraceus*** Grinnell.

Regulus calendula cineraceus Grinnell, Condor, Vol. 6, p. 25 (1904) (Strain's Camp, Mount Wilson, Los Angeles Co., California).

Hab. Mountains of southern California.

19. ***Regulus calendula grinnelli*** W. Palmer.

Regulus calendula grinnelli W. Palmer, Auk, Vol. 14, p. 399 (1897) (Sitka, Alaska).

Hab. Pacific Coast District of North America, breeding from British Columbia to head of Lynn Canal and Yakutat Bay, Alaska. Occasionally migrating in winter to Middle California.

20. ***Regulus calendula obscurus*** Ridgway.

Regulus calendula obscurus Ridgway, Bull. U. S. Geol. and Geogr. Surv. Terr. Vol. 2, p. 184 (1876) (Guadalupe Isl., Lower California).

Hab. Guadalupe Island, off Lower California.

4. GENUS POLIOPTILA SCLATER

Culicivora (nec Swainson 1827!) Swainson, Classif. Birds, Vol. 2, 1837, p. 243 (Sp. un. : *C. atricapilla* Swainson).

Polioptila Sclater, Proc. Zool. Soc. Lond. Vol. 23, 1855, p. 11 (Type : *Motacilla caerulea* Linnæus).

Characters. Bill somewhat shorter than head, slender, depressed and rather broad at base; culmen nearly straight for basal third, rather abruptly decurved terminally, the tip very slightly uncinat; maxillary tomium nearly straight with a distinct subterminal notch; gonys straight or very faintly convex. Rictal bristles soft, though well developed. Nostrils exposed, rather large, longitudinal, distinctly operculate, not covered by latero-frontal plumules. Wing

moderately long, rather rounded; tip formed by fourth and fifth primaries, which are nearly equal in length, third scarcely shorter; first primary about half as long as second. Secondaries broad and rather long. Tail as long as, or somewhat longer than, wing, much rounded, the rectrices rather narrow with rounded tip. Tarsus long and slender, twice as long as middle toe without claw, the acrotarsium distinctly scutellate; toes slender, the lateral ones about equal in length to hallux. Plumage soft, but not so copious as in the other genera of the subfamily.

Coloration. Above grey or bluish grey, the pileum wholly or partly black in the adult males of most species; tail black with a greater or lesser extent of white on outermost rectrices; under parts white, pale grey, or creamy. Females duller in colour, without any black on pileum. The young resemble the adult females. *P. schistaceigula* Hartert differs very markedly in coloration: The white in the tail is restricted to a narrow apical margin of the outermost rectrix, the general colour of the plumage is dark slate grey, almost blackish on pileum, with the exception of the axillaries, middle of abdomen and under tail coverts, which are pure white. Besides a narrow rim round the eye, a narrow line from rictus to eye and a few minute spots on upper throat are also white.

Habits. The Gnat-catchers frequent the forests in small flocks, feeding on insects, and, in their habits, are reported to resemble our Tits. Their nest, a deeply cup-shaped, compact structure of plant-fibers, spiders' webs, mosses and other soft material, outside often ornamented with small bright-coloured lichens, is attached to branches of trees. The clutch consists of five pale greenish blue or bluish white eggs, speckled with reddish brown.

Geographical Distribution. Warmer parts of North America, Cuba, Bahama Island, Central- and South America, except the extreme south.

Twenty-five species and subspecies are known, most of which belong to the northern-portion of the Neotropical region.

KEY TO THE SPECIES AND SUBSPECIES OF POLIOPTILA

1. Tail very much graduated, the outermost rectrix being about half as long as central pair. Wing never more than 40 mm. 1. *P. LEMBEVEI* 1).
- Tail rounded or slightly graduated, the outermost rectrix being more than six-sevenths as long as central pair. Wing 45 mm. or more. 2.
2. Outermost rectrix with more than terminal half white 5.
- Outermost rectrix with much less than terminal fourth white 3.
3. Top and sides of the head dark slate grey like back; throat and foreneck dull slate grey, strongly contrasted with the silky white of breast and abdomen 25. *P. SCHISTACEIGULA* ♂ ad. 2).
- Top of the head glossy bluish-black, back slate grey or plumbeous; under parts nearly uniform greyish white or light grey. 4.

1) The adult males have a curved black line bordering upper and posterior margin of the auricular region. The forehead is pale ashy-grey like the remaining upper parts. Sides of the head and under parts very pale grey, nearly white on abdomen.

2) Female unknown.

4. Outermost rectrix with outer web wholly white, except basal third; back paler : plumbeous; under parts greyish white or very pale grey. } 2. *P. PLUMBEA PLUMBEA*.
 — Outermost rectrix with outer web only edged with white; back darker : deep slate grey; under parts light grey 4. *P. CALIFORNICA*.
5. With more or less of glossy black on forehead, sides of the head or pileum. 6.
 — No glossy black either on forehead or on crown. Sometimes a black patch on upper portion of ear coverts 25.
6. Black of head confined to forehead and sides of the head. Crown never black 7.
 — Black of head covering at least greater part of pileum 13.
7. Lores and ear coverts glossy black like forehead 8.
 — Lores and ear coverts bluish or slate grey like the back 9.
8. Pileum and back light bluish grey, cheeks, malar region and lower surface of the body pure white, occasionally very faintly shaded with pale greyish on chest and sides 11. *P. DUMICOLA BERLEPSCHI* ♂ ad.
 — Pileum and back deep bluish slate; cheeks, malar region and lower parts bluish grey, shading into pale grey or greyish white on middle of abdomen 10. *P. DUMICOLA DUMICOLA* ♂ ad.
9. Crown within U-shaped black mark bluish grey, not distinctly glossed 10.
 — Crown within U-shaped black mark dark slate grey, somewhat glossed with greenish blue 9. *P. NELSONI* ♂ ad.
10. Darker : the under parts light bluish grey, only the abdomen, anal region and under tail coverts white 8. *P. CÆRULEA CÆSIOGASTER* ♂ ad.
 — Paler : the under parts white, or greyish white, shaded with pale bluish grey on sides 11.
11. Larger : wing more than 49, tail more than 50 mm. 12.
 — Smaller : wing about 47,5, tail about 46,5 mm. 7. *P. CÆRULEA MEXICANA* ♂ ad.
12. Black at base of lateral rectrix more restricted, usually concealed by under tail coverts; upper parts somewhat clearer and bluer. 5. *P. CÆRULEA CÆRULEA* ♂ ad.
 — Black at base of lateral rectrix more extended, showing beyond longest under tail coverts; upper parts slightly duller. 6. *P. CÆRULEA OBSCURA* ♂ ad.
13. Lores white, sometimes divided by a black line crossing from rictus to anterior angle of eye. 14.
 — Lores black, sometimes with a few white feathers intermixed 18.
14. Superciliary region black, sometimes a white streak or spot above posterior angle of eye, but not confluent with white of lores. 15.
 — Superciliary region white, confluent with white of lores. 16.
15. Lores entirely white. Larger : wing 49, tail 52 mm. 15. *P. ALBILORIS ALBILORIS* ♂ ad.
 — Lores with a black line crossing from rictus to anterior angle of eye. Smaller : wing 47,5, tail 47 mm. 16. *P. ALBILORIS BAIRDI* ♂ ad.
16. Upper parts deep slate grey; breast and abdomen beautiful cream-colour; outermost rectrix entirely white. 12. *P. LACTEA* ♂ ad. (♀ unknown).
 — Upper parts light bluish grey; under parts white, more or less shaded with pale grey on chest and sides; outermost rectrix with extreme base black. 17.

17. Black at base of lateral rectrices less extended, usually concealed by under tail coverts. Tail shorter : 41-48 mm. 13. *P. BILINEATA BILINEATA* ♂ ad.
- Black at base of lateral rectrices more extended, showing beyond longest under tail coverts. Tail longer : 51-56 mm. 14. *P. BILINEATA ANDINA* ♂ ad.
18. Grey of upper parts paler and more bluish 19.
- Grey of upper parts darker, more slaty 20.
19. Smaller : wing about 45 mm. Under parts entirely pure white, or with sides but faintly tinged with very pale bluish grey. 17. *P. NIGRICEPS ALBIVENTRIS* ♂ ad.
- Larger : wing about 48 mm. Under parts strongly shaded with bluish grey on chest and sides 18. *P. NIGRICEPS NIGRICEPS* ♂ ad.
20. Greater upper wing coverts very distinctly margined with pure white ; white edges of innermost secondaries (tertials) extremely broad, occupying nearly the entire width of the outer web 19. *P. LIVIDA LIVIDA* ♂ ad.
- Greater upper wing coverts edged with the colour of the back, dark bluish or slate grey ; white edges of innermost secondaries (tertials) much narrower, occupying only from one-fourth to one-third of the width of the outer web 21.
21. Outermost rectrix entirely white, sometimes with traces of black at the extreme base of inner web 20. *P. LIVIDA INNOTATA* ♂ ad.
- Outermost rectrix with basal third or half of inner web black 22.
22. With considerably more than basal half of inner web of outermost rectrix black 21. *P. LIVIDA LEUCOGASTRA* ♂ ad.
- With much less than basal half of inner web of outermost rectrix black. 23.
23. Black at base of outermost rectrix more restricted, entirely concealed by under tail coverts. Bill weaker and shorter : 11 mm. 23. *P. LIVIDA PARVIROSTRIS* ♂ ad.
- Black at base of outermost rectrix more extended, showing beyond longest under tail coverts. Bill stronger and longer : 12-13 mm. 24.
24. Grey of back etc. paler, more bluish. Tail shorter : 47-52 mm. 22. *P. LIVIDA PLUMBICEPS* ♂ ad.
- Grey of back etc. darker, more slaty. Tail longer : 54-57 mm. 24. *P. LIVIDA MAIOR* ♂ ad.
25. Upper portion of ear coverts pale grey or greyish white. 25.
- Upper portion of ear coverts slate blackish or black, producing a conspicuous dusky postocular patch. 34.
26. No white superciliary streak 27.
- With a distinct white superciliary streak. 13. *P. BILINEATA BILINEATA* ♀ 1).
27. Ear coverts with at least upper half pale grey, not conspicuously different from darker grey pileum, and shading into paler grey on lower portion 29.
- Ear coverts white, or greyish white, abruptly contrasted with a dusky postocular streak, above which is a narrow whitish line. 28.
28. Tail longer : averaging 48 mm. 15. *P. ALBILORIS ALBILORIS* ♀.
- Tail shorter : averaging 43 mm. 16. *P. ALBILORIS FAIRDI* ♀.
29. Outermost primary much less than half as long as second 30.
- Outermost primary much larger, at least half as long as second 18. *P. NIGRICEPS NIGRICEPS* ♀ 2).

1) Female of *P. bilineata andina* unknown.2) Female of *P. nigriceps albiventris* unknown to the author.

30. Larger, with smaller bill : wing 50 or more, bill less than 10 mm. 31.
 — Smaller, with larger bill : wing 48 or less, bill 10 mm. or more. 32.
31. Black at base of lateral rectrices more restricted; grey of upper parts clearer, white of under parts less greyish 5. *P. CÆRULEA CÆRULEA* ♀.
 — Black at base of lateral rectrices more extended; grey of upper parts duller, white of under parts greyer 6. *P. CÆRULEA OBSCURA* ♀.
32. Smaller and paler : wing about 45, tail 43,5 mm. 7. *P. CÆRULEA MEXICANA* ♀.
 — Larger and darker : wing 47 and more, tail more than 50 mm. 33.
33. Upper parts more bluish slate grey, under parts pale bluish grey, shading into white on abdomen, anal region and under tail coverts. 8. *P. CÆRULEA CÆSIOGASTER* ♀.
 — Upper parts duller slate grey, under parts white medially. 9. *P. NELSONI* ♀.
34. Cheeks and anterior portion of ear coverts bluish grey, sometimes mixed with silvery white on malar region; posterior half of ear coverts occupied by a large, deep black patch. Lower parts bluish grey, shading into whitish on anal region and under tail coverts. 10. *P. DUMICOLA DUMICOLA* ♀.
 — Cheeks, anterior and lower portion of ear coverts pure white; dusky patch more restricted to upper half of ear coverts and duller black. Lower parts white, chest and sides sometimes faintly shaded with very pale greyish. 35.
35. Greater upper wing coverts broadly and very distinctly edged with pure white. White edges to innermost secondaries (tertials) extremely broad, reaching almost to the shaft. 19. *P. LIVIDA LIVIDA* ♀ 1).
 — Greater upper wing coverts edged with colour of back (bluish or slate grey). White edges to innermost secondaries (tertials) much narrower, occupying not more than one-third of width of outer web 36.
36. Lores entirely white, abruptly contrasted with bluish grey of pileum. Feathers on eyelid pure white 11. *P. DUMICOLA BERLEPSCHI* ♀.
 — Lores bluish grey, somewhat mixed with whitish, not abruptly contrasted with slate grey of pileum. Feathers on eyelid slaty. 37.
37. Outermost rectrix entirely white 20. *P. LIVIDA INNOTATA* ♀.
 — Outermost rectrix at base of inner web black for one-third or more of its length 38.
38. Black at base of lateral rectrices more extended. Back darker, slate grey. 21. *P. LIVIDA LEUCOGASTRA* ♀.
 — Black at base of lateral rectrices more restricted. Back paler, bluish grey 22. *P. LIVIDA PLUMBICEPS* ♀.

✓ 1. *Poliioptila lembeyei* (Gundlach).

Culicivora lembeyei Gundlach, Ann. Lyc. Nat. Hist. New York, Vol. 6, p. 273 (1858) (Eastern Cuba).

Hab. Island of Cuba, Greater Antilles.

2. *Poliioptila plumbea plumbea* (Baird).

Culicivora atricapilla (nec Swainson 1831-32!) Lawrence, Ann. Lyc. Nat. Hist. New York, Vol. 5, p. 124 (1852) (Texas).

Culicivora plumbea Baird, Proc. Acad. Nat. Sc. Philad. Vol. 7, p. 118 (1854) (Bill Williams R., Arizona: = male juv.).

1) The females of *P. livida parvirostris* and *P. livida maior* are unknown.

Poliophtila melanura, *P. atriceps* Lawrence, Ann. Lyc. Nat. Hist. New York, Vol. 6, p. 168 (1858) (Ringgold Barracks, Texas).

Fig. Cassin, Illustr. Birds Calif. Texas, 1854, pl. 27; Kennerly, Rep. Pacific R. R. Surv. Vol. 10, Pt. 4, 1859, pl. 33, f. 2.

Hab. South-western United States and adjacent parts of northern Mexico, from the Upper Rio Grande Valley to the Colorado Valley, thence southward through Lower California to Cape St. Lucas, north to southern Nevada, and S. E. California (Inyo County), west to eastern Riverside County, California; south to Tamaulipas, Nuevo Leon, Chihuahua and Sonora.

3. *Poliophtila plumbea margaritæ* Ridgway.

Poliophtila margaritæ Ridgway, Birds North and Middle Amer. Vol. 3 (= Bull. U. S. Nat. Mus. no. 50, Pt. 3), p. 733, foot-note (1904) (Margarita Island, off Lower California).

Hab. Margarita Island, off Lower California, (Doubtful form.)

4. *Poliophtila californica* Brewster.

Poliophtila californica Brewster, Bull. Nutt. Ornith. Club, Vol. 6, p. 103 (1881) (Riverside, San Bernardino Co., California).

Fig. Baird, Brewer & Ridgway, Hist. N. Amer. Birds, Vol. 1, 1874, pl. 6, f. 7.

Hab. Southern California, west and north of Colorado desert, and Pacific coast district of northern Lower California; north to Ventura County; south to Santa Rosalia Bay and San Fernando; east to the Colorado River.

✓ 5. *Poliophtila cærulea cærulea* (Linnæus).

Motacilla cærulea Linnæus, Syst. Nat. ed. 12, Vol. 1, p. 337 (1766) (based on *Motacilla parva cærulea* Edwards, Glean. Nat. Hist. Vol. 2, 1760, p. 194, pl. 302 : Pensilvania).

Motacilla cana Gmelin, Syst. Nat. Vol. 1, II, p. 973 (1789) (based on « Figuiet cendré à gorge cendrée » Buffon, Hist. Nat. Ois. Vol. 5, p. 319, and « Grey-throated Warbler », Pennant, Arctic Zool. Vol. 2, p. 411 : Louisiana).

Fig. Baird, Brewer & Ridgway, Hist. N. Amer. Birds, Vol. 1, 1874, pl. 6, f. 5.

Hab. Eastern United States : north to New Jersey, Pennsylvania, southern Ontario, southern Michigan, northern Illinois, southern Iowa and eastern Nebraska; southward to Florida, Louisiana and southern Texas; wintering in Florida and other Gulf States, and southward to Bahamas, Cuba, eastern Mexico and Guatemala.

6. *Poliophtila cærulea obscura* Ridgway.

Poliophtila cærulea obscura Ridgway, Proc. U. S. Nat. Mus. Vol. 5, p. 535 (1883) (San José del Cabo, Lower California).

Hab. South-western United States and contiguous parts of northern Mexico; from western Texas to California; northward to Colorado, southern Utah, southern Nevada and interior of northern California; southward to Cape St. Lucas and through Mexican States of Chihuahua, Sonora, and Sinaloa to Colima.

7. *Poliophtila cærulea mexicana* (Bonaparte).

Culicivora mexicana Bonaparte, Consp. Gen. Avium, Vol. 1, p. 316 (1850) (Mexico).

Hab. South-eastern Mexico, in States of San Luis Potosi, Vera Cruz, Oaxaca, Chiapas, Tabasco, Campeche and Yucatan; Guatemala.

8. *Poliophtila cærulea cæsiogaster* Ridgway.

Poliophtila cærulea cæsiogaster Ridgway, Man. N. Amer. Birds, p. 569 (1887) (New Providence Isl., Bahamas).

Hab. Bahamas : Islands of Abaco, Andros, New Providence, Little Abaco, Inagua; Cozumel and adjacent coast of Yucatan (Merida).

9. *Poliophtila nelsoni* Ridgway.

Poliophtila nelsoni Ridgway, Proc. Biol. Soc. Wash. Vol. 16, p. 109 (1903) (Oaxaca City, Oaxaca).

Hab. States of Oaxaca (Oaxaca City) and Chiapas (Comitlan), S. E. Mexico.

10. *Polioptila dumicola dumicola* (Vieillot 1).

Sylvia dumicola Vieillot, Nouv. Dict. (nouv. ed.), Vol. 11, p. 170 (1817) (based on Azara no. 158 : Paraguay).

Culicivora boliviana Sclater, Proc. Zool. Soc. Lond. Vol. 20, 1852, p. 34 (Dec. 1853) (Bolivia; type in Brit. Mus. examined; part. : the specimens obtained by d'Orbigny belong to the next form).

Fig. Proc. Zool. Soc. Lond. 1852, pl. 47 (type of *C. boliviana* Sclater).

Hab. Paraguay; Argentine Republic, south to Buenos Aires, west to Cordova, Tucuman, Salta; south-western and central parts of Bolivia (Caiza, Bolivian Chaco, S. José, Samaipata, Santa Cruz de la Sierra); S. W. Matto Grosso (Corumbá); Uruguay; South Brazil, State of Rio Grande do Sul (São Lourenço).

11. *Polioptila dumicola berlepschi* Hellmayr.

Polioptila berlepschi Hellmayr, Novit. Zool. Vol. 8, p. 356 (1901) (Interior of Brazil : northern São Paulo, Goyaz, Matto Grosso; type locality : Rio das Pedras, on the Rio Parana, northern S. Paulo).

Hab. Campos-districts of the interior of Brazil : in states of Goyaz (City of Goyaz, Leopoldina), N. W. Minas Geraes (Agua Suja), northern S. Paulo (Rio Parana : Rio das Pedras, Itapurá), northern Matto Grosso (Cuyaba, Chapada, Caxoeirinha, Engenho do Gama); westwards to plains of eastern Bolivia (Chiquitos, Moxos).

12. *Polioptila lactea* Sharpe 2).

Polioptila lactea Sharpe, Cat. Birds Brit. Mus. Vol. 10, p. 453 (1885) (« South America », the type is a skin of the well-known Rio-make).

Polioptila melanocephala Bertoni, Anal. Cientif. Paraguays (Aves Nuev. del Paraguay), p. 143 (1901) (Paraguay : interior of primeval forest at 25°40' south lat.).

Hab. South-eastern Brazil : in states of Rio de Janeiro (Rio) and S. Paulo (Rio Feio, between Ypanema and Rio Paranapanema); and Paraguay (Sapucay etc.).

13. *Polioptila bilineata bilineata* (Bonaparte) 3).

Culicivora bilineata Bonaparte, Consp. Gen. Avium, Vol. 1, p. 316 (1850) (Cartagena, Colombia; types in Berlin Mus. examined).

1) The type of *C. boliviana* in the Brit. Mus., exact locality unknown, and a single male from Santa Cruz (Central Bolivia) in Coll. H. v. Berlepsch differ from a large series of *P. dumicola dumicola* (Paraguay, Argentine, Western Bolivia [San José, Samaipata]) in having the upper throat and middle of the abdomen rather whitish, and the silvery-white malar stripe broader and more distinct. Two males from Argentine, one from Buenos Aires, the other from Espartillar (south of Buenos Aires), however, also agree in these respects with the type of *C. boliviana*. A good series is required to settle the status of the Central Bolivian form.

2) Cfr. Hellmayr, Novit. Zool. Vol. 13, 1906, pp. 316, 317.

3) Mr. Ridgway, in his admirable work : Birds of North and Middle America, Vol. 3, 1904, pp. 726-729, attempted to discriminate between *P. bilineata* (« from Veragua *) to Carribean Coast of Province of Santa Marta, Colombia ») and *P. superciliaris* (from the « Isthmus of Panama to Guatemala »). *P. bilineata* is said to have the under parts pure white, with the flanks only washed with pale bluish grey, and to be larger (3 males from Santa Marta : wing 48-50, tail 42-44; 3 females from Santa Marta : wing 45.5-47, tail 42-43.5 mm.); *P. superciliaris* to have the chest and sides of the body strongly shaded with bluish grey and to be of smaller size (7 males : wing 45-47.5, tail 38-41; 10 females : wing 41.5-44, tail 36.5-39.5 mm.). Having once more gone into the question, I am — much to my regret — unable to concur with Mr. Ridgway's view. Besides the types of *C. bilineata* ♂ ♀ ad. from Cartagena, Berlin Museum, kindly forwarded by Dr. Reichenow, and two topotypical males of *P. superciliaris* from Lion Hill, Panama R. R., obtained by McLeannan and received from Mr. Geo. N. Lawrence, which have been obligingly lent me by Count Berlepsch and Mons. A. Ménégaux respectively, I have before me forty-two specimens. As to the supposed differences in size it will be seen from the table given below that they have no real existence, while the colour characters do not prove to be constant either. It is only just to mention that the types of *C. bilineata* Bonaparte fully bear out the characters assigned to this form by Mr. Ridgway, viz. under parts pure white, with the flanks only pale bluish grey and the chest very faintly shaded with the same etc., while the two topotypes of *P. superciliaris* have the whole breast and sides much darker and more strongly washed with bluish grey. The grey of the back is by no means darker than in the types of *C. bilineata* and many other specimens from Ecuador and Peru. The large majority of my examples from Costa Rica and Guatemala agree in coloration of the under parts with the two adult males from Lion Hill, but the grey of the back is either pale as in the latter, or darker more slaty. Nevertheless, I should have admitted the distinctness of the two

*) Mr. Ridgway includes Veragua in the range of the southern *P. bilineata*, apparently on the strength of Salvin's record and without having seen a specimen. One of Arce's examples from Chitra, Veragua, an adult male, is in the Tring Museum. It presents all the characters of *superciliaris*, viz. chest and sides strongly washed with bluish grey etc., and, if two forms be distinguished, it should undoubtedly go with the Central American race. The range of *P. bilineata* would, consequently, become restricted to N. W. South America.

Polioptila superciliaris Lawrence, Ann. Lyc. Nat. Hist. New York, Vol. 7, p. 304 (1861) (Lion Hill, Panama R. R.).
Polioptila superciliaris magna Ridgway, Proc. Biol. Soc. Wash. Vol. 16, p. 110 (1903) (Cartago, Costa Rica; based on a single female!).

Hab. Central America, from Guatemala to Veragua (Chiriqui) and Panama (line of Panama Railroad); northern Colombia (Coast region: Cartagena, Santa Marta, Bonda); south through western Ecuador (Nanegal, Babahoyo, Guayaquil, Esmeraldas, Balzar, Vices, Santo Domingo, Yaguachi, Santa Elena, Puna Isl. etc.) to N. W. Peru (Guadalupe, Tumbes, Lechugal, Pacasmayo, Tembladera), in the mountains up to 1200 feet (Tembladera).

14. ***Polioptila bilineata andina*** Hellmayr.

Polioptila bilineata andina Hellmayr, Verh. Zool.-bot. Ges. Wien, Vol. 53, p. 224 (1903) (Cajabamba, North Peru, 9000 feet).

Hab. High Mountains of North Peru: Cajabamba, at elevations of 9000 feet.

15. ***Polioptila albiloris albiloris*** Sclater & Salvin.

Polioptila albiloris Sclater & Salvin, Proc. Zool. Soc. Lond. 1860, p. 298 (1860) (Motagua Valley, Guatemala).

Fig. Salvin & Godman, Biol. Centr.-Amer. Aves. Vol. 1, 1879, pl. 5, ff. 1, 2.

Hab. Guatemala (Chuacus) to Oaxaca (Santa Efigenia, Tehuantepec, Cuicuitlan, Huilotepec, Tapani) in S. W. Mexico.

16. ***Polioptila albiloris bairdi*** Ridgway.

Polioptila bairdi Ridgway, Proc. Biol. Soc. Wash. Vol. 16, p. 110 (1903) (San Juan del Sur, Nicaragua).

Hab. Western Nicaragua (Realejo, San Juan del Sur, Sucuya, Grenada) and Costa Rica (Liberia, Miravelles, Bebedero, Bagaces, Cartago).

17. ***Polioptila nigriceps albiventris*** Lawrence.

Polioptila albiventris Lawrence, Ann. New York Acad. Sc. Vol. 3, p. 273 (1885) (Temax, Yucatan).

Hab. Yucatan (Temax, Progreso) and Cozumel Island.

forms as races, were it not that my extensive series from Western Ecuador and N. W. Peru shewed such a considerable amount of individual variation in the colour of the belly, half of the skins being like *P. superciliaris* from Central America, while the other half exactly resembled the types of *C. bilineata*. Hence it became impossible to admit more than one form. The dimensions which Mr. Ridgway gives for the type of his *P. superciliaris magna* are well within the limits of individual variation of the species.

P. BILINEATA (Bonaparte)		Wing	Tail
1 ♂ ad.	Cartagena: Type of the species	46.5	42 mm.
8 ♂ ad.	W. Ecuador (Guayaquil, Balzar)	47-52	42-47 "
1 ♂ ad.	Nanegal, W. Ecuador	48	45.5 "
1 ♂ ad.	Tumbes, N. W. Peru	50	45 "
2 ♂ ad.	Tembladera, N. Peru	47.50	45.48 "
1 ♀ ad.	Cartagena: Type of the species	45	41.5 "
3 ♀ ad.	Guayaquil, W. Ecuador	45-50	44-45 "
2 ♀ ad.	Balzar, W. Ecuador	47	44.40 "
5 ♀ ad.	Tembladera, N. W. Peru	47-49	45-49 "
1 ♀ ad.	Tumbes, N. W. Peru	47	40 "
P. SUPERCILIARIS Lawrence			
2 ♂ ad.	Lion Hill, Panama R. R., Topotypes of <i>P. superciliaris</i>	45.48	42 mm.
1 ♂ ad.	Veragua (Chiriqui)	51	46 "
1 ♂ ad.	Chiriqui	50	44 "
1 ♂ ad.	Boruca, W. Costa Rica	48	43 "
1 ♂ ad.	Bebedero, Costa Rica	49	44 "
2 ♂ ad.	Buenos Aires, Costa Rica	48	43.44 "
1 ♂ ad.	Matagalpa, Nicaragua	49	41 "
2 ♂ ad.	Guatemala	48.5	43.44 "
1 ♀ ad.	Guatemala	49	43 "
2 ♀ ad.	Bebedero, Costa Rica	48	42.5 "
1 ♀ ad.	Miravelles, Costa Rica	49	40 "
1 ♀ ad.	Matagalpa, Nicaragua	45	40.5 "
1 ♀ ad.	Chiriqui	44	41 "

18. *Polioptila nigriceps nigriceps* Baird.

Polioptila nigriceps Baird, Rev. Amer. Birds, p. 69 (1864) (Mazatlan, Sinaloa, Mexico).

Polioptila nigriceps restricta Brewster, Auk, Vol. 6, p. 97 (1889) (Alamos, South Sonora, Mexico).

Hab. Western Mexico, from southern Sonora (Alamos, Culiacan) to Oaxaca (Tehuantepec, Santa Efigenia, Puerto Angel, Huilotepec, Tapana, Cuicatlan etc.); Salvador (La Union)?

19. *Polioptila livida livida* (Gmelin) 1). (Plate, Figs. 6, 6a.)

Motacilla livida Gmelin, Syst. Nat. Vol. 1, II, p. 981 (1789) (based on « Figuiers de Madagascar » Daubenton, Pl. Enl. pl. 705, f. 3 [= 2]; locality erroneous, we substitute *Cayenne* as terra typica).

Polioptila buffoni Sclater, Proc. Zool. Soc. Lond, 1861, p. 127 (1861) (part.: « Guiana [= Cayenne] et [errore!] Nova Grenada »; *Cayenne* to be considered as type locality).

Hab. Surinam (Paramaribo); French Guiana (Cayenne, Roche-Marie, Saint-Jean du Maroni), Brazilian Guiana (Amapa) and Lower Amazons (Pará, Santarem; Urucurituba, left bank of the Rio Tapajós).

20. *Polioptila livida innotata* Hellmayr.

Polioptila buffoni innotata Hellmayr, Novit. Zool. Vol. 8, p. 359 (1901) (North Brazil [Rio Branco], British Guiana [Quonja, Aunai]; types from Forte do Rio Branco, North Brazil).

Hab. North Brazil: Forte do São Joaquim, on the Rio Branco; and British Guiana (Quonja, Aunai, R. Rupununi).

21. *Polioptila livida leucogastra* (Wied).

Sylvia leucogastra Wied, Beitr. Naturg. Brasil. Vol. 3, II, p. 710 (1831) (province of Bahia, East Brazil).

Culicivora atricapilla Swainson, Zool. Ill. (new ser.), Vol. 2, pl. 57 (1832) (no locality).

Hab. Eastern Brazil, from Bahia to Pernambuco.

22. *Polioptila livida plumbeiceps* Lawrence.

Polioptila plumbeiceps Lawrence, Proc. Acad. Nat. Sc. Philad. Vol. 17, p. 37 (1865) (Venezuela; = male juv.).

Polioptila sclateri Sharpe, Cat. Birds Brit. Mus. Vol. 10, p. 449 (1885) (Venezuela).

[*Polioptila nigriceps*] *anteocularis* 2) Hellmayr, Novit. Zool. Vol. 7, p. 537 (1900) (Bogotá, Colombia).

Hab. Northern Venezuela, from state of Cumaná to La Guayra and Caracas, including Margarita Island, southward to the Rio Apuré (San Fernando), the Orinoco-River (Maipures, Ciudad Bolívar, Alta-gracia) and its southerly tributary, the Caura; west to Colombia (Bogotá-collections; Cauca Valley; and, according to Sharpe, Valencia, Sierra Nevada de Santa Marta).

23. *Polioptila livida parvirostris* Sharpe.

Polioptila parvirostris Sharpe, Cat. Birds Brit. Mus. Vol. 10, p. 448 (1885) (Chamicuros, Eastern Peru).

Hab. Southern tributaries of the Peruvian Amazons: Ucayali, Huallaga etc.

24. *Polioptila livida maior* Hellmayr.

Polioptila nigriceps maior Hellmayr, Nov. Zool. Vol. 7, p. 538 (1900) (Suecha, Andes of North Peru).

Hab. Andes of North Peru, at elevations of from 5000 to 9000 feet (Suecha, Cajabamba, Araqueda, Callacate etc.).

25. *Polioptila schistaceigula* Hartert. (Plate, Fig. 3.)

Polioptila schistaceigula Hartert, Bull. Brit. Ornith. Club. Vol. 7, p. 30 (1898) (Cachabi, N. Ecuador).

Hab. N. W. Ecuador (Cachabi) and Isthmus of Darien.

1) Cfr. Hellmayr, Verh. Zool.-bot. Ges. Wien, Vol. 53, 1903, pp. 223, 224.

2) Ridgway (Birds of North and Middle America, Vol. 3, 1904, p. 714) considers this form to be different from *P. l. plumbeiceps*. I have shown, however, that the differences do not hold good when series of both are compared (cfr. Hellmayr, Novit. Zool. Vol. 14, 1907, pp. 4, 5).

EXPLANATION OF PLATE

- Fig. 1. Head of *Leptopoecile sophiæ sophiæ* ♂.
— 1a. Tail of *Leptopoecile sophiæ sophiæ* ♂.
— 2. Head of *Lophobasileus elegans* ♂.
— 2a. Tail of *Lophobasileus elegans* ♂.
— 3. *Polioptila schistaceigula* (entire figure).
— 4. *Regulus regulus tristis* (entire figure).
— 5. Head of *Regulus calendula calendula*.
— 6. Head of *Polioptila livida livida* ♂.
— 6a. Foot of *Polioptila livida livida* ♂.
— 7. Foot of *Regulus regulus regulus*.
-

Munich, 15th July 1911.

FAM. REGULIDÆ

- 1, 1a. HEAD AND TAIL OF LEPTOPOECILE SOPHIÆ SOPHIÆ ♂. 2, 2a. HEAD AND TAIL OF LOPHOBASILEUS ELEGANS ♂.
 3. POLIOPTILA SCHISTACEIGULA. 4. REGULUS REGULUS TRISTIS ♂. 5. REGULUS CALENDULA CALENDULA ♂.
 6, 6a. HEAD AND FOOT OF POLIOPTILA LIVIDA LIVIDA ♂. 7. FOOT OF REGULUS REGULUS REGULUS.

GENERA AVIUM

CONDUCTED BY

P. WYTSMAN

WITH CONTRIBUTIONS BY MESSRS. A. DUBOIS, E. HARTERT,
C. E. HELLMAYR, W. R. OGILVIE-GRANT, Hon. W. ROTHSCHILD, T. SALVADORI,
P. L. SCLATER, &^a

PASSERES

FAM. PARIDÆ

by C. E. HELLMAYR

WITH 3 COLOURED PLATES

1911

PRICE £ 1.5.6 (FR. 31.80)

FAM. PARIDÆ

FAM. PARIDÆ

BY C. E. HELLMAYR

THE Tits are small, ten-primaried, acutiplantar Oscines, with the bill much shorter than the head, more or less convex (except in subfamily *Remizinae*), and the wing rounded, with third to sixth primaries longest.

Characters. Bill relatively small, much shorter than the head, more or less conoidal, but extremely variable as to relative length, thickness and degree of curvature; the maxillary tomium usually smooth, very rarely with a slight subterminal notch (*Parisoma*), in one subfamily (*Paradoxornithinae*) more or less deeply sinuated; gonys relatively long (twice as long as mandibular rhami). Nostrils mostly very small, roundish, non-operculate, entirely concealed by antrorse latero-frontal plumules, sometimes, however, operculate, longitudinal and more or less exposed. Rictal bristles usually distinct, though never very conspicuous, sometimes (*Remizinae*, *Psaltiriparinae*) even obsolete. Wing rather long, rounded; third to sixth primaries longest; second primary exceedingly variable in length, either about equal to seventh or eighth, or (in subfamilies *Certhiparinae* and *Paradoxornithinae*) not longer than secondaries; first primary about half as long as second, sometimes (*Remizinae*, *Panurinae*) rudimentary, scarcely obvious. Tail variable in length, seldom only half as long as wing (in genus *Cephalopyrus*), usually about as long, sometimes much longer than wing, rounded, graduated or emarginate. Tarsus variable in length, but always decidedly longer than middle toe with claw; acrotarsium scutellate or booted; proportion of toes variable, usually outer toe slightly longer than inner toe, but slightly shorter than middle toe (except in *Mohoua*, in which genus outer and middle toes are equal), hallux equal in length to inner toe, but stouter, its claw much larger than those of anterior toes, sometimes nearly as long as the digit; basal phalanx of middle toe adherent to lateral toes for most, if not the whole, of its extent. Plumage lax, soft and copious.

Coloration extremely variable. See characters of subfamilies. Sexes mostly alike, sometimes different.

Geographical Distribution. Palaearctic, Nearctic, Indo-Malayan, Australian, New Zealand and Ethiopian Regions.

Six subfamilies with twenty-four genera.

Habits and Reproduction. The Titmice are arboreal, very active, non-migratory birds. Their foods consists both of insects and various kinds of seeds, fruits etc. Nidification variable: nest either placed in holes of trees, crevices of walls etc.; or a very bulky purse-like or retort-shaped structure, suspended or attached to branches of twigs of trees or bushes (*Remizinae*, *Psaltriparinae*); or an open, cup-shaped structure, placed on or near the ground (*Panurinae*) etc. Eggs variable in shape and colour.

Observations. The family *Paridae*, as here defined, is certainly a rather heterogenous group, the last two subfamilies, *Paradoxornithinae* and *Certhiiparinae*, being of somewhat doubtful affinities, yet they appear to be more nearly related to the *Paridae* than to any other family.

Bibliography. Gadow, Cat. Birds Brit. Mus. Vol. 8, 1883, pp. 1-79; Hellmayr, Tierreich, Livr. 18, 1903, pp. 29-167; Ridgway, Bull. U. S. Nat. Mus. no. 50, Pt. 3, 1904, pp. 375-436 1).

KEY TO THE SUBFAMILIES OF PARIDÆ

1. *Exposed culmen decidedly shorter than inner toe (without claw).* [*Nasal opening concealed by antrorse latero-frontal plumules*]. *Tarsus nearly twice as long as middle toe (without claw)* 2.
- *Exposed culmen equal to, or longer than, inner toe (without claw). Tarsus much less than twice as long as middle toe (without claw). First primary about half as long as second* 3.
- *Exposed culmen about equal to inner toe (without claw). Tarsus more than twice as long as middle toe (without claw). First primary much more than half as long as second. Second primary equal in length to secondaries.* 4.
2. *Nasal fossa occupying about basal half of maxilla, nasal opening non-operculate, roundish. Maxilla abruptly contracted terminally, with culmen strongly ridged. Under tail coverts much less than half as long as longest rectrices. First primary well-developed, nearly half as long as second* 2. Subfam. PSALTRIPARINÆ.
- *Nasal fossa occupying much less than basal half of maxilla, broadly operculate, with slit like nasal opening situated near lower edge of groove. Maxilla not abruptly contracted, though narrow, terminally, with culmen above much rounded. Under tail coverts fully half as long as longest rectrices. First primary rudimentary, reduced to a minute, lanceolate feather, not reaching to tip of primary coverts* 5. Subfam. PANURINÆ.

1 Mr. Ridgway's admirable work has been of the greatest assistance to me in the preparation of this revision, and most of the family- and generic characters have been taken from it.

3. Bill with either culmen or gonys (usually both) distinctly convex, its tip not acute. First primary about half as long as second, the latter always shorter than seventh. Rictal bristles distinct. 1. Subfam. PARINÆ.
- Bill with both, culmen and gonys, nearly straight, its tip acute. First primary decidedly less than half as long as second, usually rudimentary, scarcely exceeding primary-coverts, the second longer than seventh. Rictal bristles obsolete 3. Subfam. REMIZINÆ.
4. Bill extremely elevated, very much deeper than wide, with outlines strongly convex, and culmen much rounded above; maxillary tomium more or less deeply sinuated. Nostrils non-operculate, small, roundish, entirely concealed by dense, antrorse, latero-frontal plumules. 4. Subfam. PARADOXORNITHINÆ.
- Bill not elevated, as wide as, or even wider than, deep, with culmen but slightly convex for terminal half and distinctly ridged; maxillary tomium without trace of sinuation. Nostrils distinctly operculate, large, longitudinal, posteriorly overhung by bristly latero-frontal plumules. 6. Subfam. CERTHIPARINÆ.

1. SUBFAM. PARINÆ

THE TITMICE

In this group I include, besides the true Tits (*Parus*), the old-world genera *Melanochlora*, *Penthornis*, *Parisoma* (s. strict.), *Aphelocephala* and *Sphenostoma*. They are all, without exception, small-sized birds with rather strong, distinctly convex, more or less blunt bill, rounded, even or slightly emarginate tail, composed of equally broad rectrices, and with interorbital septum without any large, central foramen.

Characters. Bill relatively small, much shorter than head, about equal to, or longer than, inner toe without claw, much longer than deep, with either culmen or gonys (usually both) distinctly convex, its tip not acute; maxillary tomium with or without subterminal notch. Nasal opening occupying much less than basal half of maxilla, either operculate and then mostly exposed, or non-operculate and concealed by antrorse latero-frontal plumules. Wing rather long, rounded; third, fourth and fifth, or fourth and fifth, primaries longest; second primary always shorter than seventh, equal either to eighth or to ninth; first primary about half as long as second. Tail variable as to relative length, even, rounded, or slightly emarginate; rectrices broad, more or less rounded at tip. Tarsus much less than twice as long as middle toe (without claw); acrotarsium distinctly scutellate; middle toe longest, outer toe slightly longer than inner; basal phalanx of middle toe adherent to inner toe for entire length, to outer toe for more than half its length; hallux equal in length to inner toe, but stouter. Interorbital septum without any large central foramen. Plumage soft and copious.

Coloration variable (see genera). Sexes sometimes alike, sometimes more or less different.

Geographical Distribution. Palæarctic, Neartic, Indo-Malayan, Australian and Ethiopian Regions.

Nidification. Nest either in holes of various kinds (*Parus*), or a free, bulky structure (*Aphelocephala*). Eggs mostly white, spotted with brownish red or light red (*Parus*), or fleshy white (*Aphelocephala*).

KEY TO THE GENERA OF PARINÆ

1. Nostrils non-operculate, small, roundish, entirely concealed by antrorse latero-frontal plumules. Tongue with distinct horny bristles. Upper tail coverts covering not more than basal third of tail, usually much less 4.
- Nostrils situated in a large operculated groove, nasal opening roundish, hidden by antrorse latero-frontal plumules. Tongue without bristles. Upper tail coverts long, covering basal half of tail 4. Genus APHELOCEPHALA.
- Nostrils operculate, entirely exposed. Upper tail coverts short, covering much less than basal third of tail 4.
2. Bill decidedly longer than hallux (without claw), with culmen more abruptly curved, and tip of maxilla slightly uncinat 2. Genus PENTHORNIS.
- Bill about as long as hallux (without claw), with culmen less abruptly curved, and tip of maxilla not uncinat 3.
3. Bill stout, much expanded at base; tail strongly rounded, the outermost rectrix falling short of the middle pair by length of inner toe with claw 3. Genus MELANOCHLORA.
- Bill more slender, not expanded at base; tail even, emarginate, or very slightly rounded, the difference between longest and shortest rectrix being much less than length of inner toe with claw 1. Genus PARUS.
4. Bill at base nearly as deep as wide, with culmen rounded and strongly curved for the whole of its length; no subterminal notch near end of maxillary tomium. Tail much longer than wing 5. Genus SPHENOSTOMA.
- Bill at base decidedly wider than deep, much compressed terminally, with culmen nearly straight for basal half, rather abruptly decurved terminally; maxillary tomium with slight subterminal notch. Tail about equal to length of wing. 6. Genus PARISOMA.

I. GENUS PARUS LINNÆUS

- Parus** Linnæus. Syst. Nat., ed. 10, p. 189 (1758) (type by elimination : *Parus major* Linnæus).
- Lophophanes** Kaup, Skizz. Entwicklungsgesch. pp. 91, 92 (1829) (type by elimination : *Parus cristatus* Linnæus).
- Cyanistes** Kaup, ibidem, p. 99 (1829) (type : *Parus cyanus* Pallas).
- Pœcile** (nec *Pœcilus* Bonelli 1809) Kaup, ibidem, p. 114 (1829) (type by elimination : *Parus palustris* Linnæus).
- Sylviparus** Burton, Proc. Zool. Soc. Lond. Vol. 3, 1835, p. 154 (1836) (type : *Sylviparus modestus* Burton).
- Pœcila** Gray, Genera of Birds, Vol. 1, p. 191 (1848) (nom. emend. pro *Pœcile* Kaup).
- Penthestes** Reichenbach, Avium Syst. Nat. pl. 62 (1850) (type : *Parus lugubris* Temminck).
- Melaniparus** Bonaparte, Consp. Gen. Avium. Vol. 1, p. 228 (1850) (sp. : *P. niger*, *leucomelas*, *leucopterus*, *leuconotus*).
- Machlolophus** Cabanis, Mus. Heinean. Vol. 1, p. 91 (1851) (type : *Parus spilonotus*).

- Bæolophus** Cabanis, Mus. Heinean. Vol. 1, p. 91 (1851) (type : *Parus bicolor* Linnæus).
Pentheres Cabanis, ibidem, p. 92 (1851) (nom. emend. pro *Melaniparus* Bonaparte).
Pæcila Bonaparte, Ann. Sc. Nat. (4). Vol. 1, p. 121 (1854) (nom. emend. pro *Poecile* Kaup).
Poikilis J. H. Blasius, List Europ. Birds, p. 8 (1862) (nom. emend. pro *Poecile* Kaup).
Pæcilia Dybowski, Bull. Soc. Zool. Fr. Vol. 8, p. 361 (1883) (nom. emend. pro *Poecile* Kaup).
Sittiparus de Selys-Longchamps, ibidem, Vol. 9, pp. 43, 58 (1884) (type : *Parus varius* Temminck & Schlegel).
Periparus de Selys-Longchamps, ibidem, pp. 43, 59 (1884) (type : *Parus ater* Linnæus).
Pardaliparus de Selys Longchamps, ibidem, p. 73 (1884) (sp. : *P. elegans*, *P. amabilis*, *P. venustulus*).
Phæopharus Madarász, Magyar Mad. p. 139 (1900) (type : *P. palustris* Linnæus).
Ægithospiza Hellmayr, Journ. f. Ornith. Vol. 49, p. 171 (1901) (type : *Parus fringillinus* Fischer & Reichenow).
Pæciloides Bianchi, Ann. Mus. Zool. St-Petersb. Vol. 7, p. 241 (1902) (type : *Poecile superciliosa* Przewalski).

Characters. Bill much shorter than head, extremely variable as to relative length, shape and size, sometimes slender, sometimes stout, but always more or less conic, with obtuse tip; culmen much rounded above, decidedly decurved terminally, without trace of subterminal notch; gonys more or less distinctly ascending terminally. Nostrils basal, roundish, small, non-operculate, completely concealed by dense, antrorse latero-frontal plumules. Rictal bristles obvious, though short and soft. Tongue obtuse, its tip beset with horny bristles. Wing rather long, but rounded; fourth and fifth, fourth, fifth and sixth, or third, fourth and fifth primaries longest; second primary equal to ninth or eighth, always shorter than seventh; first primary much less than half as long as second, but considerably longer than primary coverts. Tail extremely variable as to relative length, either much shorter, or conspicuously longer, than wing, rounded or emarginate, but never much graduated; rectrices rounded or slightly pointed at tip. Tarsus rather strong, conspicuously longer than middle toe with claw, or wing-tip; the acrotarsium distinctly scutellate; outer toe slightly longer than inner toe, its claw reaching to or beyond base of middle toe; hallux equal in length to outer toe, but much stouter, its claw much larger than those of anterior toes, sometimes nearly as long as the digit; basal phalanx of middle toe adherent to inner toe for its entire length, to outer toe for about half its length. Feathers of pileum often much elongated, forming a full, erect or pendant crest of various length and shape. Plumage woolly, soft and lax.

Coloration extremely variable. In some species the upper parts are plain brown or grey, the lower parts white, greyish or buff, without light markings on wings and tail; others are brightly-coloured birds, with the upper parts varied with black, yellow and green, the wings ornamented by bright yellow, white or bluish markings, the under surface bright yellow or white, with black throat and abdominal stripe. Often is there a distinct greyish or white nuchal patch, and the outer rectrices are partly white.

Geographical Distribution. Palæarctic, Nearctic, Indo-Malayan and Ethiopian Regions.

Habits and Nidification. The Tits are very active, omnivorous, non-migratory birds. Their nest, a very careless, loose structure of mosses, lichens, dry leaves etc., lined inside with feathers, hair and other soft material, is placed in holes of all kind; the clutch consists of from six to fourteen eggs, which are white, spotted all over with reddish brown or pale red.

Observations. I have been in considerable doubt about the propriety of uniting in a single genus the numerous species and subspecies commonly referred to *Parus*. However, several attempts to use the slight structural differences (in shape and size of bill, shape and relative length of tail) together with style of coloration as generic characters having entirely failed I see no other way out of the difficulty but the one here taken. With regard to the question of subdivision of this genus the remarks of Mr. Ridgway (Birds North- and Middle Amer. Vol. 3, p. 378) should be consulted.

KEY TO THE SPECIES AND SUBSPECIES OF PARUS¹⁾

1. Head with a distinct, full occipital crest, the crest-feathers being either rounded, or slightly attenuated and recurved at the tip 2.
- Head without a distinct, full crest, the occipital feathers being either normally shaped, or very slightly lengthened (section *Cyanistes*, *Parus funereus*), or only a few of them are elongated (several forms of section *Periparus*) 24.
2. Plumage above uniform olive-green, lower parts paler. Above the eye a well-defined, bright lemon-yellow stripe, only to be seen when the feathers are raised 3. (*P. MODESTUS*).
- Plumage not uniform olive-green. No bright lemon-yellow stripe above the eye. 4.
3. Under parts pale dingy greenish, more yellowish in the middle of the abdomen 72. *P. MODESTUS MODESTUS*.
- Under parts duller, throat and breast more greyish green 73. *P. MODESTUS SATURATION*.
4. Upper wing coverts with large white or yellow apical spots. Head above metallic black, with a distinct pale nuchal patch, sides of head yellow, with a black streak from eye to sides of neck 5. (*MACHLOLOPHUS*).
- Upper wing coverts without trace of light apical spots. Head above never uniform metallic glossy black. No pale nuchal patch; sides of head without black streak 11.
5. Throat yellow like the remainder of under parts. Nuchal patch white. 6.
- Throat more or less black. Nuchal patch yellow. 7.
6. Head above like all the upper parts glossy greenish black; middle of the abdomen with a distinct black longitudinal stripe 50. *P. HOLSTI* ♂.
- Lateral portions of pileum washed with olive, back etc. dull greenish olive-grey; no blackish median stripe on the abdomen 50. *P. HOLSTI* ♀.
7. Forehead yellow, crown black 8.
- Forehead black like the crown 10.
8. Back bluish grey, spotted with black on anterior portion. Below: throat and middle of breast down to anal region black, sides and flanks clear cinereous 51. *P. REX* ♂.
- Back greenish, sometimes varied with blackish on upper portion. Below mainly yellow, with more or less of black on throat; flanks sometimes greyish 9.

1) *P. atricapillus sakhalinensis* could not be included in the key, being unknown to the author.

9. Whole throat and broad stripe down the middle of breast and abdomen black; sides of breast bright yellow, flanks more greenish 49. *P. SPILONOTUS*.
- Upper throat only more or less black, foreneck and breast yellowish green, flanks and anal region ashy grey 51. *P. REX* ♀.
10. Back bright olive-green; apical spots to upper wing coverts pale yellow. 47. *P. XANTHOGENYS XANTHOGENYS*.
- Back dull greyish olive-green; apical spots to upper wing coverts pure white. 48. *P. XANTHOGENYS APLONOTUS*.
11. Bill slender, its depth at base equal to not more than half its length; tail emarginate; longer crest feathers recurved terminally 12. (*LOPHOPHANES*).
- Bill very stout, its depth at base equal to more than half the length of exposed culmen; tail more or less rounded; longer crest-feathers not recurved terminally 16. (*BÆOLOPHUS*).
12. Feathers of pileum and crest uniform mouse-grey; sides of head light buff, speckled with grey; throat and remaining lower parts deep buff 13. (*P. DICHROUS*).
- Feathers of forehead and crown black, broadly edged with white; crest-feathers black, edged and tipped with white; sides of head white, the auricular region surrounded above and behind by a broad black band. Middle of throat and foreneck black, remainder of lower parts white, tinged with brown on sides and flanks 14. (*P. CRISTATUS*).
13. Back olivaceous grey, scarcely different from colour of pileum; lower parts deep rusty buff. 77. *P. DICHROUS DICHROUS*.
- Back light olive-brown, decidedly contrasting with mouse-grey of pileum and crest; lower parts light buff 78. *P. DICHROUS DICHROIDES*.
14. Back and upper wing coverts lighter: greyish brown or clear wood-brown. Larger: wing of adult male about 63-68 mm 15.
- Back and upper wing coverts decidedly darker: deep olive-brown. Smaller: wing of adult male about 60-63 mm. (Flanks strongly washed with brownish.) 76. *P. CRISTATUS SCOTICUS*.
15. Back and upper wing coverts light isabelle-brownish, with a greyish cast. Flanks paler buff 74. *P. CRISTATUS CRISTATUS*.
- Back and upper wing coverts darker: wood-brown. Flanks more deeply buff 75. *P. CRISTATUS MITRATUS*.
16. Throat white or grey; no black on sides of head or neck 17.
- Throat black or partly so; a black band across end of auricular region and another across side of neck. 23. (*P. WOLLWEBERI*).
17. Above slate-grey or olive-grey, the head with black on forehead or crown, or else the forehead rusty; sides and flanks cinnamon-rufous or cinnamon-buff. 18.
- Above brownish grey or greyish brown, the head without any black or rusty; sides and flanks pale brownish grey or greyish brown 20.
18. Crown and crest grey, like back; forehead black or dusky 81. *P. BICOLOR*.
- Crown and crest black or blackish; forehead whitish or rusty 19. (*P. ATRICRISTATUS*).
19. Smaller: adult male averaging wing 71, tail 62 mm.; grey of upper parts darker, more strongly tinged with olive. 82. *P. ATRICRISTATUS ATRICRISTATUS*.
- Larger: adult male averaging wing 77, tail 67 mm.; grey of upper parts lighter, less tinged with olive 83. *P. ATRICRISTATUS SENNETTI*.

20. *Smaller : wing of adult male averaging less than 70, of female not more than 68 mm.; upper parts browner* 84. *P. INORNATUS INORNATUS.*
- *Larger : wing of adult male averaging more than 70, of female more than 68 mm.; upper parts greyer* 21.
21. *Upper parts darker : brownish grey* 85. *P. INORNATUS MURINUS.*
- *Upper parts lighter : light brownish grey.* 22.
22. *Under parts more decidedly greyish; tail and tarsus longer, bill larger.* 86. *P. INORNATUS RIDGWAYI.*
- *Under parts more whitish; tail and tarsus shorter, bill smaller* 87. *P. INORNATUS CINERACEUS.*
23. *Darker : with grey of upper parts more olive; under parts light olive-grey* 79. *P. WOLLWEBERI WOLLWEBERI.*
- *Paler : with grey of upper parts clearer; under parts dull greyish white* 80. *P. WOLLWEBERI ANNEXUS.*
24. *Head all round black* 25.
- *Head not all round black, the cheeks and auricular region being either wholly white, greyish white, yellow, buff, pale rufous, or chestnut, or at least a distinct subocular band over the cheeks, beginning at base of bill, grey (P. griseiventris)* 38.
25. *Nape and upper back pale sulphur-yellow, rump delicate bluish grey. Lower parts (except black throat) bright yellow, flanks slightly shaded with greenish.* 109. *P. AMABILIS.*
- *No yellow whatever in the plumage* 26.
26. *Nape and upper back buffy greyish white, abruptly contrasted with the glossy black of head and lower rump. (Upper wing coverts and all the lower parts uniform black, more or less glossy.)* 38. *P. LEUCONOTUS.*
- *Nape and upper back not buffy greyish white, being either black like the pileum, or slaty or brownish grey like lower rump* 27.
27. *Upper wing coverts edged with slaty (sometimes the greater series slightly tipped with white), quills and rectrices without trace of white markings. (General colour dark slaty with slight greenish gloss, head and throat darker, blackish.)* 39. *P. FUNEREUS.*
- *Upper wing coverts with a large amount of white; quills and outer rectrices more or less broadly edged with white* 28.
28. *Back and upper tail coverts glossy black like the pileum* 29.
- *Back and upper tail coverts grey, abruptly contrasted with black of pileum.* 33.
29. *Lower breast, abdomen and under tail coverts white, abruptly contrasted with black of chest and throat* 37. *P. ALBIVENTRIS.*
- *Whole under surface black or slaty, though sometimes with abdomen rather duller than anterior lower parts; under tail coverts only with white edges.* 30.
30. *Greater upper wing coverts black, exteriorly edged with white. (Under parts slaty black in adults, paler, more greyish slate in females and young birds.)* 32. *P. NIGER NIGER.*
- *Greater upper wing coverts entirely white.* 31.
31. *Rectrices, except central pair, more or less distinctly edged with white. Wing 85-90 mm.* 33. *P. NIGER INSIGNIS.*

- *Rectrices uniform black, or the outermost pair only edged with white at tip and along outer web.* 32.
32. *Largest : wing 85-95 mm.* 36. *P. NIGER LACUUM.*
- *Middle-sized : wing 75-84 mm.* 35. *P. NIGER LEUCOMELAS.*
- *Smaller : wing 69-76 mm.* 34. *P. NIGER GUINEENSIS.*
33. *Foreneck and chest black like throat in males, somewhat duller, more brownish black in females; in both sexes a large glossy black patch, continuous to black of chest, occupying the middle of the breast.* 34.
- *Foreneck and chest grey, separating black of throat from colour of belly; no black patch in middle of breast.* 35.
34. *Sides of breast, and abdomen dingy white, flanks faintly washed with pale brownish grey* 45. *P. FASCIIVENTER FASCIIVENTER.*
- *Sides of breast, and abdomen distinctly washed with buffy brown.* 46. *P. FASCIIVENTER TANGANYICÆ.*
35. *Breast and abdomen deeper : cinnamomeous; flanks not greyish* 36.
- *Breast and abdomen paler : fawn-colour or brownish buff; flanks washed with greyish.* 37.
36. *Cinnamomeous colour of belly deeper* 40. *P. RUFIVENTRIS RUFIVENTRIS.*
- *Cinnamomeous colour of belly paler* 41. *P. RUFIVENTRIS MASUKUENSIS.*
37. *Belly light fawn-colour.* 42. *P. RUFIVENTRIS PALLIDIVENTRIS.*
- *Belly brownish buff or buffy* 43. *P. RUFIVENTRIS ROVUMÆ.*
38. *Forehead and crown without any black, the former being white, the latter either greyish white, or light or dark blue; across hindneck a broad band of dark blue or blackish blue. Under parts mainly white, or yellow, or composed of these two colours, often with black on throat and middle of breast.* 39. *(CYANISTES).*
- *Forehead, sides of head, nape band and under surface of body pale rufous, palest and shaded with greyish on abdomen. Crown feathers blackish, edged with grey, forming a well-defined cap.* 44. *P. FRINGILLINUS.*
- *Upper part of the head uniform black, only forehead sometimes differently coloured, with or without pale nuchal patch. With more or less black on throat.* 54.
39. *Chin and throat white, without any black. Top of the head whitish or very faintly shaded with pale bluish grey. Outer rectrices mostly white.* 40.
- *Chin and middle of throat black. Crown light or dark blue, abruptly contrasted with white forehead. Outer rectrices blue-grey, the outermost pair sometimes narrowly edged with white along outer web.* 43.
40. *Lower parts (except a more or less distinct blackish streak along middle of breast) uniform white.* 41.
- *Lower parts not uniform white, foreneck and chest being extensively bright yellow.* 42.
41. *Crown nearly pure white; grey at base of lateral rectrices indistinct and more restricted.* 68. *P. CYANUS CYANUS.*
- *Crown distinctly shaded with pale bluish grey; grey at base of lateral rectrices very distinct and more extended.* 69. *P. CYANUS TIANSHANICUS.*

42. Behind the eye a very distinct bluish black stripe confluent with the broad, bluish black nuchal band 70. *P. CYANUS FLAVIPECTUS*.
 — No blackish stripe behind the eye; bluish black nuchal band narrow, interrupted in the middle 71. *P. CYANUS BEREZOWSKII*.
43. Lower parts mostly white, with a more or less well-developed pale yellow patch on chest. Inner secondaries with broad, white apical spots. (Crown azure-blue, contrasted with white forehead. Wing about 65 mm.) 67. *P. PLESKII*.
 — Lower parts yellow, with median portion of lower breast and abdomen more or less white. Inner secondaries but narrowly edged with white at tip 44.
44. Crown and band across occiput deep blackish blue, no whitish nuchal patch; upper back blue-grey or bluish grey, sometimes faintly washed with greenish 45.
 — Crown and band across occiput much lighter, pale or dark azure-blue; a very large whitish or greyish white nuchal patch; back uniform olive-green or greyish green, without any bluish grey 49.
45. Lower back and rump olive-green, contrasting with blue-grey of upper back. (Greater upper wing coverts tipped with white; belly yellow with blackish abdominal stripe, but without any white.) 65. *P. CÆRULEUS OMBRIOSUS*.
 — Whole back nearly uniform blue-grey, only the uropygium slightly washed with olive-greenish 46.
46. Greater upper wing coverts broadly tipped with white, forming a well-defined oblique wing-band 47.
 — Greater upper wing coverts uniform dark blue, or very faintly edged with greyish white at tip, but never with a distinct white band. . . 64. *P. CÆRULEUS TENERIFFÆ*.
47. Chest, sides and under tail coverts pale yellow, middle of breast and abdomen extensively white, without or with a very indistinct blackish stripe 66. *P. CÆRULEUS PALMENSIS*.
 — All the breast and abdomen, including under tail coverts, deep yellow, with a very narrow, black and white stripe along middle of breast and abdomen 48.
48. Upper parts deeper blue-grey, abdomen deeper yellow 62. *P. CÆRULEUS ULTRAMARINUS*.
 — Upper parts clearer bluish grey, abdomen paler yellow 63. *P. CÆRULEUS DEGENER*.
49. Back brighter, decidedly olive-green or yellowish green. Yellow of under parts deeper 50.
 — Back duller, greyish green or greenish olive-grey. Yellow of under parts paler 53.
50. Back clearer, light olive-green. Size larger: wing of adult males averaging 68 mm. 51.
 — Back darker, dull greenish olive. Size smaller: wing of adult males averaging 63-64 mm. 52.
51. Back more decidedly green, light nuchal area very faintly shaded with bluish grey, lateral interscapular feathers with scarcely any bluish tinge 55. *P. CÆRULEUS CÆRULEUS*.

- Back clearer, more yellowish green; light nuchal area and lateral interscapular feathers distinctly shaded with pale bluish grey . . . 58. *P. CÆRULEUS ORIENTALIS*.
52. Bill larger, stout. White tips to inner secondaries narrower and more sharply defined 56. *P. CÆRULEUS OBSCURUS*.
- Bill smaller, slender. White tips to inner secondaries wider . . . 57. *P. CÆRULEUS OGLIASTRÆ*.
53. Back decidedly pale greyish green or greyish olivaceous; breast and abdomen very pale yellow 61. *P. CÆRULEUS PERSICUS*.
- Back less tinged with greyish; breast and abdomen averaging darker yellow } 60. *P. CÆRULEUS RADDEI*.
59. *P. CÆRULEUS SATUNINI*.
54. Broad band across forehead (as well as lores, cheeks, malar- and auricular regions and sides of neck) deep buff or chestnut, abruptly contrasted with glossy black of pileum and nape; large nuchal patch of buff or chestnut; no light superciliary streak. Bill stout, with remarkably blunt tip. 55. (*SITTIPARUS*).
- Forehead either black like the pileum, or else, narrowly white and confluent with a well-defined superciliary stripe, reaching to the sides of the neck. Bill slender, with tip not remarkably obtuse . . . 57.
55. Forehead, nuchal patch, as well as sides of head and neck, chestnut-brown. Back dull olive, on anterior portion slightly mixed with chestnut 54. *P. VARIUS OWSTONI*.
- Forehead, nuchal patch, as well as sides of head and neck, deep buff. Back slate-grey 56.
56. Larger: wing of males 80-86, of females 74-76 mm. Upper back cinnamon-rufous; middle of breast and abdomen buff, sides and flanks clear cinnamon-rufous 52. *P. VARIUS VARIUS*.
- Smaller: wing of adult (type, not sexed) 65.5 mm. No cinnamon-rufous on upper surface, the whole back being deep slate-grey; all the lower parts below the black throat patch uniform light chestnut. . . 53. *P. VARIUS CASTANEOVENTRIS*.
57. No whitish nuchal patch; greater upper wing coverts never tipped with white nor conspicuously edged with whitish 58. (*PENTHESTES*).
- A more or less distinct white or whitish nuchal patch in the center of the hindneck, or else, a distinct black stripe along middle line of belly 110.
58. A well-defined white superciliary streak 59.
- No white superciliary streak 61.
59. Under parts, below black throat, pale cinnamomeous 115. *P. SUPERCILIOSUS*.
- Under parts, below black throat and chest, dull white, sides and flanks olive grey 60.
60. Back, as well as sides and flanks, more purely grey; bill larger . . 117. *P. GAMBELI BAILEYÆ*.
- Back, as well as sides and flanks, decidedly olive-grey; bill smaller . 116. *P. GAMBELI GAMBELI*.
61. Head above deep black, the apical portion of the feathers with a distinct metallic gloss 62.
- Head above dull black (without metallic gloss), dark brown or greyish brown 76.
62. Under parts below the black throat uniform cinnamomeous 121. *P. DAVIDI*.

- Under parts below black throat not uniform cinnamomeous, being white or whitish medially, buff, olive-grey or olive-brown on sides and flanks 63.
63. Chin, throat and foreneck uniform black, abruptly defined against colour of breast. Sides and flanks olive-grey or olive-brown 64.
- Chin and middle of upper throat only uniform black, the black bases, on lower throat and foreneck, being almost completely concealed by the broad white tips. Sides and flanks buff 66.
64. Back olive-grey, edges of upper wing coverts and quills olive-greyish; sides of neck pure white, sides and flanks dingy olive-grey . . . 118. *P. SCLATERI*.
- Back dusky olive-brown, edges of upper wing coverts and quills olive-brown; sides of neck clouded with brownish; sides and flanks dark olive-brown 65.
65. Larger : wing 64-69, tail 56-58 mm, with sides and flanks more rufescent olive-brown. 120. *P. HYPERMELÆNUS DEJEANI*.
- Smaller : wing 62, tail 49 mm., with sides and flanks deeper olive-brown without any rufescent tinge 119. *P. HYPERMELÆNUS HYPERMELÆNUS*.
66. Back as well as edges to upper wing coverts and quills decidedly brown, without or with very little greyish admixture. Sides decidedly buff. 67.
- Back as well as edges to upper wing coverts and quills decidedly greyish, with little brownish admixture. Sides not perceptibly washed with buffy 74.
67. Smaller : wing of male averaging 64 mm, with back much darker, deep brown with a slight, but decided rufescent tinge 125. *P. PALUSTRIS DRESSERI*.
- Larger : wing of male averaging 66 mm., with back decidedly paler, earthy- or hair-brown without any rufescent tinge 68.
68. Sides and flanks strongly and extensively suffused with deep buff, sides of neck much clouded with dusky. Back deeper brown 69.
- Sides and flanks but faintly washed with pale buff, this colour gradually shading into the white area of the middle; sides of neck scarcely clouded with pale brownish. Back paler, ashy brown 71.
69. Back deep hair-brown; buff wash on sides and flanks strongly pronounced 126. *P. PALUSTRIS ITALICUS*.
- Back lighter brown; buff wash on sides and flanks paler 70.
70. Back warmer brown 128. *P. PALUSTRIS KOREJEWI*.
- Back lighter, sandy brown 129. *P. PALUSTRIS HELLMAYRI*.
71. Back darker and browner 72.
- Back paler and more greyish brown 73.
72. Back somewhat darker, more olive-brown. Bill averaging longer and stouter 124. *P. PALUSTRIS LONGIROSTRIS*.
- Back somewhat paler, more purely hair-brown. Bill averaging shorter and more slender. 123. *P. PALUSTRIS COMMUNIS*.
73. Back decidedly greyish brown; edges to upper wing coverts and quills less brownish. Bill slender 122. *P. PALUSTRIS PALUSTRIS*.

- Back decidedly more brownish; edges to upper wing coverts and quills more brownish. Bill stout 127. *P. PALUSTRIS STAGNATILIS*.
74. Larger, with longer tail: averaging in males 68, in females 64 mm. 75.
- Smaller, with shorter tail: averaging in males 60, in females 56 mm. 132. *P. PALUSTRIS HENSONI*.
75. Back nearly pure ashy grey. Bill slender 130. *P. PALUSTRIS BREVIROSTRIS*.
- Back slightly shaded with brownish. Bill stout, deep at base . . . 131. *P. PALUSTRIS CRASSIROSTRIS*.
76. Back chestnut. (Pileum brown.) 77. (*P. RUFESCENS*).
- Back not chestnut, being either brown, grey, whitish grey or isabelle-colour 79.
77. Sides and flanks extensively chestnut. 77a.
- Sides and flanks pale brownish grey with little, if any, chestnut. 78.
- 77a. Smaller, with shorter tail (in male 52-55 mm.) 166. *P. RUFESCENS RUFESCENS*.
- Larger, with longer tail (in male 57-61 mm.) 167. *P. RUFESCENS VIVAX*.
78. Sides and flanks obviously tinged or intermixed with chestnut. . . 168. *P. RUFESCENS NEGLECTUS*.
- Sides and flanks without any chestnut, or with a very slight tinge of that colour. 169. *P. RUFESCENS BARLOWI*.
79. Sides and flanks bright wood-brown, fulvous, or rusty brown, distinctly, if not abruptly, contrasted with dingy white of middle portion of belly 80.
- Sides and flanks white or slightly tinged with buff. 89.
80. Pileum and nape much darker, coffee-brown or blackish brown. Bill stouter and longer (culmen about 11-12 mm.) 81. (*P. SONGARUS*).
- Pileum and nape much paler, drab- or greyish brown. Bill slender and shorter (culmen about 9-10 mm.) 82.
81. Pileum and nape dull brownish black, back bright isabelle-brown . 151. *P. SONGARUS SONGARUS*.
- Pileum and nape dark coffee-brown, back paler and duller, sandy brown 152. *P. SONGARUS AFFINIS*.
82. Sides of neck white; sides and flanks wood-brown or fulvous . . . 83. (*P. CINCTUS*).
- Sides of neck grey; sides and flanks rusty brown or cinnamon-brown 87. (*P. HUDSONICUS*).
83. Darker and browner above 84.
- Paler and more greyish above. 85.
84. Pileum greyish brown; rectrices edged with rufescent buff. Bill smaller, slender 158. *P. CINCTUS CINCTUS*.
- Pileum drab grey; rectrices edged with greyish. Bill larger, stout . 159. *P. CINCTUS SAYANUS*.
85. Bill smaller: culmen about 9 mm. 162. *P. CINCTUS ALASCENSIS*.
- Bill larger: culmen about 10 mm. 86.
86. Sides and flanks paler, fawn-colour 160. *P. CINCTUS OBTECTUS*.
- Sides and flanks darker, wood-brown 161. *P. CINCTUS KOLYMENSIS*.
87. Larger (wing in male 66 mm. or more, in female 65 mm. or more). 88.
- Smaller (wing in male 64, in female 60-61 mm.) 165. *P. HUDSONICUS LITTORALIS*.
88. Paler and browner above, throat more sooty. 163. *P. HUDSONICUS HUDSONICUS*.
- Darker and less brown above, throat blacker 164. *P. HUDSONICUS COLUMBIANUS*.
89. Larger: with remarkably stout, deep and strong bill of a brownish horn-colour. Wing 70-80 mm. 90. (*P. LUGUBRIS*).
- Smaller: with exceedingly slender, small bill, which is uniform black. Wing 58-70 mm. 94. (*P. ATRICAPILLUS*).

90. *Pileum deep, velvety brownish black; black throat-patch abruptly defined against white of chest, not broken, on lower edge, by white tips to the feathers* 91.
- *Pileum dull blackish brown or deep brown; black throat-patch not abruptly defined against white of chest, but with posterior edge much broken by white tips to the feathers* 92.
91. *Upper parts decidedly earthy brown or greyish brown; sides and flanks tinged with pale buffy* 157. *P. LUGUBRIS ANATOLIE.*
- *Upper parts clear buffy grey; sides and flanks pure white like remainder of belly* 156. *P. LUGUBRIS DUBIUS.*
92. *Sides and flanks only washed with buffy, middle of breast and abdomen pure white or nearly so* 93.
- *Lower breast, abdomen and under tail coverts decidedly washed all over with buff* 155. *P. LUGUBRIS HYRCANUS.*
93. *Pileum decidedly blackish brown. Larger: wing 72-80, tail 63-68 mm.* 153. *P. LUGUBRIS LUGUBRIS*
- *Pileum dark seal-brown. Smaller: wing 70-74, tail 60-64 mm.* 154. *P. LUGUBRIS LUGENS.*
94. *Chin and whole throat black, only the feathers near posterior edge of this black area more or less conspicuously tipped with white* 95. (American forms).
- *Chin and middle of upper throat only black, while, on sides of throat and on lower throat, the black bases of the feathers are almost completely concealed by long white tips* 101. (Palearctic forms).
95. *Black of throat with posterior edge much broken by white tips to feathers; greater wing coverts and secondaries conspicuously edged with white; tail relatively longer (difference between length of tail and length of wing decidedly less than length of culmen)* 96.
- *Black of throat with posterior edge more «solid», very abruptly defined against white of chest; greater wing coverts and inner secondaries edged with light grey; tail relatively shorter (difference between length of tail and length of wing much greater than length of culmen).* 99.
96. *Larger and paler: wing of male averaging 66 mm. or more, of female more than 62 mm.* 97.
- *Smaller and much darker: wing of male averaging 62, of female 59.5 mm.* 136. *P. ATRICAPILLUS OCCIDENTALIS.*
97. *Smaller and darker, with tail relatively shorter: male averaging wing 66, tail 61.5, female wing 63, tail 59-60 mm.* 133. *P. ATRICAPILLUS ATRICAPILLUS.*
- *Larger and paler, with tail relatively longer: male averaging wing 66, tail 65, female wing 64.5, tail 64 mm.* 98.
98. *Grey of back slightly darker and more buffy, the sides and flanks more strongly buffy* 134. *P. ATRICAPILLUS SEPTENTRIONALIS.*
- *Grey of back slightly paler and purer, the sides and flanks paler buffy, sometimes entirely white* 135. *P. ATRICAPILLUS TURNERI.*
99. *Larger, the back clearer grey* 100.

- *Smaller, the back more brownish grey* 139. *P. ATRICAPILLUS IMPIGER.*
100. *Grey of upper parts slightly darker* 137. *P. ATRICAPILLUS CAROLINENSIS.*
- *Grey of upper parts slightly paler* 138. *P. ATRICAPILLUS AGILIS.*
101. *Back and upper wing coverts decidedly brownish. Edges to inner secondaries buffy or brownish white* 102.
- *Back and upper wing coverts clearer, buffy grey. Edges to inner secondaries white or hoary* 107.
102. *Darker and more brownish above* 103.
- *Paler and less brownish, more greyish above* 106.
103. *Larger : wing 65-70 mm.* 147. *P. ATRICAPILLUS MONTANUS.*
- *Smaller : wing 57-64 mm.* 104.
104. *Smaller : wing 57-61 mm., with back etc. darker, deep greyish brown, and with flanks and ear coverts strongly shaded with rusty buff* 150. *P. ATRICAPILLUS KLEINSCHMIDTI.*
- *Larger : wing 58.5-64 mm., with back etc. not so dark, and with flanks and ear coverts much less suffused with buff* 105.
105. *Slightly darker above; wing averaging shorter : 58-62 mm.* 149. *P. ATRICAPILLUS RHENANUS.*
- *Slightly paler above; wing averaging longer : 60-64 mm.* 148. *P. ATRICAPILLUS SALICARIUS.*
106. *Larger, wing of male averaging 67.5 mm., with back etc. slightly paler and more greyish* 146. *P. ATRICAPILLUS ASSIMILIS.*
- *Smaller, wing of male averaging 62 mm., with back etc. slightly darker and more brownish* 145. *P. ATRICAPILLUS BIANCHII.*
107. *Back etc. exceedingly pale, whitish grey; edges to rectrices pure white; sides and flanks pure white, without the slightest buff tinge* 140. *P. ATRICAPILLUS KAMTSCHATKENSIS.*
- *Back etc. decidedly darker, clear buffy grey; edges to rectrices hoary; sides and flanks distinctly, though sometimes faintly, tinged with buff* 108.
108. *Back etc. duller grey; size averaging smaller* 109.
- *Back etc. clearer grey; size averaging larger* 143. *P. ATRICAPILLUS BAICALENSIS.*
109. *Sides and flanks paler buff; tail longer : 57-62 mm.* 144. *P. ATRICAPILLUS BOREALIS.*
- *Sides and flanks deeper buff; tail shorter : 53-58 mm.* 141. *P. ATRICAPILLUS RESTRICTUS.*
110. *Without trace of black longitudinal stripe on middle of belly* 111.
- *With a very distinct black stripe along middle line of breast and abdomen* 136.
111. *Upper tail coverts glossy black, abruptly contrasted with colour of back* 112. (*PARDALIPARUS*).
- *Upper tail coverts grey, olive, or brown, but never black* 116. (*PERIPARUS*).
112. *Lower back and rump delicate blue-grey* 114. *P. VENUSTULUS.*
- *Lower back and rump light green* 113.
113. *Sides of head and neck white, faintly tinged with pale yellowish. White apical spots on median and greater upper wing coverts much restricted* 112. *P. ELEGANS EDITILE.*
- *Sides of head and neck bright yellow. Light apical spots on median and greater upper wing coverts large* 114.

114. Upper back black, variegated with white and olive-green 115.
 — Upper back mostly white, with very little or no olive-green, and very little black 111. *P. ELEGANS ALBESCENS.*
115. Bill larger; with apical spots on upper wing coverts and rectrices nearly pure white; underneath, the black confined to chin and throat 110. *P. ELEGANS ELEGANS.*
 — Bill smaller; with apical spots on upper wing coverts and rectrices pale yellow; underneath, black of throat continued on to the chest 113. *P. ELEGANS MINDANENSIS.*
116. Upper wing coverts uniform, not tipped with whitish 117.
 — Median and greater upper wing coverts broadly tipped with whitish 120.
117. Middle of breast and abdomen more or less extensively ferruginous. 88. *P. RUBDIVENTRIS.*
 — Belly without any ferruginous 118.
118. Larger: wing about 71-77 mm. Throat and chest black; sides of head and neck pure white 89. *P. RUFONUCHALIS RUFONUCHALIS.*
 — Smaller: wing about 67-72 mm. Throat only black, chest, like abdomen, ashy grey or greyish white. Sides of head and neck buff. 119.
119. Breast and abdomen ashy grey, slightly shaded with brownish 90. *P. RUFONUCHALIS BEAVANI.*
 — Breast and abdomen dull greyish isabelle colour, greyish white in the middle 91. *P. RUFONUCHALIS PÆCILOPSIS.*
120. Black of throat paling into dark grey on chest, rest of belly ashy grey 92. *P. MELANOLOPHUS.*
 — Breast and abdomen never grey, being either pale yellow, white, whitish or buff. 121. (*P. ATER*).
121. Sides of head and neck as well as breast and abdomen pale sulphur-yellow. 121a.
 — Sides of head and neck pure white; breast and abdomen not sulphur-yellow; back brown, olive-grey or bluish grey 122.
- 121a. Back and upper tail coverts light olive greenish; sides and flanks greyish 96. *P. ATER LEDOUCCI.*
 — Back olive-grey, washed with cinnamon, upper tail coverts, sides and flanks cinnamon brown 93a. *P. ATER HIBERNICUS.*
122. Black of throat continued over the entire chest; sides and flanks much darker, deep olive-grey or rufescent olive-brown. 123.
 — Black colour below confined to chin and throat; sides and flanks pale or deep buff, but never olive-grey nor olive-brown 124.
123. Sides and flanks dull olive-grey 95. *P. ATER ATLAS.*
 — Sides and flanks deep rufescent olive-brown 108. *P. ATER CYPRIOTES.*
124. Breast and abdomen nearly uniform deep buff or chamois, middle line scarcely paler than sides 125.
 — Sides and flanks only more or less deeply washed with buff, middle of breast and abdomen largely white or whitish 127.
125. Larger: wing 61-64 mm. Vertical feathers not or but slightly elongated. Breast and abdomen deeper, ochraceous buff 102. *P. ATER RUFPECTUS.*

- *Smaller : wing 54-59 mm. Vertical feathers much elongated.*
Breast and abdomen paler, chamois. 126.
126. *Back paler grey. Crest-feathers less elongated, not recurved terminally* 101. *P. ATER PEKINENSIS.*
- *Back darker grey. Crest-feathers more elongated, slightly recurved terminally* 103. *P. ATER ÆMODIUS.*
127. *Larger : wing 63-70 mm.* 128.
 — *Smaller : wing 55-63, very rarely 64 mm.* 131.
128. *Bill slender, culmen about 12 mm.* 129.
 — *Bill stout, culmen about 10-11 mm.* 130.
129. *Whole back dark olive-grey; sides and flanks decidedly washed with buff.* 106. *P. ATER DERJUGINI.*
 — *Upper and middle back pure bluish grey (as in P. ater ater), rump only olive-grey; sides and flanks creamy white* 107. *P. ATER MOLTCHANOVI.*
130. *Back decidedly rufescent olive-brown* 104. *P. ATER PHEONOTUS.*
 — *Back dull brownish olive.* 105. *P. ATER MICHALOWSKII.*
131. *Upper back purely bluish grey, more or less contrasted with olive-grey of rump* 132.
 — *Upper back olive-grey like the rump* 134.
132. *Bill thicker, stronger, its depth at base about 7.5-8.2 mm. Buff tinge on sides and flanks paler and more restricted; white apical spots on wing coverts smaller* 98. *P. ATER ATER.*
 — *Bill slender, weaker, its depth at base rarely exceeding 7.5 mm. Buff tinge on sides and flanks brighter and more extended; white apical spots on wing coverts larger* 133.
133. *Back more purely blue-grey. Feathers of occiput distinctly elongated, as to form a slight crest* 100. *P. ATER INSULARIS.*
 — *Back less purely bluish grey. Feathers of occiput not or very slightly elongated* 99. *P. ATER AMURENSIS.*
134. *Sides and flanks strongly washed with deep rusty buff* 94. *P. ATER VIEIRÆ.*
 — *Sides and flanks much paler, light buff* 135.
135. *Back more strongly washed with olive; buff tinge on sides and flanks slightly paler* 93. *P. ATER BRITANNICUS.*
 — *Back less decidedly washed with olive; buff tinge on sides and flanks deeper* 97. *P. ATER SARDUS.*
136. *Back deep black like the pileum.* 1. *P. NUCHALIS.*
 — *Back never black, being either bluish grey, or light green, or ashy brown, in abrupt contrast with black of pileum* 137.
137. *Upper back either wholly light green, or at least, anterior portion strongly washed with that colour* 138.
 — *Upper back bluish or blue-grey, without any green or with but a faint greenish sheen immediately behind the whitish nuchal patch, or uniform greyish or earthy brown* 150.
138. *Under parts lighter or deeper yellow, sometimes (P. m. aphrodite) creamy with more or less of yellow on chest* 139.
 — *Under parts dingy creamy or buffy white, without any yellow* 147.

139. Median upper wing coverts black, with broad, white edges, greater series black, exteriorly narrowly edged with blue and broadly tipped with white 140. (P. MONTICOLUS).
- Median upper wing coverts uniform pale bluish grey, greater series bluish grey, dusky on inner web, broadly tipped with white 141. (P. MAJOR part.).
140. Lower rump only grey; white tips to greater wing coverts and inner secondaries rather narrower 2. P. MONTICOLUS MONTICOLUS.
- Whole rump grey; white tips to greater wing coverts and inner secondaries rather wider 3. P. MONTICOLUS INSUPERATUS.
141. Green area above more restricted to upper back; yellow of under parts decidedly paler 141a.
- Green area above extended all over anterior and middle portions of back; yellow of under parts much deeper 142.
- 141a. Larger : wing of male 75 mm. and more, of female 71-74 mm. } 10. P. MAJOR BLANFORDI 1).
 — Smaller : wing of male 71-73, of female 68-70 mm. 11. P. MAJOR ZAYROSSIENSIS 1).
 — Smaller : wing of male 71-73, of female 68-70 mm. 11a. P. MAJOR TERRÆSANCTE.
142. Yellow of under parts duller, about sulphur-yellow. 143.
- Yellow of under parts deeper, more saturated, often mixed with creamy white 145.
143. Bill slenderer 144.
- Bill stout and deep 5. P. MAJOR NEWTONI.
144. Yellow of under parts slightly purer, the wedge-shaped white apical spot on the outermost rectrix more extended, abruptly defined 4. P. MAJOR MAJOR.
- Yellow of under parts slightly duller, the wedge-shaped white apical spot on outermost rectrix more restricted and rather obsolete 7. P. MAJOR CORSUS.
145. Tarsus longer : 20-22 mm. Yellow of under parts never admixed with creamy-white 6. P. MAJOR EXCELSUS.
- Tarsus shorter : 18-20 mm. Yellow of under parts often admixed with creamy-white 146.
146. Smaller : wing 67-69, tail 57-60 mm. 9. P. MAJOR APHRODITE.
- Larger : wing 68-74, tail 60-70 mm. 8. P. MAJOR PELOPONNESIUS.
147. White on outer rectrices much more extended, especially the penultimate pair entirely white, except a narrow, blackish stripe along basal half of inner web. 23. P. MAJOR TIBETANUS.
- White on outer rectrices much less extended, the penultimate pair blackish, with a short, wedge-shaped apical spot only white 148.
148. Larger : wing 69-75 mm. 21. P. MAJOR MINOR.
- Smaller : wing 65-70 mm. 149.
149. Greater portion of upper back olive-green 22. P. MAJOR COMMIXTUS.
- Only the anterior portion of upper back, next to the pale nuchal patch, olive-green 24. P. MAJOR OKINAWÆ.

1) Owing to lack of material I am unable to say by which characters the two forms are distinguishable. Sarudny's long description is almost useless.

150. Tail very slightly rounded, the outermost rectrix being scarcely 5 mm. shorter than the longest 151. (African forms).
 — Tail much rounded, the outermost rectrix being at least 10 mm. shorter than the longest 156. (Palæarctic and Indian forms).
151. Cheeks, subocular region, ear coverts and sides of neck buffy white or white 152.
 — No white on sides of head, only with a pale grey band running from base of bill under the eye to lower portion of ear coverts 31. *P. GRISEIVENTRIS*.
152. Inner web of remiges edged with isabelline. White area on sides of head bordered behind by a blackish band 153.
 — Inner web of remiges edged with white. White area on sides of head behind not bordered by black 154.
153. Whitish nuchal spot distinct; breast and abdomen more decidedly tinged with buff. 29. *P. AFER THRUPPI*.
 — Whitish nuchal spot obsolete; breast and abdomen scarcely tinged with buff. 30. *P. AFER BARAKÆ*.
154. Back earthy brown or greyish brown; edges to upper wing coverts and rectrices smoky white 26. *P. AFER AFER*.
 — Back bluish grey; edges to upper wing coverts and rectrices nearly pure white 155.
155. Whitish nuchal patch distinct. Bill larger 27. *P. AFER CINERASCENS*.
 — Whitish nuchal patch absent or obsolete. Bill smaller 28. *P. AFER PARVIROSTRIS*.
156. Upper parts very dark blue-grey; greater upper wing coverts blackish with blue-grey outer margin, the innermost only with a minute, white apical spot; rectrices without any white, sometimes the outermost with a very small, white tip 25. *P. NIGRILORIS*.
 — Upper parts light bluish grey or pale cinereous; greater upper wing coverts with broad, white or buffy greyish white apical spots, forming a wide transverse band on the wing; outer rectrices for greater part white 157. (*P. MAJOR* part.)
157. Upper parts light cinereous; sides of breast, flanks and under tail coverts pure white, with a very faint greyish shade on lower flanks. 158.
 — Upper parts dark bluish grey; sides, flanks and under tail coverts dull buffy greyish 160.
158. Interscapulum sometimes slightly shaded with greenish; white of lateral rectrices more restricted, outermost rectrix with outer web and small spot at tip of inner web, penultimate rectrix with a limited apical spot white 12. *P. MAJOR INTERMEDIUS*.
 — Interscapulum never shaded with greenish; white of lateral rectrices much extended, outermost rectrix nearly entirely white, penultimate with whole outer web and a large portion of apical half of inner web white. 159.
159. Bill stouter, deeper. Tail longer : 77-81 mm. 13. *P. MAJOR TURKESTANICUS*.
 — Bill slender, less deep. Tail shorter : 68-76 mm. 14. *P. MAJOR BOKHARENSIS*.

160. *Bluish grey of upper parts darker, without whitish nuchal patch; white of lateral rectrices less extended* 20. *P. MAJOR SARAWACENSIS*.
 — *Bluish grey of upper parts lighter, with distinct whitish or greyish white nuchal patch; white of lateral rectrices more extended* 161.
 161. *Central pair of rectrices black, narrowly edged with grey along outer web*. 17. *P. MAJOR MAHRATTARUM*.
 — *Central pair of rectrices wholly grey, or with but a narrow blackish line along the shaft* 162.
 162. *Nuchal patch darkened with greyish. Larger: wing 70-78, tail 68-72 mm.* 15. *P. MAJOR CASCHMIRENSIS*.
 — *Nuchal patch pure white or very nearly so. Smaller: wing 62-72, tail 53-65 mm.* 163.
 163. *Smaller: wing 61-65 mm., with larger, longer bill* 19. *P. MAJOR HAINANUS*.
 — *Larger: wing 64-68 mm., with smaller, shorter bill* 164.
 164. *White of lateral rectrices more extended* 16. *P. MAJOR PLANORUM*.
 — *White of lateral rectrices less extended*. 18. *P. MAJOR CINEREUS*.

1. ***Parus nuchalis* Jerdon.**

Parus nuchalis Jerdon, Illustr. Ind. Ornith. pl. 46 (1843) (Eastern Ghats, west of Nellore, Madras Presidency); Madras Journ. Vol. 13, II, 1844, p. 131, pl. 2.

Hab. Originally described from the Eastern Ghats, Madras, and recorded from Bangalore, Mysore, in South India; but also found in the Aravalli Range from the country round Sambhar Lake to Deesa, in Rajputana, N. W. India.

Obs. The northern birds are most likely to be different from *P. nuchalis* of the Ghats, but I have never been able to examine specimens from the type locality.

2. ***Parus monticolus monticolus* Vigors.**

Parus monticolus Vigors, Proc. Comm. Zool. Soc. Lond. Vol. 1, p. 22 (1831) (Himalayan Mountains).

Fig. Gould, Birds Asia, Vol. 2, pl. 57.

Hab. Himalayas, from Kashmir to Bhutan, also in Assam, Manipur, and thence to the mountainous parts of Western and Southern China (Szechuen, Kansu, Hoopah, Shensi etc.)

3. ***Parus monticolus insperatus* Swinhoe.**

Parus insperatus Swinhoe, The Ibis (new ser.), Vol. 2, pp. 308, 402 (1866) (Formosa).

Hab. Mountains of Formosa.

4. ***Parus major major* Linnæus. (Pl. 1, Fig. 6; Pl. 2, Fig. 9.)**

Parus major Linnæus, Syst. Nat., ed. 10, p. 189 (1758) («Habitat in Europa». We fix Sweden as type locality).

Parus Fringillago Pallas, Zoogr. Rosso-Asiat. Vol. 1, p. 555 (1827) (new name for *P. major* Linnæus: «per omniam Rossiam et Sibiriam»).

Parus robustus Brehm, Handb. Naturg. Vög. Deutschl. p. 461 (1831) («liebt die Nadelhölzer», type locality: Germany).

Parus cyanotos Brehm, Vogelfang, p. 241 (1855) («in Deutschland»).

Parus intercedens Brehm, ibidem, p. 241 (1855) («kommt äusserst selten nach Mitteldeutschland»; type, examined in Tring Museum, is a pale aberration).

Parus major verus Brehm, Naumannia, Vol. 6, p. 367 (1856) (Scandinavia, Germany).

Parus pallidus Brehm, ibidem, p. 367 (1856) (type from Greiz, Saxony, examined in the Tring Museum, is an abnormally pale specimen).

Parus major sulfureus Kollibay, Journ. f. Ornith. Vol. 52, p. 459 (1904) (Bocche di Cattaro, Dalmatia).

Fig. Naumann, Vög. Deutschl. Vol. 4, pl. 94, f. 1.

Hab. Europe, from the Polar circle southwards to Spain, Italy, the northern Balkan states, east through Russia and Western Siberia as far as the Altai Mountains.

5. ***Parus major newtoni* Prazák.**

Parus major newtoni Prazák, Ornith. Jahrb. Vol. 5, p. 239 (1894) (England).

Hab. England, Scotland, Ireland.

6. **Parus major excelsus** Buvry.
Parus major excelsus Buvry, Journ. f. Ornith. Vol. 5, p. 194 (1857) (Forest Nratka-el-abbia, Northern Algeria).
 Hab. Woods of Algeria, Tunisia and Morocco.
7. **Parus major corsus** Kleinschmidt.
Parus corsus Kleinschmidt, Ornith. Monatsber. Vol. 11, p. 6 (1903) (Corsica).
 Hab. Corsica and Sardinia.
8. **Parus major peloponnesius** Parrot.
Parus major peloponnesius Parrot, Journ. f. Ornith. Vol. 53, p. 547 (1905) (Calamata, Greece).
 Hab. Greece.
9. **Parus major aphrodite** Madarász.
Parus aphrodite Madarász, Term. Füzet. Vol. 24, p. 272 (1901) (Cyprus).
 Hab. Cyprus; Asia Minor?
10. **Parus major blanfordi** Prazák.
Parus major blanfordi Prazák, Ornith. Jahrb. Vol. 5, p. 240 (1894) (Persien. Types from Teheran, North Persia, in the Vienna Museum examined).
Parus major caspius Sarudny & Loudon, Ornith. Monatsber. Vol. 13, p. 109 (1905) («bewohnt jene verschiedenen Provinzen, die an das Kaspische Meer grenzen [Ghilan, Masanderan und Asterabad] und ebenso die Wälder des Tieflandes von Talysch »).
 Hab. North Persia; countries on the south shore of the Caspian Sea from Lenkoran to Asterabad.
11. **Parus major zayrossiensis** Sarudny & Loudon.
Parus major zayrossiensis Sarudny & Loudon, Ornith. Monatsber. Vol. 13, p. 108 (1905) («System des Sagroschgebirges, südwestliches Persien »).
 Hab. S. W. Persia : Zagrosh, Shiráz, Fars etc.
- 11a. **Parus major terræsanctæ** Hartert.
Parus major terræsanctæ Hartert, Vögel paläarkt. Fauna, Lief. 6, p. xxxii (1910) (Jerusalem).
 Hab. Palestine.
12. **Parus major intermedius** Sarudny.
Parus boharensis var. *intermedius* Zarudnoi, Bull. Soc. Nat. Moscou (n. s.), Vol. 3, p. 789 (1890) (Mountains of South-western Transcaspia : «Karguy-Sou, Firousé, Gujarmaou, Soumbar and Tchandyr »).
Parus transcaspus Zarudnoi, ibidem (n. s.), Vol. 7, p. 364 (1893) (new name for *P. boharensis* var. *intermedius*).
 Hab. Mountains of North-east (east of Asterabad) and Eastern Persia, S. W. Transcaspia and southern parts of Afghanistan and Baluchistan.
13. **Parus major turkestanicus** Sarudny & Loudon.
Parus boharensis turkestanicus Sarudny & Loudon, Ornith. Monatsber. Vol. 13, p. 109 (1905) («bewohnt das Dsungarei-, Semiratschja- und Syr-Darja Gebiet »).
 Hab. Turkestan (provinces of Syr-Darja and Semiretchje, Tian-shan), and Western Dsungaria (Dsharkent etc.).
14. **Parus major bokharensis** Lichtenstein.
Parus bokharensis Lichtenstein, in Eversmann's Reise nach Orenburg und Buchara, p. 131 (1823) (Bokhara).
Parus boharensis typicus Zarudnoi, Bull. Soc. Nat. Moscou (n. s.), Vol. 3, p. 789 (1890) (Plains of Tedshen, Murgab, Merw, Kara-ben etc.).
 Hab. Plains of Transcaspia (Tedshen, Merw, Murgab), Bokhara, the valley of the Amu-Darja.
15. **Parus major caschmirensis** Hartert.
Parus major caschmirensis Hartert, Vögel paläarkt. Fauna, Lief. 3, p. 345 (1905) (Gilgit).
 Hab. Mountains of Kashmir, N. W. India.
16. **Parus major planorum** Hartert.
Parus major planorum Hartert, Novit. Zool. Vol. 12, p. 499 (1905) (South Punjab).
 Hab. Plains of Northern India : Punjab, Rajputana, south probably to the Vindhya Range.
17. **Parus major mahrattarum** Hartert.
Parus major mahrattarum Hartert, Novit. Zool. Vol. 12, p. 499 (1905) (Ceylon).
 Hab. Indian Peninsula, from the Vindhya Range southwards, and Ceylon.

18. **Parus major cinereus** Vieillot.

Parus cinereus Vieillot, Nouv. Dict. Hist. Nat. Vol. 20, p. 316 (1818) (Batavia, Java).

Parus atriceps Horsfield, Trans. Linn. Soc. Lond. Vol. 13, p. 160 (1821) (Java).

Parus albigena Wilkes, Encycl. Lond. Vol. 18, p. 727 (1821) (based on Levaillant, Ois. d'Afr. Vol. 3, t. 139, fig. sup. [= f. 1] : S. Africa, errore!).

Parus nipalensis Hodgson, Ind. Review, Vol. 1, p. 31 (1837) (Nepal).

Parus cinereus (*P. caesius* Tickell MS.) Jerdon, Birds India, Vol. 2, p. 278 (1863) (India generally).

Fig. Temminck, Pl. Col. t. 287, f. 2.

Hab. Himalayas, from Simla to Bhutan, Assam, Western Burma, Malayan Peninsula, Greater and Lesser Sunda Islands, east to Flores and Alor.

19. **Parus major hainanus** Hartert.

Parus major hainanus Hartert, Novit. Zool. Vol. 12, p. 499 (1905) (Hainan).

Hab. Island of Hainan.

20. **Parus major sarawacensis** H. Slater.

Parus cinerascens (nec Vieillot 1818) H. Slater, The Ibis (5), Vol. 3, p. 122, pl. 4 (1885) (Bungal Hills, near Sarawak, N. Borneo).

Parus sarawacensis H. Slater, ibidem, p. 327 (1885) (nom. emend.).

Hab. Sarawak, North Borneo : Bungal Hills.

21. **Parus major minor** Temminck & Schlegel.

Parus minor Temminck & Schlegel, Fauna Japon. Aves, p. 70, t. 33 (1848) (« Japon »).

Parus major arlatus, Thayer & Bangs, Bull. Mus. Comp. Zool. Harvard Coll., Vol. 52, p. 140 (1909) (Ichang, Hupeh, China) 1).

Hab. South-east Siberia (Ussuri, Amoorland), North China (southwards to the valley of the Yangtsekiang and Shanghai), Manchouria, and North Japan (Yezo, Hondo, Kiu-siu).

22. **Parus major commixtus** Swinhoe.

Parus commixtus Swinhoe, The Ibis (new ser.), Vol. 4, p. 63 (1868) (Amoy, South China).

Hab. Southern China, west to Upper Burma and Eastern Tenasserim.

23. **Parus major tibetanus** Hartert.

Parus major tibetanus Hartert, Vög. palaarkt. Fauna, Lief. 3, p. 346 (1905) (Chaksam, Tsongpo-valley, Tibet).

Hab. Southern Tibet (Gyantse, Chaksam, Lhasa).

24. **Parus major okinawæ** Hartert.

Parus major okinawæ Hartert, Vög. palaarkt. Fauna, Lief. 3, p. 346 (1905) (Okinawa-shima, Loo-choo Islands).

Hab. Okinawa Island, northern group of the Loo-choo Islands.

25. **Parus nigriloris** Hellmayr. (Pl. 1, Fig. 7.)

Parus nigriloris Hellmayr, Ornith. Monatsber. Vol. 8, p. 139 (1900) (Ishigaki, southern Loo-choo Islands).

Parus stejnegeri Bangs, Bull. Mus. Comp. Zool. Harvard Coll. Vol. 36, p. 267 (1901) (Ishigaki).

Hab. Ishigaki Island, southern group of the Loo-choo Islands.

26. **Parus afer afer** Gmelin.

Parus afer Gmelin, Syst. Nat. Vol. 1, II, p. 1010 (1789) (based upon « Black-Breasted Titmouse », Latham, Gen. Syn. Birds Vol. 2, II, p. 539 : « ad caput bonæ spei »).

Parus fuscus Vieillot, Nouv. Dict. Hist. Nat. Vol. 20, p. 309 (1818) (based on Levaillant, Ois. d'Afr. Vol. 3, = pl. 139, f. 2 [inf.] : « dans les environs du Cap » 2).

Fig. Levaillant, Ois. d'Afr. Vol. 3, pl. 139, f. 2 (inf.).

Hab. South Africa : southern Cape Colony (Capetown, Deelfontein etc.).

27. **Parus afer cinerascens** Vieillot.

Parus cinerascens Vieillot, Nouv. Dict. Hist. Nat. Vol. 20, p. 316 (1818) (based on Levaillant, Ois. d'Afr. Vol. 3, pl. 138 : « dans les mimosas du Candeboo »).

1) I cannot find any constant difference between birds from Ussuri and Japan on one side, and those from Central China (Ichang, Shasi, Itu on the Yangtze; Ningpo near Shanghai) on the other.

2) Vieillot (loc. cit.) erroneously quotes pl. 134, f. 1, where *Anthoscopus m. minutus* is represented, but his description (les plumes « du dessus du corps et des ailes d'un brun terreux ») leaves no doubt that he intended to name the lower figure of plate 139.

Parus variegatus Wilkes, Encycl. Lond. Vol. 18, p. 726 (1821) (based on Levaillant, Ois. d'Afr. pl. 138; cfr. Cassin, Proc. Acad. Nat. Sc. Philad. Dec. 1867, p. 221).

Parus afer intermedius 1) (nec *P. boharensis* var. *intermedius* Sarudny 1890) Shelley, Birds Afr. Vol. 2, p. 241 (1900) (Potchefstroom, Transvaal).

Parus afer damarensis Reichenow, Ornith. Monatsber. Vol. 10, p. 77 (1902) (Damaraland).

Fig. Levaillant, Ois. d'Afr. Vol. 3, pl. 138.

Hab. South-western (Benguella, Damaraland) and South-eastern Africa (Oranje Colony, Transvaal; probably also in Lourenço Marques; Natal?).

28. ***Parus afer parvirostris* Shelley.**

Parus afer parvirostris Shelley, Birds Africa, Vol. 2, p. 241 (1900) (Salisbury, Mashonaland).

Hab. South Central Africa : Rhodesia (Salisbury, Ndola, Melssetter) and southern part of British Central Africa (Katanga on the lower Shiré River, south of Lake Nyasa).

29. ***Parus afer thruppi* Shelley.**

Parus thruppi Shelley, The Ibis (5), Vol. 3, p. 406, pl. 11, f. 2 (1885) (Plateau of northern Somaliland, south of Berbera).

Hab. Northern and Central Somaliland, southern limits not exactly known.

30. ***Parus afer barakæ* Jackson.**

Parus barakæ Jackson, The Ibis (7), Vol. 5, p. 639 (1899) (Njemps, British East Africa).

Hab. British East Africa (Njemps near Lake Baringo) and northern German East Africa (plains of Kilima Ndjaro : Taweta, Kahe, Taro).

31. ***Parus griseiventris* Reichenow.**

Parus griseiventris Reichenow, Journ. f. Ornith. Vol. 30, p. 210 (1882) (Kakoma).

Parus gilviventris (lapsu) Böhm, ibidem, Vol. 31, p. 207 (1883) (Kakoma).

Fig. Journ. f. Ornith. Vol. 34, 1886, pl. 2.

Hab. German East Africa : only known from Kakoma in southern Unjamwezi.

32. ***Parus niger niger* Vieillot.**

Parus niger Vieillot, Nouv. Dict. Hist. Nat. Vol. 20, p. 325 (1818) (based on Levaillant, Ois. d'Afr. Vol. 3, pl. 137 [♂ ♀] : « sur les bords des rivières Sondag, Swartekop et dans le pays des Caffres » i. e. South-eastern Africa).

Parus leucopterus Swainson, Birds West. Afr. Vol. 2, p. 42 (1837) (part. : new name for *P. niger* Vieillot with which the author erroneously unites the birds from « Senegal »).

Parus luctuosus Lichtenstein, Nomencl. Avium Mus. Berol. p. 36 (1854) (nom. nud.).

Parus xanthostomus Shelley, Bull. Brit. Ornith. Club, Vol. 1, p. 6 (1892) (« in terrâ Zambesianâ »; = juv.).

Parus fülleborni Reichenow, Ornith. Monatsber. Vol. 8, p. 5 (1900) (Undis, Nyasaland; = ♀).

Fig. Levaillant, Ois. d'Afr. Vol. 3, pl. 137 (♂ ♀); Shelley, Birds Afr. Vol. 2, pl. 10, f. 1 (juv.).

Hab. South Africa, northward as far as the Cunene, in the west, and Pangani River (Useguha), in the east 2).

33. ***Parus niger insignis* Cabanis.**

Parus (Pentheres) insignis Cabanis, Journ. f. Ornith. Vol. 28, p. 419 (1880) (Angola).

Hab. South-west and Central Africa : from Angola east to Nyasaland and to west shore of Lake Tanganyika.

34. ***Parus niger guineensis* Shelley.**

Parus guineensis Shelley, Birds Africa Vol. 2, p. 229 (1900) (West Africa).

Hab. Western Africa : from Senegal to the Niger.

35. ***Parus niger leucomelas* Rüppell.**

Parus leucomelas Rüppell, Neue Wirbelthiere, Vög. p. 100, pl. 37, f. 2 (1835) (Taranta Mountains, Temben, Abyssinia).

1) According to Prof. Neumann (in litt.) scarcely distinguishable from Damaraland specimens by its slightly darker grey back. If separable it would require a new name.

2) Very likely two races can be distinguished : one, the true *P. n. niger*, inhabiting South and S. E. Africa, and another undescribed in Damaraland. *P. xanthostomus* (type in Brit. Mus. examined) and *P. fülleborni* (vide Neumann in litt.) are certainly nothing but youngish females of *P. n. niger*.

Penthestes melanoleucus Württemberg, Naumannia, Vol. 7, p. 433 (1857) (nom. nud.).

Fig. Ruppell, Neue Wirbelthiere, Vög. pl. 37, f. 2.

Hab. North-east Africa : Abyssinia and Shoa.

N. B. The records of this species from the Victoria Nyansa require confirmation. The birds from this district very likely represent a distinct form.

36. **Parus niger lacuum** Neumann.

Parus niger lacuum Neumann, Journ. f. Ornith. Vol. 54, p. 260 (1906) (Suksuki River, South Ethiopia).

Hab. North-eastern Africa : Lake-district south of the Hawash and Omo-region.

37. **Parus albiventris** Shelley.

Parus albiventris Shelley, The Ibis (4), Vol. 5, p. 116 (1881) (Uzogo).

Fig. Shelley, Birds Africa, Vol. 2, pl. 10, f. 2.

Hab. Southern Brit. East Africa (Elgeju, Mau) and German East Africa : from the Victoria Nyanza south to the Rovuma River.

N. B. Perhaps merely a geographic form of the *P. niger*-group, but exact limits of range as compared with that of *P. n. niger* not yet sufficiently established.

38. **Parus leuconotus** Guérin.

Parus leuconotus Guérin-Ménéville, Rev. Zool. Vol. 6, p. 162 (1843) (« Abyssinie »).

Parus dorsatus Rüppell, Syst. Uebers. Vög. N.-O. Afr. p. 42, pl. 18 (1845) (Abyssinia).

Fig. Ferrest & Galinier, Voy. Abyssinie, Vol. 3, pl. 9, f. 1.

Hab. North-eastern Africa : Highlands of Abyssinia and Shoa, southward as far as Djamdjam-country.

39. **Parus funereus** (J. & E. Verreaux). (Pl. 1, Fig. 3.)

Melanoparus funereus J. & E. Verreaux, Journ. f. Ornith. Vol. 3, p. 104 (1885) (Gaboon).

? *Parus nigricinereus* Jackson, Bull. Brit. Ornith. Club, Vol. 8, p. 22 (1898) (Nandi, Equatorial Africa).

Fig. The Ibis (7), Vol. 5, 1899, pl. 13 (*P. nigricinereus*).

Hab. Western Africa (Gold coast, Camaroons, Gaboon); Equatorial Africa (Nandi, Ruwenzori).

N. B. This little-known species may, after all, be divisible into two races, in which case the name *P. nigricinereus* would have to be retained for the eastern form.

40. **Parus rufiventris rufiventris** Barboza du Bocage.

Parus rufiventris Barboza du Bocage, Journ. Acad. Lisboa, Vol. 6, p. 161 (1877) (Caconda, Benguella).

Fig. Barboza du Bocage, Ornith. Angola, pl. 10, f. 1.

Hab. S. W. Africa : Angola, Benguella, Congo-basin (Stanley-pool, Léopoldville etc.).

41. **Parus rufiventris masukuensis** Shelley.

Parus masukuensis Shelley, Birds Africa, Vol. 2, p. 238 (1900) (Nyika Plateau and Masuku Range).

Hab. British Central Africa : Masuku Range and Nyika Plateau, west of Lake Nyasa; N. E. Rhodesia : Ulungu Mt., West Loangwa district.

42. **Parus rufiventris pallidiventris** Reichenow.

Parus pallidiventris Reichenow, Journ. f. Ornith. Vol. 33, p. 217 (1885) (Kakoma).

Fig. Reichenow, Vög. Afr. Vol. 3, pl. [18].

Hab. German East Africa : Kakoma in southern Unjamwezi.

43. **Parus rufiventris rovumæ** Shelley.

Parus rovumæ Shelley, Bull. Brit. Ornith. Club, Vol. 1, p. 6 (1892) (« prope flumen Rovuma dictum in Africa orientale »).

Hab. Coast districts of Eastern Africa, from Useguha southward to the lower Zambezi and Mashonaland (Salisbury).

44. **Parus fringillinus** Fischer & Reichenow.

Parus fringillinus Fischer & Reichenow, Journ. f. Ornith. Vol. 32, p. 56 (1884) (foot of Meru Mountain).

Fig. Zeitschr. ges. Ornith. Vol. 1, 1884, pl. 19.

Hab. German East Africa : Masailand (plains on the foot of the Meru Mountain).

45. **Parus fasciiventer fasciiventer** Reichenow.

Parus fasciiventer Reichenow, Ornith. Monatsber. Vol. 1, p. 31 (1893) (Ruwenzori).

Fig. Reichenow, Vög. Afr. Vol. 3, pl. [18].

Hab. Central Africa : Ruwenzori Range.

46. *Parus fasciiventer tanganyicæ* Reichenow.

Parus fasciiventer tanganyicæ Reichenow, Ornith. Monatsber. Vol. 17, p. 42 (1909) (Forests west of Lake Tanganyika).

Hab. Central Africa : Forests west of Lake Tanganyika.

47. *Parus xanthogenys xanthogenys* Vigors.

Parus xanthogenys Vigors, Proc. Comm. Zool. Soc. Vol. 1, p. 23 (1831) (Himalayan Mountains).

Fig. Gould, Birds Asia, Vol. 2, pl. 52; Contrib. Ornith. 1852, t. [87], f. 1.

Hab. Western Himalaya, from Murree to Eastern Nepal, at elevations of from 4000 to 7000 feet.

48. *Parus xanthogenys aplonotus* Blyth 1).

Parus aplonotus Blyth, Journ. Asiat. Soc. Bengal, Vol. 16, 1, p. 444 (1847) (« Mountains of Central India »).

Parus ferdoni Blyth, ibidem, Vol. 25, p. 445 (1856) (Bombay).

Fig. Gould, Birds Asia, Vol. 2, pl. 54.

Hab. The peninsula of India, south of a line drawn from Abu to Pareshnath in Behar, up to elevations of 6000 feet.

49. *Parus spilonotus* Blyth.

Parus spilonotus Blyth, Cat. Birds Mus. Asiat. Soc. p. 103 (1849) (name based on *P. xanthogenys* [nec Vigors] Blyth, Journ. Asiat. Soc. Bengal, Vol. 16, 1, 1847, p. 445 : Himalayas).

Parus subviridis (Tickell MS.) Blyth, Journ. Asiat. Soc. Bengal, Vol. 24, p. 267 (1855) (« mountainous interior of Tenasserim provinces »).

Fig. Gould, Birds Asia, Vol. 2, pl. 53; Contrib. Ornith. 1852, pl. [87], f. 2.

Hab. Eastern Himalayas (Nepal, Sikkim), Assam, Khasia Hills, Manipur, Burma, Tenasserim, at elevations of from 3000 to 6000 feet 2).

50. *Parus holsti* Seebohm.

Parus holsti Seebohm, Bull. Brit. Ornith. Club, Vol. 4, p. 7 (1894) (Interior of Formosa).

Fig. The Ibis (7), Vol. 1, 1897, p. 211, pl. 6.

Hab. Mountains of Formosa.

51. *Parus rex* A. David. (Pl. 1, Fig. 2.)

Parus (Macholophus) rex A. David, Ann. Sc. Nat. (5), Vol. 19, art. no. 9, p. 4 (1874) (« Koatén, Fokien occidental »).

Fig. David & Oustalet, Ois. Chine, p. 286, pl. 36.

Hab. Mountains of South China (West Fohkien) and Tonkin.

52. *Parus varius varius* Temminck & Schlegel 3).

Parus varius Temminck & Schlegel, Fauna Japon. Aves, p. 71, pl. 35 (1848) (« Japon »).

Parus sieboldi Seebohm, Birds Japanese Emp. p. 85 (1890) (new name for *P. varius*).

Parus rubidus Blakiston, The Ibis, Vol. 4, p. 321 (1862) (err. typ.).

Fig. Fauna Japon. Aves, pl. 35.

Hab. Japan (Hondo, Yezo) and Corea.

53. *Parus varius castaneoventris* Gould.

Parus castaneoventris Gould, Proc. Zool. Soc. Lond. 1862, p. 280 (1863) (Formosa).

Parus cinnamomeiventris Gray, Handlist Birds, Vol. 1, p. 231 (1869) (err. typ.).

Fig. Gould, Birds Asia, Vol. 2, pl. 49.

Hab. Formosa.

1) A doubtful species is :

Parus griffithii Blyth, Journ. Asiat. Soc. Bengal, Vol. 16, 1, p. 445 (1847) (« between Assam and Ava »).

This supposed species has been based on a drawing of a bird obtained by Dr. Griffith, between Assam and Ava. It is said to differ from *P. x. xanthogenys* and *P. x. aplonotus* by lacking the crest and by having the upper parts black (instead of olive) and the back spotted with yellow.

2) Having never seen any Tenasserim specimens I cannot vouch for *P. subviridis* being really a synonym of *P. spilonotus*. Blyth's original description certainly suggests a bird different from the latter, unless it be taken from a young or immature example.

3) A nearly allied form appears to inhabit Okinawa-shima, central group of the Loo-choo Islands (see Stejneger, Proc. U. S. Nat. Mus. Vol. 9, 1886, p. 650). The single female is stated to be smaller than *P. v. varius* (wing 67 instead of 76-86 mm.) and somewhat different in coloration : chestnut patch on upper back smaller, flanks paler etc. In size it is thus seen to be intermediate between *P. v. varius* and *P. v. castaneoventris*.

54. *Parus varius owstoni* Ijima. (Pl. 2, Fig. 8.)

Parus Owstoni Ijima, Dobutsugaku Zasshi, Yokohama, no. 62 (1893) (Myiakeshima [Seven Islands, Idzu, Japan]); Ornith. Monatsber. Vol. 5, 1897, pp. 143-144 (reprint).

Hab. Japan, Seven Islands : Myiake and Iachijio.

55. *Parus caeruleus caeruleus* Linnæus.

Parus caeruleus Linnæus, Syst. Nat., ed. 10, p. 190 (1758) (« Habitat in Europa »; we fix Sweden as type locality).

Parus erectus P. L. S. Müller, Natursystem, Suppl. p. 178 (1776) (ex Buffon, Europa).

Parus coerulescens Brehm, Handb. Naturg. Deutschl. p. 463 (1831) (« sie bewohnt Mitteldeutschland »).

Parus caeruleus pallidus (nec *P. pallidus* Brehm 1836) H. Grote, Ornith. Monatsber. Vol. 10, p. 181 (1902) (Lessnøje near St.-Petersbourg; type examined).

Parus caeruleus languidus H. Grote, Journ. f. Ornith. Vol. 52, p. 307 (1904) (nom. emend. for *P. c. pallidus* Grote).

Parus caeruleus calamensis Parrot, Verhandl. Ornith. Ges. Bayern, Vol. 7, p. 28 (1908) (Calamata, Greece).

Fig. Naumann, Vög. Deutschl. Vol. 4, pl. 95, ff. 1, 2.

Hab. North-, Central- and South Europe : in Scandinavia northwards to 64° latitude, in the Russian Empire only in the Baltic Provinces (St. Petersburg, Livland, Esthland etc.), Poland and in the southern gouvernements down to the northern slopes of the Caucasus. Common in Austria, Hungary, on the Balkan Peninsula, in Italy, Germany, Switzerland and France. Doubtfully recorded from Asia Minor and Transcaucasia. Specimens from Spain and Portugal are probably different.

56. *Parus caeruleus obscurus* Prazák.

[*Parus caeruleus*] *obscurus* Prazák, Ornith. Jahrb. Vol. 5, p. 246 (1894) (England).

Hab. Great Britain and Ireland.

57. *Parus caeruleus ogliastræ* Hartert.

Parus caeruleus ogliastræ Hartert, Vög. paläarkt. Fauna, Lief. 3, p. 349 (1905) (Lanusei, Ogliastro-district, Eastern Sardinia).

Hab. Sardinia and Corsica.

58. *Parus caeruleus orientalis* (Sarudny & Loudon).

Cyanistes caeruleus orientalis Sarudny & Loudon, Ornith. Monatsber. Vol. 13, p. 105 (1905) (Eastern Governments of European Russia).

Hab. East Russia : Governments of Orenburg, Ufa, Samara, Kasan, Simbirsk.

59. *Parus caeruleus satunini* (Sarudny).

Cyanistes caeruleus satunini Sarudny, Ornith. Monatsber. Vol. 16, p. 6 (1908) (Lenkoran, Kumbashinsk (Talysh) etc., N. Persia).

Hab. Northern Persia : vicinity of Lenkoran and Kumbashinsk (Talysh), Kaswin and Transcaspien Mountains.

60. *Parus caeruleus raddei* Sarudny.

Cyanistes caeruleus raddei Sarudny, Ornith. Monatsber. Vol. 16, p. 5 (1908) (« in den persischen Provinzen Astera-bad, Masanderan und Ghilan »).

Hab. North Persia : Elburz Mountains, provinces of Asterabad, Mazanderan and Ghilan.

61. *Parus caeruleus persicus* Blanford.

Parus (*Cyanistes*) *persicus* Blanford, The Ibis (3), Vol. 3, p. 89 (1873) (« in quercetis prope urbem Shiraz »).

Fig. Blanford, East. Persia, Vol. 2, Zool. pl. 16, f. 2.

Hab. Oak-wood- of S. W. Persia (Shiraz, Zagrosh, Fars etc.).

62. *Parus caeruleus ultramarinus* Bonaparte.

Parus ultramarinus Bonaparte, Rev. Zool. Vol. 4, p. 146 (1841) (« habite la régence de Tunis, ... et notamment à Sfax »).

Parus caeruleanus Malherbe, Bull. Soc. Moselle, Vol. 3, p. 58 (1845) (Bône, Algeria).

Fig. Journ. f. Ornith. Vol. 38, 1890, pl. 4, f. 1.

Hab. Tunis, Algeria, Morocco.

63. *Parus caeruleus degener* Hartert.

Parus caeruleus degener Hartert, Novit. Zool. Vol. 8, pp. 309, 322 (1901) (Fuerteventura and Lanzarote).

Cyanistes ultramarinus insularis (nec *P. ater insularis* Hellmayr) Bianchi, Ann. Mus. Zool. St-Petersb. Vol. 7, p. 252 (1902) (ex Meade-Waldo, The Ibis (6), Vol. 5, 1893, p. 190 : Fuerteventura and Lanzarote).

Hab. Eastern Canary Islands : Fuerteventura, Lanzarote.

64. ***Parus cæruleus teneriffæ* Lesson.**

Parus Teneriffæ Lesson, Traité d'Ornith. p. 456 (1831) (Ténériffe).

Parus violaceus Bolle, Journ. f. Ornith. Vol. 2, p. 455 (1854) (Canary Islands).

Fig. Dresser, Birds Eur. Vol. 9, pl. 660, fig. inf.; Journ. f. Ornith. Vol. 38, 1890, pl. 4, f. 2.

Hab. Canary Islands : Teneriffe, Gran Canaria, Gomera.

65. ***Parus cæruleus ombriosus* Meade-Waldo.**

Parus ombriosus Meade-Waldo, Ann. Mag. Nat. Hist. (6), Vol. 5, p. 103 (1890) (Hiero).

Fig. Dresser, Birds Eur. Vol. 9, pl. 661; The Ibis (6), Vol. 2, 1890, pl. 13.

Hab. Canary Island : Hierro.

66. ***Parus cæruleus palmensis* Meade-Waldo.**

Parus palmensis Meade-Waldo, Ann. Mag. Nat. Hist. (6), Vol. 3, p. 490 (1889) (Palma).

Fig. Dresser, Birds Eur. Vol. 9, pl. 660, fig. sup.; The Ibis (6), Vol. 1, 1889, pl. 16.

Hab. Canary Island : Palma.

67. ***Parus pleskii* Cabanis.**

Parus (Cyanistes) Pleskii Cabanis, Journ. f. Ornith. Vol. 25, p. 213, pl. 3, f. 1 (1877) (St. Petersburg).

Parus pleskei var. *pallesceus* Hellmayr, Journ. f. Ornith. Vol. 49, p. 175 (1901) (North Russia).

Fig. Dresser, Birds Eur. Vol. 9, pl. 659; new edition of « Naumann. », Vol. 2, pl. 18, f. 8; Menzbier, Ornith. Geogr. Eur. Ross. Vol. 1, 1882, pl. 1 (*pallesceus*).

Hab. Only known breeding place : Motiwilowka, Gouv. Kiew, South Russia. Beyond breeding time specimens have been taken near St. Petersburg, Moscow and Orenburg.

Obs. This form is still imperfectly known. Hartert considers it to be a geographic race of *P. cæruleus*, but this opinion is not supported by its having been found breeding within the area occupied by *C. c. cæruleus*. The examples named *pallesceus* may be hybrids between *P. pleskei* and *P. cyanus cyanus*.

68. ***Parus cyanus cyanus* Pallas. (Pl. 1, Fig. 11.)**

Parus cyanus Pallas, Nov. Comment. Acad. Petrop. Vol. 14, 1, p. 498, pl. 13, f. 1 (1770) («... a Volgensibus regionibus datur avicula, cuius patria, qua latissime ad orientem patet Sibiria extenditur, ubi ab accuratissimo quondam Messerschmidio passim observata et pro *Pavo cæruleo* descripta fuit ». Terra typica therefore Volga, S. Russia).

Parus saebyensis Sparrman, Mus. Carlson. Vol. 1, t. 25 (1876) (« Ad prædium Carlsonianum Saeby in Sudermannia detecta est »).

Parus Knjæscik Gmelin, Syst. Nat. Vol. 1, 11, p. 1013 (1789) (« in Sibiria quercetis »; ex Lepechin, iter, Vol. 1, p. 181, 1770).

Parus cyanus and *Parus elegans* Brehm, Vogelfang, p. 242 (1855) (« beide kommen aus Asien sehr selten nach Europa, bis Deutschland »).

Fig. Dresser, Birds Eur. Vol. 3, pl. 114.

Hab. Eastern Russia and West Siberia, exact eastern limits yet to be determined, though it is certainly this form which occurs in the Governments Omsk and Tomsk.

69. ***Parus cyanus tianschanicus* (Menzbier). (Pl. 1, Fig. 12.)**

Cyanistes cyanus var. *tian-schanicus* Menzbier, Bull. Soc. Zool. Fr. Vol. 9, p. 276 (1884) (« dans les montagnes qui bordent les déserts de l'Asie centrale au nord-ouest et à l'ouest »).

Hab. Mountains of Central Asia (Tian-shan, Altai, Alatau, Tarbagatai, Kwen-lun etc.) and Eastern Siberia to Amoorland.

70. ***Parus cyanus flavipectus* Severtzow.**

Parus flavipectus Severtzow, Izv. Obshs. Moskov. Vol. 8, no. 2, p. 133, pl. 8, f. 7 (1873) (Turkestan); Olphe-Galliard, Zeitschr. ges. Ornith. Vol. 4, 1887, p. 95 (transl.).

Fig. Menzbier, Ornith. Turkestan, pl. 10 (♂ ♀, juv.).

Hab. East Turkestan : valley of the Ferghana and Naryn Rivers.

71. ***Parus cyanus berezowskii* (Pleske).**

Cyanistes berezowskii Pleske, Bull. Brit. Ornith. Club, Vol. 3, p. 13 (1893) (Upper Chuanche, China).

Fig. Aves Przewalsk. t. 7, ff. 3, 4.

Hab. Mountain forests of the Upper Chuanche, West China, up to 8000 feet.

72. **Parus modestus modestus** (Burton).

Sylviparus modestus Burton, Proc. Zool. Soc. Lond. Vol. 3, 1835, p. 154 (1836) («apud montes Himalayensis»).

Parus (?) *minutus* Jerdon, Madras Journ. Vol. 11, p. 8 (1840) («edge of northern Ghats»).

Parus seriophrys Blyth, Journ. Asiat. Soc. Bengal, Vol. 13, II, p. 942 (1844) (ex Hodgson MS. : Nepal).

Hab. Himalayas, from Kashmir to Bhutan, and mountains of Southern (Szechuen, Fohkien) and Central (Tsin-ling Range) China. Jerdon records it from Ajanta, Khandesh district. I have not seen specimens from this locality.

73. **Parus modestus saturator** (Rippon).

Sylviparus saturator Rippon, Bull. Brit. Ornith. Club, Vol. 16, p. 87 (1906) (Mount Victoria, southern Chin Hills, Burma).

Hab. Burma : Mount Victoria in the southern Chin Hills. Godwin-Austen's record of *S. modestus* from the eastern Barail Range (Japvo, Khunho), south of the Brahmaputra River, probably also refers to the present form.

74. **Parus cristatus cristatus** Linnæus

Parus cristatus Linnæus, Syst. Nat., ed. 10, p. 189 (1758) («Habitat in Europa»; we fix Sweden as type locality : ex Fauna Suec. no. 239).

Fig. New edition of Naumann's Vög. Mitteleur. Vol. 2, pl. 19, f. 1.

Hab. Scandinavia, Northern and Western Russia (Baltic Provinces, Poland), East Prussia.

75. **Parus cristatus mitratus** Brehm.

Parus mitratus Brehm, Handb. Naturg. Vög. Deutschl. p. 467 (1831) («bewohnt die deutschen Schwarzwälder»).

Parus rufescens (nec Townsend 1837) Brehm, Vogelfang, p. 243 (1855) («Mitteld Deutschland»).

Lophophanes cristatus brunneus Prázák, Journ. f. Ornith. Vol. 45, p. 347 (1897) (new name for *P. rufescens* Brehm : «West Europe»).

Fig. New edition of Naumann's Vög. Mitteleur. Vol. 2, pl. 19, f. 2, pl. 20, f. 1.

Hab. Central and western parts of Germany, Jutland, Holland, France, Switzerland, Austria, Hungary, Spain, Balkan Peninsula.

76. **Parus cristatus scoticus** (Prázák).

Lophophanes cristatus scoticus Prázák, Journ. f. Ornith. Vol. 45, p. 347 (1897) (Scotland).

Hab. Very locally distributed in Scotland, breeding particularly in the Strathspey.

Obs. This is a well-marked form, easily recognizable by its much darker, brownish olive back and smaller size (wing 60-63 mm.).

77. **Parus dichrous dichrous** Hodgson.

Parus dichrous Hodgson, Journ. Asiat. Soc. Bengal, Vol. 13, II, p. 943 (1844) (Nepal).

Fig. Gould, Birds Asia, Vol. 2, pl. 58.

Hab. Himalaya from Dharmasala to Sikkim, at elevations of from 7500 to 12,000 feet.

78. **Parus dichrous dichroides** (Przewalski).

Lophophanes dichroides Przewalski, in Rowley's Ornith. Miscell. Vol. 2, p. 189 (1877) (Kansu, N. W. China).

Fig. Aves Przewalsk. pl. 9, f. 2.

Hab. Western and N. W. China (Kansu, Mupin, Tetung Mountains), in coniferous forests of the subalpine region.

79. **Parus wollweberi wollweberi** (Bonaparte).

Lophophanes wollweberi Bonaparte, Compt. Rend. Acad. Sc. Paris, Vol. 31, p. 478 (1850) (Zacatecas, Mexico).

Lophophanes galeatus (Lichtenstein MS.) Cabanis, Mus. Heinean. Vol. 1, p. 90, footnote (1850) (Mexico).

Hab. Highlands of Mexico, in the States of Oaxaca, Puebla, Vera Cruz (Orizaba) and northwards to Zacatecas.

80. **Parus wollweberi annexus** Cassin.

Parus annexus Cassin, Proc. Acad. Nat. Sc. Philad. Vol. 5, p. 103, pl. 1 (1850) («Rio Grande, Texas», locality erroneous, cfr. Ridgway, Birds North- and Middle America, Vol. 3, 1904, p. 394, footnote).

Hab. Mountains of Arizona, New Mexico, Sonora and Chihuahua.

81. **Parus bicolor** Linnæus 1).

Parus bicolor Linnæus, Syst. Nat., ed. 12, Vol. 1, p. 340 (1766) (ex Catesby, Crested Titmouse. Nat. Hist. Carolina, Vol. 1, pl. 57 : Carolina).

Lophophanes missouriensis Baird, Rep. Pacific R. R. Surv. Vol. 9, p. 384, in text (1858) (Fort Leavenworth, Kansas).

Parus (*Lophophanes*) *bicolor floridanus* Bangs, Auk, Vol. 15, p. 181 (1898) (Clear Water, Hillsboro Co., Florida).

Fig. Audubon, Ornith. Biogr. Vol. 1, 1831, pl. 39.

Hab. Eastern United States, north to southern Pennsylvania and New Jersey, Central Ohio, northern Indiana, northern Illinois, southern Iowa, and N. E. Nebraska; west to eastern portion of the Great Plains (Nebraska to Texas); south to Gulf coast, including southern Florida as well as eastern and central parts of Texas.

82. **Parus atricristatus atricristatus** Cassin 1).

Parus atricristatus Cassin, Proc. Acad. Nat. Sc. Philad. Vol. 5, p. 103, pl. 2 (1850) (Rio Grande, Texas).

Hab. Rio Grande Valley, and Mexican States of Coahuila, Nuevo Leon, Tamaulipas, San Luiz Potosi and Vera Cruz.

83. **Parus atricristatus sennetti** (Ridgway).

Bacolophus atricristatus sennetti Ridgway, Birds North- and Middle America [= Bull. U. S. Nat. Mus. no. 50, Pt. 3], Vol. 3, p. 386 (1904) (Leon Springs, Bexar Co., Texas).

Fig. Cassin, Illustr. Birds Calif. 1853, pl. 3.

Hab. Central Texas, exact southern limits not yet known.

84. **Parus inornatus inornatus** Gambel.

Parus inornatus Gambel, Proc. Acad. Nat. Sc. Philad. Vol. 2, p. 265 (1845) (near Monterey, California).

Bacolophus inornatus restrictus Ridgway, Proc. Biol. Soc. Wash. Vol. 16, p. 109 (1903) (Oakland, California); = *B. i. inornatus*; J. Grinnell, Auk, Vol. 23, 1906, pp. 186-188.

Fig. Journ. Acad. Nat. Sc. Philad. (2), Vol. 1, 1847, pl. 8, f. 2.

Hab. California : north of San Bernardino Mountains and Colorado Desert; north to Mendocino and Siskiyou; south to Santa Barbara, Ventura and Kern; east to western slope of Sierra Nevada.

85. **Parus inornatus murinus** (Ridgway).

Bacolophus inornatus murinus Ridgway, Proc. Biol. Soc. Wash. Vol. 16, p. 109 (1903) (Nachoguero Valley, Lower California).

Hab. Southern California (Los Angeles, San Bernardino, San Diego Counties) and Northern Lower California (Nachoguero Valley, San Pedro Martir Mountains etc.).

86. **Parus inornatus ridgwayi** Richmond.

Lophophanes inornatus griseus (nec *Parus griseus* Gmelin 1788) Ridgway, Proc. U. S. Nat. Mus. Vol. 5, p. 344 (1882) (Iron City, south. Utah).

Parus inornatus ridgwayi Richmond, Proc. Biol. Soc. Wash. Vol. 15, p. 155 (1902) (new name for *L. i. griseus* Ridgway).

Hab. Mountains of the arid interior Districts of western United States; north to Nevada, Utah and Colorado; east to western Texas (Guadalupe Mts.); west to eastern base of Sierra Nevada and S. E. California; south to Mexican boundary line in New Mexico and Arizona.

87. **Parus inornatus cineraceus** (Ridgway).

Lophophanes inornatus cineraceus Ridgway, Proc. U. S. Nat. Mus. Vol. 6, p. 154 (1883) (Laguna, Lower California).

Hab. Cape St. Lucas District of Lower California (Sierra de la Laguna, Victoria Mountains).

88. **Parus rubidiventris** Blyth.

Parus rubidiventris Blyth, Journ. Asiat. Soc. Bengal, Vol. 16, 1, p. 445 (1847) («Nepal and Sikkim»).

Fig. Gould, Birds Asia, Vol. 2, pl. 59.

Hab. Nepal.

Obs. This is a very imperfectly known form and may perhaps turn out to be a geographic race of *P. rufonuchalis* or even an immature stage of *P. r. beavani*. It differs from the latter in having the breast and abdomen ferruginous, sometimes mixed with greyish, especially on the flanks. Besides, the head and throat are duller, more of a brownish black.

1) Hybrids between *P. bicolor* and *P. a. atricristatus* have been described under the names : *Parus atricristatus castaneifrons* Sennett (Auk, Vol. 4, 1887, p. 28 : Bee Co., Texas) and *Parus bicolor texensis* Sennett (loc. cit. p. 29 : Bee Co., Texas). The former agrees with *P. a. atricristatus* in having the crown and crest black, but the frontal band is chestnut instead of whitish, while the other form has the crown and crest grey like *P. bicolor*, from which it differs by the forehead being rusty or chestnut instead of black. See Ridgway, Birds North- and Middle America, Vol. 3, 1904, p. 386; Allen, Bull. Amer. Mus. New York, Vol. 23, 1907, pp. 467-481.

89. **Parus rufonuchalis rufonuchalis** Blyth.

Parus rufonuchalis Blyth, Journ. Asiatic Soc. Bengal, Vol. 18, II, p. 810 (1849) («Range beyond Simla, near the snow-line »).

Fig. Gould, Birds Asia, Vol. 2, pl. 60.

Hab. Turkestan, and Himalayas from Gilgit to Ghurwal, in the breeding season at elevations of from 7000 to 12,000 feet.

90. **Parus rufonuchalis beavani** (Jerdon).

Lophophanes Beavani (Blyth MS.) Jerdon, Birds of India, Vol. 2, p. 275 (1863) (Mount Tonglo, Sikkim, at elevations of 10,000 feet).

Parus Atkinsoni Jerdon, ibidem, p. 276 (1863) («interior of Sikkim, at a considerable elevation »).

Hab. Eastern Himalayas (Nepal, Sikkim) and Western China 1) (Tsinling, South Shen-si, Kansu).

91. **Parus rufonuchalis pœcilopsis** (Sharpe) 2).

Lophophanes pœcilopsis Sharpe, Bull. Brit. Ornith. Club, Vol. 13, p. 11 (1902) (Chü-tung, W. Yunnan).

Hab. S. W. China : W. Yunnan).

92. **Parus melanolophus** Vigors.

Parus melanolophus Vigors, Proc. Comm. Zool. Soc. Lond. Vol. 1, p. 23 (1831) (Himalaya).

Fig. Gould, Birds Asia, Vol. 2, pl. 61.

Hab. Parts of Afghanistan, and western Himalayas (from Kumaon to Gilgit and Murree), at elevations of from 6000 to 12,000 feet.

93. **Parus ater britannicus** Sharpe & Dresser.

Parus britannicus Sharpe & Dresser, Ann. Mag. Nat. Hist. (4), Vol. 8, p. 437 (1871) (England).

Fig. Mem. Proc. Manchester Lit. Philos. Soc. Vol. 50, Pt. 3, no. 13, pl., f. 2.

Hab. England, Scotland.

93a. **Parus ater hibernicus** Ogilvie-Grant.

Parus hibernicus Ogilvie-Grant, Bull. Brit. Ornith. Club, Vol. 27, p. 37 (1910) (Ireland).

Fig. The Ibis, 1911, pp. 548-552, pl. 10.

Hab. Ireland.

94. **Parus ater vieiræ** Nicholson.

Parus vieiræ Nicholson, Mem. Proc. Manchester Lit. Philos. Soc. Vol. 50, Pt. 3, no. 13, p. 16, pl., f. 1 (1906) (Coimbra, Portugal).

Hab. Portugal, probably also in Spain.

95. **Parus ater atlas** Meade-Waldo.

Parus atlas Meade-Waldo, Bull. Brit. Ornith. Club, Vol. 12, p. 27 (1901) (Atlas Mountains, Morocco).

Fig. The Ibis, 1903, pl. 6.

Hab. Morocco : Atlas Mountains, at elevations of 6000 feet and more.

96. **Parus ater ledouci** Malherbe. (Pl. 1, Fig. 5.)

Parus ledouci Malherbe, Bull. Soc. Moselle, Vol. 3, p. 57 (1845) (Algeria).

Fig. The Ibis, 1871, pl. 3; Dresser, Birds Europe, Vol. 3, pl. 107.

Hab. North Algeria and North Tunisia.

97. **Parus ater sardus** Kleinschmidt.

Parus sardus Kleinschmidt, Ornith. Monatsber. Vol. 11, p. 186 (1903) (Sardinia).

Hab. Sardinia and Corsica.

98. **Parus ater ater** Linnæus.

Parus ater Linnæus, Syst. Nat., ed. 10, p. 190 (1758) («Habitat in Europa »; we fix Sweden as type locality).

Parus carbonarius Pallas, Zoogr. Rosso-Asiat. Vol. 1, p. 556 (1827) (new name for *P. ater* of Linnæus).

1) I have not seen specimens from any Chinese locality.

2) Unknown to the author.

Parus abietum Brehm, Handb. Naturg. Vög. Deutschl. p. 466 (1831) (« bewohnt die gebirgigen deutschen Schwarzwälder »).

Parus ater schwederi Loudon & Tschusi, Ornith. Jahrb. Vol. 16, p. 140 (1905) (Livland).

Hab. Europe, from 64° n. lat. south to Italy, the Balcan States, Asia Minor, and east to West and Central Siberia.

Obs. As a rule, specimens from Scandinavia, East Prussia and Russia (Livland) are purer bluish grey on the back and have the flanks rather pale. If the form from Central- and S. E. Europe should prove to be separable the name *P. a. abietum* would become available for it.

99. ***Parus ater amurensis*** (Buturlin).

Periparus ater amurensis Buturlin, Ornith. Monatsber. Vol. 15, p. 80 (1907) (Amoor, Ussuri, Sakhalin etc.).

Hab. Eastern Siberia : Amoorland, Ussuri, Sakhalin and the shores of the Okhotsk Sea.

100. ***Parus ater insularis*** Hellmayr.

Parus ater insularis Hellmayr, Ornith. Jahrb. Vol. 13, p. 36 (1902) (Japan, type from Suruga, Hondo).

Hab. Japan (Yezo, Hondo).

101. ***Parus ater pekinensis*** A. David.

Parus pekinensis A. David, The Ibis (new series), Vol. 6, p. 155 (1870) (Pekin, China).

Fig. Nouv. Arch. Mus. Paris, Vol. 8, 1872, Bull. pl. 5, f. 1; David & Oustalet, Ois. Chine, pl. 34.

Hab. China (from Pekin to Fohkien), Manchooria, Corea (Chemulpo!).

102. ***Parus ater rufipectus*** Severtzow.

Parus ater var. *rufipectus (asiatica)* Severtzow, Izv. Obshch. Moskov. Vol. 8, no. 2, p. 134 (1873) (Turkestan; Russian!); Dresser, The Ibis, 1876, p. 93 (transl.).

Parus piceae Severtzow, Stray Feath. Vol. 3, p. 423 (1875) (Turkestan).

Fig. Aves Przewalsk. pl. 9, f. 1.

Hab. Turkestan : Tian-shan Mountains, at elevations of from 8000 to 10,000 feet.

103. ***Parus ater æmodius*** Hodgson.

Parus æmodius Hodgson, Journ. Asiat. Soc. Bengal, Vol. 13, II, p. 943 (1844) (Nepal).

Lophophanes Humei W. E. Brooks, ibidem, Vol. 42, II, p. 57 (1873) (Sikkim).

Hab. Eastern Himalayas (Sikkim, Nepal), eastwards into Western China (Kansu, Shensi).

104. ***Parus ater phæonotus*** Blanford.

Parus phæonotus Blanford, The Ibis (3), Vol. 3, p. 88 (1873) (« in quercetis haud procul ab urbe persica Shiraz »).

Fig. Blanford, Eastern Persia, Vol. 2, Zool. pl. 16, f. 1.

Hab. Oak-woods of Persia (Shiraz etc.), and southern Transcaspia (Ashabad, Shirwan etc.).

105. ***Parus ater michalowskii*** Bogdanow.

Parus Michalowskii Bogdanow, Trudui Kazan. Univ. Vol. 8, IV, p. 87 (1879) (Suram Pass and Kirshaweli in Western Caucasus; Russian!); Schalow, Journ. f. Ornith. 1880, p. 268 (transl.).

Hab. Southern Caucasus (Kura valley, from Suram and Sekarsk to Kedabeg, Tiflis and Lenkoran).

Obs. One specimen from the Laba valley (Mt. Kuba), North Caucasus, differs by having the back much less brownish, greyish olive, and the brownish wash on the flanks paler and more restricted. In coloration, it is practically identical with *P. a. derjugini*, but has a much shorter, stouter bill.

106. ***Parus ater derjugini*** (Sarudny & Loudon).

« *Periparus ater* Linnæus var. *derjugini* » Sarudny & Loudon, Ornith. Monatsber. Vol. 11, p. 129 (1903) (« Tschoroch-gebiet » in N. W. Caucasus).

Hab. Lasistan in Northern Armenia, and Dshoroch-district, Transcaucas'a.

107. ***Parus ater moltchanovi*** Menzbier.

Parus moltchanovi Menzbier. Bull. Brit. Ornith. Club, Vol. 13, p. 49 (1903) (« in sylvis montium Yaïla peninsulæ Tauricæ »).

Hab. Mountains of Southern Crimea.

108. ***Parus ater cypriotes*** Dresser. (Pl. 1, Fig. 4.)

Parus cypriotes Dresser, Proc. Zool. Soc. Lond. 1887, p. 563 (1888) (Cyprus).

Fig. Dresser, Birds Europe, Vol. 9, pl. 658.

Hab. Cyprus.

109. **Parus amabilis** Sharpe.

Parus amabilis Sharpe, Trans. Linn. Soc. Lond. (2), Vol. 1, p. 338, pl. 53, f. 2 (1877) (Island of Balabac, Philippines).
Hab. Philippine Islands : Balabac, Palawan.

110. **Parus elegans elegans** Lesson.

Parus elegans Lesson, Traité d'Ornith. p. 456 (1831) (no locality; the type is from the Philippines; cfr. Pucheran, Rev. Mag. Zool. (2), Vol. 6, 1854, p. 68).
Parus quadrivittatus Lafresnaye, Rev. Zool. Vol. 3, p. 129 (1840) (« in Manilla aut in India »).
Fig. Gould, Birds Asia, Vol. 2, pl. 50.
Hab. Philippine Islands : Luzon, Mindoro, Negros, Panay, Guimaras, Cebu, Bongao 1).

111. **Parus elegans albescens** (McGregor).

Pardaliparus albescens McGregor, Philipp. Journ. Sc. Vol. 2, p. 293 (1907) (Ticao Island).
Hab. Philippine Islands : Masbate, Ticao.

112. **Parus elegans edithæ** (McGregor).

Pardaliparus edithæ McGregor, Philipp. Journ. Sc. Vol. 2, p. 294 (1907) (Calayan Island, Babuyan Group).
Hab. Northern Philippine Islands : Calayan Isl., Babuyan Group.

113. **Parus elegans mindanensis** (Mearns).

Pardaliparus elegans mindanensis Mearns, Proc. Biol. Soc. Wash. Vol. 18, p. 8 (1905) (Mount Apo, Mindanao).
Hab. Philippine Islands : Mountains of Mindanao.

114. **Parus venustulus** Swinhoe.

Parus venustulus Swinhoe, Proc. Zool. Soc. Lond. 1870, p. 133 (1870) (« from Kweifoo in Szechuen to Ichang in Hoopih »).
Pardaliparus potaninae Bianchi, Ann. Mus. Zool. St-Petersb. Vol. 7, p. 247 (1902) (based on *P. venustulus* Berezowski & Bianchi, Av. Exped. Potanini, p. 108, pl. 2, f. 3 : S. W. Kansu).
Fig. Gould, Birds Asia, Vol. 2, t. 48; Blackwelder, Research in China, Vol. 1, II, 1907, pl. 62.
Hab. Mountains of China, from Kansu and Shensi (Tsinling) south to Szechuen, Hoopih and N. W. Fohkien.

115. **Parus superciliosus** (Przewalski). (Pl. 1, Fig. 10)

Pæcile superciliosa Przewalski, in Rowley's Ornith. Miscell. Vol. 2, p. 189 (1877) (Alpine region of the mountains of Kansu).
Fig. Aves Przewalsk. p. 160, t. 8, ff. 3, 4.
Hab. Alpine region of Western China : Kansu, upper Chuanche, Southern Kookoonor-Range.

116. **Parus gambeli gambeli** Ridgway.

Parus montanus (nec Baldenstein 1827) Gambel, Proc. Acad. Nat. Sc. Philad. Vol. 1, p. 250 (1843) (Santa Fé, New Mexico).
Parus gambeli Ridgway, in Amer. Ornith. Union's Check-List, p. 335 (1886) (nom. emend.).
Parus gambeli thayeri Birtwell, Auk, Vol. 18, p. 166 (1901) (Near Albuquerque, New Mexico).
Fig. Journ. Acad. Nat. Sc. Philad. (2), Vol. 1, t. 8, f. 1.
Hab. Mountains of western United States, from the Rocky Mountains to the Coast ranges; north to British Columbia, south to Western Texas, New Mexico and Arizona and Northern California.

117. **Parus gambeli baileyæ** (J. Grinnell).

Penthestes gambeli baileyæ J. Grinnell, Condor, Vol. 10, p. 29 (1908) (Sierra San Gabriel, Los Angeles County, California).
Hab. Mountains of Southern California (Sierra San Gabriel, San Bernardino Mountains; North. Lower California?

118. **Parus sclateri** Kleinschmidt.

Parus meridionalis (nec Lilljeborg 1852) Sclater, Proc. Zool. Soc. Lond. Vol. 24, 1856, p. 203 (Jan. 1857) (El Jacale, S. Mexico).

1) It is yet to be determined to which race the birds found on the Sulu and Tawi Tawi Islands are referable. Possibly they constitute an undescribed form.

Parus sclateri Kleinschmidt, Journ. f. Ornith. Vol. 45, p. 133, in text (1897) (nom. emend.).

Hab. Highlands of Mexico from States of Oaxaca, Vera Cruz and Puebla north to S. Arizona (Chiricahua Mountains).

119. **Parus hypermelænus hypermelænus** (Berezowski & Bianchi).

Poecile hypermelaena Berezowski & Bianchi, Av. Exped. Potanini, p. 112, t. 2, f. 2 (1891) (Shen-si, near the frontier of Kansu); Deditius, Journ. f. Ornith. Vol. 45, 1897, p. 72 (transl.).

Hab. N. W. China : Lan-tsha-kou in Shensi, near the frontier of Kansu.

120. **Parus hypermelænus dejeani** Oustalet.

Parus dejeani Oustalet, Bull. Mus. Hist. Nat. Paris, Vol. 3, p. 209 (1897) (Ta-tsien-lu, Szechuen).

Hab. W. China : Szechuen.

121. **Parus davidi** (Berezowski & Bianchi).

Poecile Davidi Berezowski & Bianchi, Av. Exped. Potanini, p. 113, t. 2, f. 3 (1891) (South Kansu); Deditius, Journ. f. Ornith. Vol. 45, 1897, p. 73 (transl.).

Hab. North- and Western China : Szechuen, Kansu, Shensi (Tsinling Mts.).

122. **Parus palustris palustris** Linnæus.

Parus palustris Linnæus, Syst. Nat., ed. 10, p. 190 (1758) («Habitat in Europa»; we fix *Sweden* as terra typica; cfr. Hartert, Vög. paläarkt. Fauna, Lief. 3, p. 370).

Parus meridionalis Lilljeborg, Naumannia, Vol. 2, II, p. 100 (1852) (based on Nilsson and Selys).

Parus fruticeti Wallengren, Naumannia, Vol. 4, p. 141 (1854) («im südlichen und mittleren Schweden gemein»).

Poecila palustris vera L. Brehm, Naumannia, Vol. 6, p. 368 (1856) (part. : «in der hiesigen Gegend [errore!] und in Schweden, namentlich bei Stockholm»).

Fig. Journ. f. Ornith. Vol. 45, 1897, pl. 4; fig. sup. New edit. of «Naumann», Vol. 2, pl. 21, f. 5.

Hab. Southern- and central portions of Scandinavia, Russian Baltic Provinces and East Prussia.

123. **Parus palustris communis** Baldenstein. (Pl. 1, Fig. 9.)

Parus cinereus communis Baldenstein, Neue Alpina, Vol. 2, p. 31 (1827) («überall in unseren Tälern... selten bis in die Mittelberge hinauf», terra typica : Graubünden, Switzerland).

Parus subpalustris Brehm, Vogelfang, p. 242 (1855) («Deutschland», typ. loc. : Renthendorf).

Poecila palustris sordida Brehm, Naumannia, Vol. 6, p. 369 (1856) («Mitteldeutschland», typ. loc. : Renthendorf).

Fig. New edit. of «Naumann», Vol. 2, pl. 20, f. 4

Hab. Germany (except western- and eastern parts), Switzerland, Austria and S. W. Hungary (Baranya).

124. **Parus palustris longirostris** Kleinschmidt.

Parus dresseri longirostris Kleinschmidt, Ornith. Jahrb. Vol. 8, p. 65 (1897) («Frankreich und Rheingegend».

Terra typica : Latour, France; cfr. Hartert, Vög. paläarkt. Fauna, Lief. 3, p. 373).

Fig. Journ. f. Ornith. Vol. 45, 1897, pl. 3, fig. sup.

Hab. Rhine-province, France, Holland and Belgium.

125. **Parus palustris dresseri** Stejneger.

Parus palustris dresseri Stejneger, Proc. U. S. Nat. Mus. Vol. 9, 1886, p. 200 (1887) (Great Britain).

Fig. New edit. of Naumann's Vög. Mitteleur. Vol. 2, pl. 21, f. 4.

Hab. England and southern parts of Scotland.

126. **Parus palustris italicus** Tschusi & Hellmayr.

Parus communis italicus Tschusi & Hellmayr, Ornith. Jahrb. Vol. 11, p. 204 (1900) (Siena, Tuscany).

Parus communis tschusii Hellmayr, Ornith. Jahrb. Vol. 12, p. 110 (1901) (Cremona, N. Italy).

Hab. Italy; also in Sicily and Sardinia (breeding?)

127. **Parus palustris stagnatilis** Brehm.

Parus stagnatilis Brehm, Vogelfang, p. 242 (1855) («Galizien»).

Hab. Galizia, Hungary, Balkan Peninsula, South Russia and Caucasus; Asia Minor?

128. **Parus palustris korejewi** Sarudny & Härms.

Parus communis korejewi Sarudny & Härms, Ornith. Monatsber. Vol. 10, p. 54 (1902) (Karatau, Turkestan).

Hab. Turkestan : Karatau.

129. **Parus palustris hellmayri** Bianchi.

Parus palustris hellmayri Bianchi, Ann. Mus. Zool. St-Petersb. Vol. 7, p. 236 (1902) (based on «*Parus* sp. nov.» Kleinschmidt, Ornith. Jahrb. Vol. 8, 1897, p. 77 : Pekin, China).

Hab. North China : Pekin.

130. **Parus palustris brevirostris** (Taczanowski).

Poicilia brevirostris Taczanowski, Journ. f. Ornith. Vol. 20, p. 444 (1872) (South Baicalia).

Hab. Central Siberia (Krasnoyarsk to Irkutsk, Lake Baical, Altai etc.).

131. **Parus palustris crassirostris** (Taczanowski).

Poicilia palustris crassirostris Taczanowski, Bull. Soc. Zool. Fr. Vol. 10, p. 470 (1885) (Sidemi River, East Siberia).

Hab. S. E. Siberia : Ussuriland ; Corea ?

132. **Parus palustris hensoni** Stejneger.

Parus hensoni Stejneger, Proc. U. S. Nat. Mus. Vol. 15, p. 342 (1892) (Hakodate, Yezo).

Parus seebohmi Stejneger, ibidem, p. 343 (1892) (Sapporo, Yezo).

Hab. North Japan : Yezo and Iterup, Kuril Isl.

133. **Parus atricapillus atricapillus** Linnaeus.

Parus atricapillus Linnæus, Syst. Nat., ed. 12, Vol. 1, p. 341 (1766) (based on Brisson, «*Parus canadensis atricapillus*», Ornith. Vol. 3, p. 553 : Canada).

Parus melanocephalus Brehm, Vogelfang, p. 242 (1855) (Nordamerika).

Fig. Audubon, Ornith. Biogr. Vol. 4, 1838, p. 374, pl. 353, f. 3.

Hab. North-eastern United States and south-eastern British Provinces, north to New Foundland, southern Labrador, south to about 40° lat. A separate colony inhabits the area between the Rocky Mountains and Cascade Range, in eastern Washington, western Idaho and central British Columbia (cfr. Ridgway, Birds North- and Middle America, Vol. 3, 1904, p. 398).

134. **Parus atricapillus septentrionalis** Harris.

Parus septentrionalis Harris, Proc. Acad. Nat. Sc. Philad. Vol. 2, p. 300 (Dec. 1845) (near mouth of Yellowstone River, western North Dakota).

Parus albescens Baird, Rep. Pacific R. R. Survey, Vol. 9, p. xxxvii (1858) (Rocky Mountains; nomen nudum, but characters given, without name, on p. 389, in text).

Hab. Great Plains and Rocky Mountain districts of central North America, from New Mexico and Kansas to Alaska (Kenai), east to eastern Kansas, Iowa, S. Dakota, W. Minnesota, Manitoba etc.).

135. **Parus atricapillus turneri** Ridgway.

Parus atricapillus turneri Ridgway, Proc. Biol. Soc. Wash. Vol. 2, p. 89 (1884) (St. Michael, Alaska).

Hab. Alaska, west and north of Cook Inlet.

136. **Parus atricapillus occidentalis** Baird.

Parus occidentalis Baird, Rep. Pacific R. R. Survey, Vol. 9, p. 391 (1858) (Shoal-water Bay, Washington).

Hab. North-west Coast of North America : from the Columbia River to British Columbia.

137. **Parus atricapillus carolinensis** Audubon.

Parus carolinensis Audubon, Ornith. Biogr. Vol. 2, p. 341, pl. 160 (1834) (near Charleston, South Carolina).

Hab. Eastern United States (south of 40° latitude), south to northern- and western Florida and golf coast westward to Louisiana.

138. **Parus atricapillus agilis** Sennett.

Parus carolinensis agilis Sennett, Auk, Vol. 5, p. 46 (1888) (Bee Co., Texas).

Hab. Eastern and central Texas, Indian Territory and Oklahoma.

139. **Parus atricapillus impiger** Bangs.

Parus carolinensis impiger Bangs, Proc. New Engl. Zool. Club, Vol. 4, p. 1 (1903) (Deep Creek, near Lake Ashby, East Florida).

Hab. Eastern Florida.

140. **Parus atricapillus kamtschatkensis** (Bonaparte).

Poecila kamtschatkensis Bonaparte, Consp. Gen. Avium, Vol. 1, p. 230 (1850) («*Parus palustris*, ex Kamtschatka, Mus. Lugd. n.).

Parus wiemuthi Dybowski MS. fide Stejneger, Bull. U. S. Nat. Mus. Vol. 29, 1885, p. 297.

Fig. Zeitschr. ges. Ornith. Vol. 1, t. 7.

Hab. Kamtschatka.

141. ***Parus atricapillus restrictus* Hellmayr.**

Parus borealis restrictus Hellmayr, Ornith. Jahrb. Vol. 11, p. 215 (1900) (Hondo).

Hab. South Japan : Island of Hondo.

142. ***Parus atricapillus sachalinensis* Lönnerberg.**

Parus atricapillus sachalinensis Lönnerberg, Journ. Sc. Coll. Tokio, Vol. 23, art. 14, p. 20 (1908) (Saghalin).

Hab. Island of Sakhalin.

143. ***Parus atricapillus baicalensis* (Swinhoe).**

Poecile baicalensis Swinhoe, Ann. Mag. Nat. Hist. (4), Vol. 7, p. 257 (1871) (« Transbaikal », the type in the Brit. Mus., examined by me, is from Kultuk, on Lake Baical).

Poecilia palustris macroura Taczanowski, Mém. Acad. Sc. St.-Petersb. (7), Vol. 39, p. 436 (1891) (Gouv. Irkutsk and Dauria).

Poecile tunkanensis Madarász, Ann. Mus. Nat. Hung. Vol. 7, p. 177 (1909) (Tunkan Mts., west of Lake Baical).

Hab. From N. E. Russia through Siberia to the shores of the Sea of Okhotsk. Manchouria and the island of Yezo, Japan.

144. ***Parus atricapillus borealis* Selys-Longchamps.**

Parus borealis Selys-Longchamps, Bull. Acad. Roy. Bruxelles, Vol. 10, II, p. 28 (1843) (Iceland, ~~errore!~~ We fix Sweden as type locality).

Parus colletti Stejneger, Proc. U. S. Nat. Mus. Vol. 11, p. 74 (1888) (Bergen, West Norway).

Fig. Journ. f. Ornith. Vol. 45, 1897, pl. 4, fig. inf.; New edit. of « Naumann », Vol. 2, pl. 21, f. 3.

Hab. Scandinavia, North-west Russia, Baltic Provinces and East Prussia.

145. ***Parus atricapillus bianchii* (Sarudny & Härms).**

Poecile salicaria neglecta (nec *Parus rufescens neglectus* Ridgway 1879) Sarudny & Härms, Ornith. Monatsber. Vol. 8, p. 19 (1900) (Pleskau, W. Russia).

Poecile salicaria bianchii Sarudny & Härms, ibidem, p. 67 (1900) (nom. emend.).

Hab. Only known from Pskow in W. Russia. Breeding places unknown, perhaps in the Waldai Mts.

146. ***Parus atricapillus assimilis* Brehm.**

Parus assimilis Brehm, Vogelfang, p. 242 (1855) (« Galizien »).

Hab. South-eastern Europe (Carpathian Mountains, Transsylvania, Hungary, Bosnia, Serbia and Bulgaria).

147. ***Parus atricapillus montanus* Baldenstein. (Pl. 1, Fig. 8.)**

Parus cinereus montanus Baldenstein, Neue Alpina, Vol. 2, p. 31 (1827) (Mountain Forests of Graubünden, Switzerland).

Parus alpestris Bailly, Bull. Soc. Hist. Nat. Savoie, 1852, p. 22 (1852) (Savoy).

Poecila salicaria alpina Brehm, Naumannia, Vol. 6, p. 370 (1856) (« auf den Alpen der Schweiz »).

Parus Baldensteinii Salis, Jahresber. Naturf. Ges. Graubündens, Vol. 6, p. 107 (1861) (« In Nadelwäldern von 4000 bis 7000 Fuss in Graubünden, z. B. St. Moritz im Engadin »).

Fig. New edition of Naumann's Vög. Mitteleuropas, Vol. 2, pl. 21, f. 2.

Hab. Forests of the Alps from Styria and Carinthia westwards to Savoy. Basses-Alpes etc. at elevations of from 3000 to 7000 feet.

148. ***Parus atricapillus salicarius* Brehm.**

Parus salicarius Brehm, Handb. Naturg. Vög. Deutschl. p. 465 (1831) (« Lebt in unseren Tälern, besonders an den mit Weiden besetzten Bach-, Fluss- und Teichufern »; type locality : Renthendorf).

Parus accedens Brehm, Vogelfang, p. 242 (1855) (« Deutschland »; type locality : Renthendorf).

Parus murinus Brehm, Vogelfang, p. 242 (1855) (« Deutschland »; type locality : Renthendorf).

Poecila salicaria vera Brehm, Naumannia, Vol. 6, p. 370 (1856) (« in den hiesigen Tälern », i. e. Renthendorf).

Parus musicus Homeyer (ex Brehm in litt.) Ornith. Briefe, p. 76 (1881) (« lebt und brütet im Nadelwald »; type locality : Renthendorf).

Parus salicarius communis Olphe-Galliard (ex Brehm in litt.), Ornith. Jahrb. Vol. 3, p. 146 (1892) (« Deutschland »; type locality : Renthendorf).

Hab. Parts of Germany (Mecklenburg, Silesia, Thuringia, Bavaria) and Austria, in the lowlands and hill districts up to about 3000 feet.

149. **Parus atricapillus rhenanus** Kleinschmidt.

Parus rhenanus Kleinschmidt, Ornith. Monatsber. Vol. 8, p. 168 (1900) (Banks of the Rhine between Mayence and Bingen).

Fig. Journ. f. Ornith. Vol. 45, 1897, pl. 3; New edition of « Naumann », Vol. 2, pl. 21, f. 1.

Hab. Known to inhabit the valley of the Rhine, from Worms down to Wesel, and widely distributed in Holland. Probably also occurring in Belgium and France.

150. **Parus atricapillus kleinschmidti** Hellmayr 1).

Parus montanus kleinschmidti Hellmayr, Ornith. Jahrb. Vol. 11, p. 212 (1900) (England, the type is from Coalfall Wood, Finchley, near London).

Hab. England, Scotland.

151. **Parus songarus songarus** Severtzow.

Parus songarus Severtzow, Izv. Obshch. Moskov. Vol. 8, no. 2, p. 134 (1873) (Tian-shan, Turkestan); Dresser, The Ibis (3), Vol. 6, 1876, p. 93 (transl.).

Fig. Aves Przewalsk. pl. 8, f. 1.

Hab. Northern Turkestan (Ssairam-Noor, Tian-shan, Kara-tau, Dsharkent, Musart Range etc.).

152. **Parus songarus affinis** (Przewalski).

Poecile affinis Przewalski, in Rowley's Ornith. Miscell. Vol. 2, p. 188 (1877) (Alashan and Kansu).

Fig. Aves Przewalsk. pl. 8, f. 2.

Hab. North-eastern Tibet, Kansu, southern Mongolia.

153. **Parus lugubris lugubris** Temminck.

Parus lugubris (Natterer MS.) Temminck, Man. d'Ornith., ed. 2, Vol. 1, p. 293 (1820) (Dalmatia and Hungary).

Fig. Nauman's Vög. Deutschl. Vol. 13, II, pl. 379, f. 1; Reiser, Orn. Balc. Vol. 3, 1905, pl. 1, f. 1.

Hab. Southern Hungary (near Mehadia, in Transsylvania etc.), Istria, Dalmatia, Montenegro, Bosnia, Hercegovina, Serbia and Bulgaria.

154. **Parus lugubris lugens** Brehm.

Parus lugens Brehm, Vogelfang, p. 243 (1855) (Greece).

Parus lugubris græcus Reiser, Ornith. Jahrb. Vol. 12, p. 216 (1901) (Ætolikon, Greece).

Fig. Reiser, Orn. Balc. Vol. 3, 1905, pl. 1, f. 2.

Hab. Greece. (Specimens from Turkey which may belong here I have not seen.)

155. **Parus lugubris hyrcanus** (Sarudny & Loudon).

Poecile lugubris hyrcanus Sarudny & Loudon, Ornith. Monatsber. Vol. 13, p. 76 (1905) (Rustum Abad, prov. Ghilan, North Persia).

Hab. North Persia : Elburz Mountains in the provinces of Ghilan and Mazanderan, south of the Caspian Sea.

156. **Parus lugubris dubius** Hellmayr.

Poecile lugubris persica (nec *Parus persicus* Blanford, 1873) Prazak, Ornith. Jahrb. Vol. 6, p. 81 (1895) (ex Blanford, East. Persia, Vol. 2, Zool. p. 229 : Oak-forest near Shiraz).

Parus lugubris dubius Hellmayr, Journ. f. Ornith. Vol. 49, p. 173 (1901) (Persia).

Hab. Oak-forests of South Persia (Shiraz, Fars). — (Specimens from Palestine [Libanon] are said to belong to the same form.)

1) *Parus brandtii* (Bogdanow).

Poecile brandtii Bogdanow, Trudni Kazan. Univ. Vol. 8, IV, p. 89 (1879) (Borshom, Caucasus); Schalow, Journ. f. Ornith. Vol. 28, 1880, p. 269 (transl.); cfr. Hartert, Vög. paläarkt. Fauna, Lief. 3, 1905, p. 369.

Doubtful species, perhaps a geographical form of *P. atricapillus*.

157. *Parus lugubris anatoliæ* Hartert.

Parus lugubris anatoliæ Hartert, Vög. Paläarkt. Fauna, Lief. 3, p. 368 (1905) (Ahoory, Asia Minor).

Hab. Mountains of Asia Minor.

158. *Parus cinctus cinctus* Boddaert.

Parus cinctus Boddaert, Tabl. Pl. Enl. p. 44 (1783) (ex Daubenton, Pl. Enl. 708, Buffon & Brisson : Siberia).

Parus sibiricus Gmelin, Syst. Nat. Vol. 1, II, p. 1013 (1789) (ex Daubenton etc., Siberia).

Parus lapponicus Lundahl, Notiser Sällsk. Fauna Fenn. Vol. 1, p. 4, pl. 1, f. 1 (1848) (Lapland).

Parus septentrionalis (nec Harris 1845!) Brehm, Vogelfang, p. 243 (1855) (Russia).

Poecila sibirica vera Brehm, Naumannia, Vol. 6, p. 369 (1856) (« Verirrt sich aus dem Asiatischen Russland nach Europa, kommt aber auch in Norwegen vor »).

Poecila sibirica microrhynchos Brehm, ibidem, p. 369 (new name for *P. septentrionalis* Brehm).

Parus melanothorax (Brehm in litt.) Olphe-Galliard, Ornith. Jahrb. Vol. 3, p. 137 (1892) (Norway).

Fig. Dresser, Birds Europe, Vol. 3, pl. 112.

Hab. Northern parts of Scandinavia, Lapland, North Russia and northern Siberia (eastwards to the Jenissey).

159. *Parus cinctus sayanus* (Sushkin).

Poecile cincta sayana Sushkin, Bull. Brit. Ornith. Club, Vol. 14, p. 44 (1904) (« Sayan occidentalis, Altai »).

Hab. Eastern Sayan-Range, Altai Mountains.

160. *Parus cinctus obtectus* Cabanis.

Parus (Poecile) obtectus Cabanis, Journ. f. Ornith. Vol. 19, p. 237 (1871) (south of Lake Baikal, Siberia).

Parus griseus Sharpe & Dresser, Birds Europe, Vol. 3, p. 129 (1871) (south shores of Lake Baikal).

Hab. Siberia, from Tomsk (?), the Jenissey River (Krasnoyarsk) and the countries round Lake Baikal, east to Amoorland. Exact eastern limits not known.

161. *Parus cinctus kolymensis* (Buturlin).

Poecile kolymensis Buturlin, Journ. f. Ornith. Vol. 56, p. 284 (1908) (Kolyma R., N. E. Siberia).

Hab. N. E. Siberia, from the Kolyma River south to the shores of the Okhotsk Sea.

162. *Parus cinctus alascensis* (Prazák).

Poecile cincta alascensis Prazák, Ornith. Jahrb. Vol. 6, p. 92 (1895) (Alaska); cfr. Ridgway, Birds North- and Middle America, Vol. 3, 1904, p. 411.

Hab. Northern Alaska (St. Michael, valley of Kowak River etc.) and eastwards to northern Mackenzie (Fort Anderson).

163. *Parus hudsonicus hudsonicus* Forster.

Parus Hudsonicus J. R. Forster, Philos. Trans. Vol. 62, pp. 408, 430 (1772) (Severn R., Hudson Bay).

Parus hudsonicus evura Coues, Key N. Americ. Birds, ed. 2, p. 267 (1884) (Alaska).

Parus hudsonicus ungava Rhoads, Auk, Vol. 10, p. 328 (1893) (Fort Chimo, Ungava).

Parus stoneyi Ridgway, Man. N. Amer. Birds, p. 591 (1887) (Kowak R., N. W. Alaska).

Hab. From shores of Hudson Bay (including Ungava district) north-westward to Alaska (north and west of Cook Inlet) as far as valley of Kowak River.

164. *Parus hudsonicus columbianus* Rhoads.

Parus hudsonicus columbianus Rhoads, Auk, Vol. 10, p. 23 (1893) (Field, British Columbia).

Hab. Rocky Mountain district, from interior of British Columbia, north. Montana and Alberta to Kenai Peninsula, Alaska.

165. *Parus hudsonicus littoralis* Bryant.

Parus hudsonicus var. *littoralis* Bryant, Proc. Boston Soc. Nat. Hist. Vol. 9, p. 368 (1865) (Yarmouth, Nova Scotia).

Hab. South-eastern British Provinces (south. Labrador, Quebec, New Brunswick, Nova Scotia) and extreme north-eastern United States (Maine, New Hampshire, Vermont, N. E. New York).

166. *Parus rufescens rufescens* Townsend 1).

Parus rufescens Townsend, Journ. Acad. Nat. Sc. Philad. Vol. 7, Pt. 2, p. 190 (1837) (Columbia River).

1) J. Grinnell, The Origin and Distribution of the Chestnut-Backed Chickadee; Auk, Vol. 21, 1904, pp. 364-382.

Parus sitchensis Kittlitz, in Lutke's Voy. Le Seniavine, p. 268 in text (1836) (Sitka, Alaska; nom. nud.).

Fig. Audubon, Ornith. Biogr. Vol. 4, 1838, pl. 353.

Hab. Pacific Coast District, from North California to Sitka, Alaska; east to Montana (Great Falls).

167. ***Parus rufescens vivax*** J. Grinnell.

Penthestes rufescens vivax J. Grinnell, Univ. Calif. Publ. Zool. Vol. 5, p. 414 (1910) (Prince William Sound, Alaska).

Hab. Prince William Sound District, Alaska.

168. ***Parus rufescens neglectus*** Ridgway 1).

Parus rufescens β . *neglectus* Ridgway, Proc. U. S. Nat. Mus. Vol. 1, p. 485 (1879) (Nicasio, Marin Co., California).

Hab. Marin County, California.

169. ***Parus rufescens barlowi*** J. Grinnell 1).

Parus rufescens barlowi J. Grinnell, Condor, Vol. 2, p. 127 (1900) (Stevens Creek Canon, Santa Clara Co., California).

Hab. Middle coast district of California, south of San Francisco Bay to past Monterey.

2. GENUS PENTHORNIS HELLMAYR

Penthornis Hellmayr. Journ. f. Ornith. Vol. 49, p. 170 (1901) (sp. typ. : *Melaniparus semilarvatus* Salvadori).

Characters. Bill rather longer than in the members of the genus *Parus*, though not unlike in shape; culmen more abruptly curved in terminal portion, somewhat broadened at base, conspicuously uncinat; gonys nearly straight, at extreme tip only slightly ascending. Nostrils lateral, small, roundish, entirely hidden by the dense antrorse, latero-frontal plumules. Wing longer than in *Parus* and less rounded at tip, when folded, reaching over two-thirds of tail; third, fourth and fifth primaries longest; first primary a little less than half as long as second. Tail nearly square, much shorter than wing. Tarsus robust; acrotarsium covered in front with distinct scutes. Proportion of toes etc. as in *Parus*. Wing 70-80, tail 46-60, tarsus 15-17, bill 8-11 mm.

Coloration. Black and white. Forehead and lores white or buffy white. All the other plumage black, wings and tail duller than the rest. Sexes not much different. In the male the black portions of the plumage are strongly glossed with bluish, while the female is dull blackish brown below. Females and young birds with a more or less distinct whitish nuchal patch, half concealed by the dusky tips of the feathers. Bill black.

Geographical Distribution. Philippine Islands. Two species.

Habits and Nidification unknown.

KEY TO THE SPECIES OF PENTHORNIS

1. *With a white alar speculum. Larger : wing 80, tail 60 mm.* 2. *P. TESSACOURBE.*
— *No white alar speculum. Smaller : wing 70-74, tail 46-50 mm.* 1. *P. SEMILARVATUS.*

1. ***Penthornis semilarvatus*** (Salvadori). (Pl. 1, Fig. 1.)

Melaniparus semilarvatus Salvadori, Atti Soc. Ital. Sc. Nat. Vol. 8, 1865, p. 375 (1866) (« Himalayas », errore!).

Fig. The Ibis (4), Vol. 3, 1879, pl. 9.

Hab. Philippine Island : Luzon

1) See footnote on page 37.

2. **Penthornis tessacourbe** (Scopoli).

Muscicapa (Tessacourbe) Scopoli, *Deliciæ Flor. et Faun. Insubr.* Vol. 2, p. 95 (1786) (based on « Le Gobe-mouche noir de l'isle de Luçon », Sonnerat, *Voy. Nouv.-Guinée*, p. 59, pl. 27, f. 2 : Luzon, locality most probably erroneous).

Muscicapa luzoniensis Gmelin, *Syst. Nat.* Vol. 1, II, p. 942 (1789) (based on the same).

Micropus nehrkorni W. Blasius, *Journ. f. Ornith.* Vol. 38, p. 147 (1890) (Mindanao).

Hab. Philippine Island : Mindanao.

3. GENUS **MELANOCHLORA** LESSON

Melanochlora Lesson, *Rev. Zool.* Vol. 2, p. 42 (1839) (sp. typ. : *M. sumatrana* Lesson).

Crataionyx Eyton, *Proc. Zool. Soc. Lond.* Vol. 7, 1839, p. 104 (sp. : *C. flava* Eyton et *C. ater* Eyton).

Cratæonyx Agassiz, *Nomencl. Zool., Index*, p. 103 (1846) (nom. emend. pro *Crataionyx* Eyton).

Ptilobaphus Reichenbach, *Avium Syst.* pl. 62 (1850).

Melanichlora A. Dubois, *Syn. Avium*, Vol. 1, p. 460 (1901) (nom. emend. pro *Melanochlora* Lesson).

Characters. Bill rather stout, much shorter than head, about equal in length to inner toe with claw, with outlines decidedly convex, at base somewhat deeper than wide; culmen conspicuously curved; gonys terminally more abruptly ascending than in *Parus*. Nostrils basal, very small, nearly circular, concealed by dense, antrorse latero-frontal plumules. Rictal bristles well-developed. Wing long, rounded; fourth, fifth and sixth primaries nearly equal and longest; third primary equal to seventh, decidedly shorter than fourth to sixth; second equal to ninth; first primary somewhat less than half as long as second; wing-tip about equal to length of tarsus. Tail conspicuously shorter than the wing, slightly graduated; rectrices relatively narrow, with rather pointed tips. Tarsus robust, much longer than middle toe with claw; acrotarsium distinctly scutellate; proportions and adhesion of toes exactly as in *Parus*, but both toes and claws stronger. Feathers of pileum much lengthened, with the barbs dissolved, forming a long, full, erect crest. Wing 100-115, tail 85-90, tarsus 21-24, bill about 16 mm.

Coloration. Sexes different. Forehead, crown, crest and under parts (including under tail coverts) bright yellow in both sexes; nape, back, wings, tail, throat and breast deep black, glossed with bluish green in the male, olive-brown with a slight greenish sheen in the female. The young birds resemble the female, but have a much shorter crest, the upper wing coverts tipped with yellow, and the rectrices edged with whitish.

Observations. Though not unlike *Parus* in general appearance, the stouter bill, much more rounded tail with pointed rectrices, longer tarsus, and the peculiar of the elongated crown-feathers render *Melanochlora* a well-characterized genus among the *Paridae*.

Geographical Distribution. India, Burma, Malakka, Sumatra. *Monotypic*.

Habits and Nidification. We are told by Indian field-ornithologists that this bird frequents the larger trees in small flocks. Nothing appears to be known regarding its nidification.

KEY TO THE SUBSPECIES OF **MELANOCHLORA SULTANEA**

1. Larger : wing of male 110-115 mm.	1. <i>M. SULTANEA SULTANEA</i> .
— Smaller : wing of male 100-107 mm.	2. <i>M. SULTANEA FLAVOCRISTATA</i> .

1. **Melanochlora sultanea sultanea** (Hodgson). (Pl. 2, Figs. 6a, 6b.)*Parus sultaneus* Hodgson, Ind. Review, Vol. 1, p. 31 (1837) (Nepal).

Fig. Gould, Birds Asia, Vol. 2, pl. 51.

Hab. The lower ranges of the Himalayas from Nepal to head of Assam valley; mountains south of the Bramaputra (Khasia hills, Cachar, Manipur); Burma (from the Kakhyru hills near Bhamo, southward to Pegu, Karennee etc.) and northern Tennasserim. Also recorded from the mountains of N. W. Fohkien, South-eastern China. I have, however, never seen Chinese examples.

2. **Melanochlora sultanea flavocristata** (Lafresnaye).*Parus flavo-cristatus* Lafresnaye, Mag. Zool. Cl. 2, pl. 80 (1837) (« Iles de la Sonde »).*Melanochlora Sumatrana* Lesson, Rev. Zool. Vol. 2, p. 42 (1839) (Sumatra).*Crataionyx flava* Eyton, Proc. Zool. Soc. Lond. Vol. 7, 1839, p. 104 (1839) (« Malaya »; = ♂).*Crataionyx ater* Eyton, ibidem, p. 104 (1839) (« Malaya »; = ♀).

Fig. Mag. Zool. 1837, Cl. 2, pl. 80.

Hab. Southern Tennasserim, Malay Peninsula, Sumatra.

4. GENUS **APHELOCEPHALA** OBERHOLSER

Xerophila (nec F. Held 1837, *Mollusca*) Gould, Proc. Zool. Soc. Lond. Vol. 8, 1840, p. 175 (1841)
(type: *X. leucopsis* Gould).

Aphelocephala Oberholser, Proc. Acad. Nat. Sc. Philad. 1899, p. 214 (1899) (nom. emend.).

Characters. Bill rather short, semi-conical, thick, decidedly deeper than wide, culmen strongly curved from base to tip; gonys straight for its basal half, distinctly ascending terminally. Tongue obtuse, without any bristles. Nasal fossæ large, operculate; nostrils very small, nearly circular and almost completely concealed by the antrorse, dense, bristle-like latero-frontal plumules. Rictal bristles strong, well developed, though not very numerous. Wing rather long, rounded; fourth and fifth primaries longest, third and sixth but little shorter; first primary somewhat longer than half the second. Secondaries broad and rather long, their length equal to about four-fifths of the wing. Tail square, much shorter than wing, not more than three-fourths of the latter. Upper tail coverts much developed, covering the basal half of the tail. Tarsus robust, rather more than twice as long as hind toe without claw; acrotarsium distinctly scutellate. Toes slender, outer toe somewhat longer than inner, with claws rather short; hallux stout, with stronger, more decidedly curved claw. Wing 56-60, tail 40-46 mm.

Coloration. Above hair-brown or chestnut (if chestnut, pileum dark brown). Lores and sides of forehead white or buff. Under parts variable, either plain buffish, with more or less ferruginous on flanks (*A. leucopsis* and *A. castaneiventris*), or with a distinct crescent (chestnut in *A. pectoralis*, black in *A. nigricincta*) over the breast. Tail tipped with white. Sexes alike. Plumage soft and lax.

Geographical Distribution. Australia. Five species and subspecies.

Habits. These birds associate in small flocks, frequent gardens, bushes, and low trees, and hop very quickly over the ground, prying among the herbage for their food, which principally consists of the seeds of grasses and small annuals. They are reported to be very tame and to be met with even in the gardens of Adelaide. The nest is of large size, of a domed form, with a hole for an entrance near the top, and is composed of dried grasses, moss, spider's webs, wool, the soft blossoms of plants and dead leaves matted together and inside lined with feathers. The eggs, mostly three in a clutch, are fleshy white.

KEY TO THE SPECIES OF APHELOCEPHALA

1. Upper parts plain olive-brownish or greyish, pileum somewhat darker than back. No pectoral collar 2.
- Back and rump chestnut-brown, pileum and upper tail coverts hair-brown. With a black or chestnut pectoral collar 4.
2. Flanks pale greyish brown, sometimes faintly shaded with rufescent 3.
- Flanks cinnamon-rufous 5. *A. CASTANEIVENTRIS*.
3. Darker 1. *A. LEUCOPSIS LEUCOPSIS*.
- Paler 2. *A. LEUCOPSIS PALLIDA*.
4. Pectoral band broad, chestnut 3. *A. PECTORALIS*.
- Pectoral band narrow, black. 4. *A. NIGRICINCTA*.

1. *Aphelocephala leucopsis leucopsis* (Gould). (Pl. 2, Fig. 1.)

Xerophila leucopsis Gould, Proc. Zool. Soc. Lond. Vol. 8, 1840, p. 175 (July 1841) (South Australia).

Fig. Gould, Birds Australia, Vol. 3, pl. 67.

Hab. South Queensland, New South Wales, Victoria, South Australia, Central- and parts of West Australia.

2. *Aphelocephala leucopsis pallida* Mathews.

Aphelocephala leucopsis pallida Mathews, Bull. Brit. Ornith. Club, Vol. 27, p. 62 (1911) (Leigh's Creek, South Australia).

Hab. Interior of South Australia (Leigh's Creek).

3. *Aphelocephala pectoralis* (Gould).

Xerophila pectoralis Gould, Ann. Mag. Nat. Hist. (4), Vol. 8, p. 192 (1871) (Port Augusta, South Australia).

Fig. Gould, Birds New Guinea, Vol. 1, pl. 12.

Hab. South Australia (Port Augusta).

4. *Aphelocephala nigrincincta* (North).

Xerophila nigrincincta North, The Ibis (7), Vol. 1, p. 340 (1895) (Missionary Plain, Central Australia).

Fig. Report Horn Exp. Centr. Austr. Vol. 2, pl. 7, fig. sup.

Hab. Central Australia.

5. *Aphelocephala castaneiventris* (Milligan).

Xerophila castaneiventris Milligan, Emu, Vol. 3, p. 70 (1903) (Day Down, Murchison District).

Fig. Emu, Vol. 4, 1905, pl. 13, f. 1.

Hab. West Australia: Murchison District, Central- and Western Division, as far north as Gascoyne River.

5. GENUS SPHENOSTOMA GOULD

Sphenostoma Gould, Proc. Zool. Soc. Lond. Vol. 5, 1837, p. 149 (1838) (sp. un. : *S. cristatum* Gould).

Characters. Bill rather long, somewhat compressed, at base nearly as deep as wide; culmen distinctly curved; maxillary tomium without trace of subterminal notch; gonyes decidedly concave. No rictal bristles. Nostrils basal, situated in a small, operculate groove, the roundish nasal opening wholly exposed, not covered by plumes. Latero-frontal plumules not directed forward. Wing moderately long, rounded; fourth and fifth primaries longest; first primary well developed, about as long as half the second. Secondaries very long, being equal to about six-sevenths of the whole wing. Tail conspicuously longer than wing, much rounded. Tarsus robust, relatively short, about equal to middle toe; acrotarsium distinctly scutellate. Toes rather long and large, claws relatively short, though strong. Feathers of pileum lengthened and narrowed, forming a long, though not dense, erect crest.

Coloration. Sexes alike. Upper parts and median tail feathers earthy brown, sometimes washed with rufescent; wings greyish brown, primaries narrowly edged with whitish along outer web. Rectrices (except middle pair) dark brown, with long white tips. Lower surface of body dingy whitish, more or less strongly washed with greyish brown or rufescent brown, especially on sides and flanks. Under tail coverts ashy brown, tipped with whitish. Wing 81-86, tail 94-97, tarsus about 27, bill 13-15 mm.

Geographical Distribution. Australia.

Habits and Nidification. This bird inhabits the low scrubby trees and bushes which stud the hot plains of Australia.

1. **Sphenostoma cristatum** Gould.

Sphenostoma cristatum Gould, Proc. Zool. Soc. Lond. Vol. 5, 1837, p. 150 (1838) (« in Nova Cambria Australi, apud oram orientalem »).

Fig. Gould, Birds Austr. Vol. 3, pl. 17.

Hab. Queensland, New South Wales, Central-, West- and North-western Australia.

6. GENUS PARISOMA SWAINSON 1)

Subgenus **Parisoma** Swainson (& J. Richardson), Fauna Boreali-Amer. Vol. 2, p. 490 (1831) (sp. typ. : « Le Grignet » = *P. subcaeruleum* Vieillot).

Parosoma L. Agassiz, Nomencl. Zool., Index, p. 274 (1846) (nom. emend.).

Ægithalopsis Heine, Journ. f. Ornith. Vol. 7, p. 431 (1859) (nom. emend.).

Characters. Bill not unlike that of *Parus*, but laterally much compressed. Culmen distinctly ridged, gradually curved from base to tip, slightly uncinate; maxillary tomium with slight subterminal notch; gonys straight, in terminal third slightly ascending. Rictal bristles short, though rather stiff. Nostrils lateral, longitudinal, situated in a large, distinctly operculate groove; the slit-like nasal opening usually quite exposed, in *P. f. plumbeum* and *P. f. orientale*, however, covered by the antrorse, latero-frontal plumules. Wing long, somewhat rounded; third, fourth and fifth primaries longest, second equal to eighth; first primary as long as, or rather longer than, half the second. Tail equal to, or rather longer than, wing, strongly rounded. Tarsus slender, somewhat longer than middle toe without claw; acrotarsium distinctly scutellate. Toes slender, with rather long, much compressed, acute claws; hallux about equal in length to outer toe. Wing 60-70, tail 58-73 mm.

Coloration. Above grey or plumbeous; wings dusky, with whitish or pale greyish markings; tail blackish, the outer rectrices with long white tips. Under parts white or pale greyish, throat and foreneck often streaked with dusky; flanks and under tail coverts white, greyish, buff or light chestnut. Bill black. Sexes alike.

1. In the « Tierreich » Livr. 18, p. 135, I also included in the above genus *Sylvia lugens* Rüppell, *Parisoma jacksoni* Sharpe and *Sylvia blanfordi* Seebohm. Prof. Neumann, however, has pointed out to me that these three species were true Warblers (*Sylvia*). Reichenow (Vog. Afr. Vol. 3, p. 523) places, near *Parisoma*, his new genus *Afatema* (type : *Parisoma olivascens* Cassin) and *Hypodes* Cassin (type : *Eopsaltria cinerea* Cassin). According to Prof. Neumann, neither of them is referable to the family of Paridae, the former being a large *Alseonax*, the latter most probably identical with *Muscicapa lugens* Hartlaub.

Geographical Distribution. Tropical Africa. Seven forms.

Habits and Nidification unknown. We have only a note by Heuglin, that, in its habits, *P. plumbeum* reminds one rather of the Flycatchers.

Observations. The systematic position of this genus is still far from being satisfactorily established, and it may yet turn out to belong to the *Muscicapidae*.

KEY TO THE SPECIES AND SUBSPECIES OF PARISOMA

1. With a black band across foreneck 3. *P. BÖHMI*.
- No black cross-band on foreneck 2.
2. Under tail coverts clear chestnut; throat broadly streaked with black 3.
- Under tail coverts white or fulvous, but not chestnut 4.
3. Upper parts darker, more plumbeous 1. *P. SUBCÆRULEUM SUBCÆRULEUM*.
- Upper parts paler, more ashy grey 2. *P. SUBCÆRULEUM CINERASCENS*.
4. Upper parts dull brownish grey; lower throat and foreneck conspicuously streaked with dusky 4. *P. LAYARDI*.
- Upper parts pure grey; throat and foreneck uniform whitish, not streaked 5.
5. Rectrices brownish black, the outer ones very slightly tipped with light grey 7. *P. HOLOSPODIUM*.
- Rectrices blackish, the outermost for the greater part white 6.
6. Upper parts darker grey; outermost rectrix with outer web and apical third of inner web white, penultimate rectrix black with a small white apical spot 6. *P. PLUMBEUM ORIENTALE*.
- Upper parts lighter grey; outermost rectrix, with the exception of the basal third of inner web, entirely white, penultimate rectrix with whole outer web and long tip to inner web white 5. *P. PLUMBEUM PLUMBEUM*.

1. *Parisoma subcæruleum subcæruleum* (Vieillot).

Sylvia subcærulea Vieillot, Nouv. Dict., Hist. Nat. Vol. 11, p. 188 (1817) (based on « Le Grignet », Levaillant, Ois. d'Afr. Vol. 3, pl. 126, f. 1 : « sur les bords de la rivière Gaus, Goud (d'Or) ou Gaurits; je l'ai trouvée répandue depuis là jusqu'au Brake-Rivier »).

Parisoma rufiventer Swainson, Classif. Birds, Vol. 2, p. 247 (1837) (based on Levaillant, Ois. d'Afr. Vol. 3, pl. 126).

Sylvia erythropygos Lichtenstein, Verz. Samml. Kaffernland, p. 14 (1842) (Caffraria).

Fig. Levaillant, Ois. d'Afr. Vol. 3, pl. 126, f. 1.

Hab. South Africa (Cape Colony) and South-eastern Africa (Natal, Oranje Colony, Transvaal, Matabeleland).

2. *Parisoma subcæruleum cinerascens* Reichenow.

Parisoma subcæruleum cinerascens Reichenow, Ornith. Monatsber. Vol. 10, p. 77 (1902) (Damaraland).

Hab. S. W. Africa : Benguella and Damaraland.

3. *Parisoma böhmi* Reichenow.

Parisoma böhmi Reichenow, Journ. f. Ornith. Vol. 39, p. 209, pl. 2, f. 2 (1882) (Seke in Ugogo).

Fig. Journ. f. Ornith. Vol. 39, pl. 2, f. 2.

Hab. Eastern Africa : from Somaliland southward to central German East Africa (Ugogo).

4. *Parisoma layardi* Hartlaub.

Parisoma layardi Hartlaub, The Ibis, Vol. 4, p. 147 (1862) (Cape Colony).

Stenostira schistacea Heuglin, Ornith. N. O. Afr. Vol. 1, II, p. 433 (1871) (« Kaplandschaft »).

Hab. Southern- and South-western Africa (Cape Colony, Oranje, Namaqua, Damaraland etc.). [Probably a subspecies of *P. plumbeum*.]

5. ***Parisoma plumbeum plumbeum* (Hartlaub). (Pl. 2, Figs. 7a, 7b.)**

Stenostira plumbea G. Hartlaub, Journ. f. Ornith. Vol. 6, p. 41 (1858) (ex J. Verreaux MS. : Casamanze River in the interior of Senegambia).

Parisoma melanurum Cassin, Proc. Acad. Nat. Sc. Philad. 1859, p. 51 (1859) (Camma and Rembo, Gaboon).

Parisoma catolencum Reichenow, Ornith. Monatsber. Vol. 8, p. 5 (1900) (« Chamba im Niassa-Gebiet »).

Hab. Western Africa (from Senegambia to Benguela), North-east Africa (White-Nile district) and South-eastern Africa (Natal, Swaziland, Nyasaland).

N. B. Specimens from Nyasaland are not quite typical. If separable, they are entitled to the name *P. plumbeum catolencum*.

6. ***Parisoma plumbeum orientale* Reichenow & Neumann.**

Parisoma orientale Reichenow & Neumann, Ornith. Monatsber. Vol. 3, p. 74 (1895) (Kibwezi, South Ukamba).

Hab. British East Africa : Taro desert, Kibwezi (Southern Ukamba).

7. ***Parisoma holospodium* Bates.**

Parisoma holospodium G. L. Bates, Bull. Brit. Ornith. Club, Vol. 25, p. 27 (1900) (Bitye, River Ja, Cameroon).

Hab. West Africa : Bitye, River Ja, in Cameroon.

2. SUBFAM. PSALTRIPARINÆ

THE LONG-TAILED TITS

This group comprises the Long-tailed Tits, small-sized birds with very small, strongly convex bill, graduated tail, composed of narrow, at tip rather attenuated rectrices, and with interorbital septum contracted to a slender, horizontal bar, separating two very large foramina.

Characters. Bill small, much less than half as long as head, about equal to length of hallux (without claw), with outlines strongly convex; culmen strongly curved, abruptly contracted terminally; gonys distinctly ascending terminally. Nasal fossa large, occupying about basal half of maxilla, entirely concealed by dense, antrorse, latero-frontal plumules. Wing short, rounded; fourth, fifth and sixth primaries longest; second primary always shorter than seventh, being equal to eighth or ninth; first primary about half as long as second, sometimes slightly shorter, sometimes very little longer (*Psaltria*); wing-tip decidedly shorter than tarsus. Tail graduated, usually longer, in one genus (*Psaltria*) slightly shorter than wing; rectrices narrow, somewhat attenuated at tip. Tarsus little less than twice as long as middle toe (without claw); scutes of acrotarsium often inclined to fuse into a single, long lamina; middle toe longest, outer toe slightly longer than inner; basal phalanx of middle toe adherent for decidedly less than its entire length to inner toe, but for its entire length to outer toe; hallux about as long as outer toe, but much stouter. Interorbital septum contracted to a slender, horizontal bar, separating two very large foramina which extend much the greater part of the distance, longitudinally, across orbit. Plumage exceedingly soft and copious.

Coloration variable (see genera). Sexes alike.

Geographical Distribution. Palearctic, Nearctic and Indo-Malayan Regions.

Nidification. Nest very bulky, purse-like, suspended or attached to twigs of trees or bushes. Eggs white, with or without reddish brown specks.

KEY TO THE GENERA OF PSALTRIPARINÆ

1. Tail excessively graduated (the outermost rectrix being about half as long as the median) and much longer than the wing, the difference being at least equal to middle toe with claw, but generally much more 7. Genus ÆGITHALOS.
- Tail much less graduated (the outermost rectrix being at least two thirds as long as the median), equal to, slightly shorter or longer than wing, the difference between length of wing and tail being decidedly less than length of tarsus. 2.
2. Basal phalanx of middle toe adherent to lateral toes for its entire length. Tail equal to, or slightly shorter than, wing 3.
- Basal phalanx of middle toe adherent to outer toe only for greater part of its length, to inner toe for a less distance. Tail decidedly longer than wing. . . . 10. Genus PSALTRIPARUS.
3. First primary slightly longer than half the second. Tail slightly shorter than wing. Bill thick, at base decidedly deeper than wide 9. Genus PSALTRIA.
- First primary equal to, or slightly shorter than, half the second. Tail about equal to wing. Bill more compressed, at base decidedly wider than deep. 8. Genus ÆGITHALISCUS.

7. GENUS ÆGITHALOS JOH. HERMANN

Ægithalos J. Hermann, *Observ. Zool.* p. 214 (1804) (type : *Pipra europaea* J. Hermann).

Acredula C. L. Koch, *Syst. Baier. Zool.* p. 199 (1816) (type : *Acredula caudata*).

Mecistura Leach, *Cat. Mamm. and Birds Brit. Mus.* p. 17 (1816) (sp. un. : *M. vagans* Leach).

Paroides L. Brehm, *Isis*, Vol. 21, p. 1284 (1828) (type : *Parus caudatus* Linnæus).

Megistura G. R. Gray, *List Genera of Birds*, p. 23 (1840) (nom. emend. pro *Mecistura* Leach).

Orites (nec Keyserling & Blasius 1840!) G. R. Gray, *List Genera of Birds*, ed. 2, p. 32 (1841) (sp. un. : *O. caudatus*).

Subgenus **Megisturus** Temminck & Schlegel, *Fauna Japon. Aves*, p. 71 (1848).

Characters. Bill very small, much less than half as long as head (exposed culmen about equal to length of hallux without claw), very much deeper than wide; culmen strongly curved, gonys less so. Nostrils small, nearly circular, entirely hidden by the antrorse, latero-frontal plumules. Rictal bristles numerous, though soft and short. Wing rather long, somewhat pointed; fourth and fifth primaries longest; sixth a little shorter, but considerably longer than third; first primary decidedly less than half the second. Tail much longer than wing, emarginate and at the same time much graduated; the rectrices rather narrow, lengthened, somewhat attenuated at tip. Submedian pair longest, the median distinctly shorter and about equal in length to the fourth from outside; outer rectrices strongly graduated, the outermost being about half as long as the middle pair. Tarsus slender, somewhat shorter than twice the length of middle toe without claw; scutes of acrotarsium inclined to fuse into a single, long lamina; outer toe slightly longer than inner one; hallux about as long as outer toe, but much stouter, with a much stronger as well as longer claw; outer toe united to middle one for its basal phalanx. Wing 54-66, tail 65-100 mm.

- Upper back mostly grey, though sometimes more or less mixed with black 12.
8. Head above uniform white without dusky stripes on sides of crown 1. A. CAUDATUS CAUDATUS.
- Head not uniform white, there being always more or less well-marked brown or black stripes along sides of crown, though sometimes merely indicated by some brownish or blackish spots above the eye and on sides of occiput 9.
9. Black crown-stripes broad, conducted on to the base of the bill; forehead and broad stripe along middle of crown and occiput pure white. No dusky spots on chest. Wing 58-62 mm. 6. A. CAUDATUS TRIVIRGATUS.
- Brown or black crown-stripes reaching not much beyond anterior angle of eye. Chest with a row of distinct dusky or brown spots 10.
10. Lateral interscapular feathers uniform rosy 11.
- Lateral interscapular feathers mixed with ashy grey. 4. A. CAUDATUS TAURICUS 1).
11. Wing longer : 62-67 mm. Stripes along sides of crown narrower, brown or black; median portion of crown purer white 2. A. CAUDATUS EUROPEUS.
- Wing shorter : 58-62 mm. Stripes along sides of crown broader, always deep black; median portion of crown more restricted and often obscured 3. A. CAUDATUS ROSEUS.
12. Lateral crown-stripes black 13.
- Lateral crown-stripes pale brown 14.
13. Larger : wing of male 60-61, tail 79-84 mm. Hindneck extensively black, contrasting with the pale ashy grey back and rump. Shoulders conspicuously rosy 8. A. CAUDATUS ITALIÆ.
- Smaller : wing of male 57-58, tail 77-79 mm. Only a narrow blackish band across hindneck, not abruptly contrasting with dark grey back. Shoulders dark grey, without rosy tinge 7. A. CAUDATUS IRBII.
14. Larger : wing 60-63 mm. 10. A. CAUDATUS MAJOR.
- Smaller : wing 56-58 mm. 9. A. CAUDATUS SICULUS.

1. *Ægithalos caudatus caudatus* (Linnæus). (Pl. 3, Fig. 9.)

Parus caudatus Linnæus, Syst. Nat., ed. 10, p. 190 (1758) («Habitat in Europa»; we fix Sweden as type locality).
Lanius biarmicus (nec *Parus biarmicus* Linnæus 1758) Linnæus, Fauna Suec., ed. 2, p. 29, t. 1, f. 84 (1761) (error! part. : excl. cit. Albin & Edwards).

Paroides pinetorum Brehm, Vogelfang, p. 243 (1855) (part. : «in einem grossen Teile von Europa»).

Acredula macrura Seebohm, Hist. Brit. Birds, Vol. 1, p. 487, in text (1883) («from St. Petersburg eastwards»).

Acredula caudata sibirica Seebohm, Birds Japan. Emp. p. 88 (1890) («Central Siberia»).

[*Ægithalus caudatus*] *japonica* Prazák, Journ. f. Ornith. Vol. 45, p. 291 (1897) («im nördlichen Japan»).

Acredula trivirgata magna Clark, Proc. U. S. Nat. Mus. Vol. 32, p. 475 (1907) (Seoul, Korea; = juv.).

Fig. Dresser, Birds Europe. Vol. 3, pl. 104; Naumann, Vög. Deutschl. Vol. 4, t. 95, ff. 4-6.

Hab. Northern- and Eastern Europe, Siberia, Corea, Northern Japan (Yezo; Iturup, Kuril Isl.). In winter in Central Germany, Roumania, Austria and on the northern slopes of the Caucasus, sometimes also in Hesse, Rhine province, Belgium and in the north of France.

2. *Ægithalos caudatus europæus* (Hermann).

Pipra? europæa J. Hermann, Observ. Zoolog. p. 214 (1804) (Basel).

Paroides longicaudus Brehm, Handb. Vög. Deutschl. p. 470 (1831) (part. : «im mittleren Deutschland»).

Paroides pinetorum Brehm, Vogelfang, p. 243 (1855) (part. : «in einem grossen Teile von Europa»).

Fig. Journ. f. Ornith. Vol. 34, 1886, pl. 16, Vol. 41, 1893, pl. 4.

Hab. Southern- and Central Europe : North France, Belgium, Holland, Western Germany (Rhine province, eastwards to Hesse and Thuringia), Austria, Switzerland, Northern Italy, Hungary, Serbia, Bosnia, Bulgaria and Roumania.

1. Unknown to the author.

3. *Ægithalos caudatus roseus* (Blyth).

Mecistura vagans Leach, Cat. Mamm. and Birds Brit. Mus. p. 17 (1816) (Devonshire; nom. nud.).

Mecistura rosea Blyth, in Gilbert White, Nat. Hist. Selborne, p. 111 (1836) (England).

Mecistura longicaudata Macgillivray, Hist. Brit. Birds, Vol. 2, p. 454 (1839) (England).

Fig. Dresser, Birds, Europe, Vol. 3, pl. 103.

Hab. Great Britain and Ireland. In winter in South France (Pyrenees).

4. *Ægithalos caudatus tauricus* (Menzbier)

Acredula rosea taurica Menzbier, Bull. Brit. Ornith. Club, Vol. 13, p. 49 (1903) (« in sylvis montium Yaila peninsulae Tauricae »).

Hab. South Russia : Forests of the Yaila Mountains, Crimea.

5. *Ægithalos caudatus macedonicus* Dresser.

Acredula macedonica Dresser, Bull. Brit. Ornith. Club, Vol. 1, p. 15 (1892) (« in monte Olympo »).

Fig. Dresser, Birds Europe, Vol. 9, t. 655, f. 1.

Hab. Greece (Olymp, Othrys, Thessalia, Lamia, Akarnania etc., but not in Morea, northwards as far as Monastir in Turkey).

6. *Ægithalos caudatus trivirgatus* (Temminck & Schlegel).

Parus (Megisturus) trivirgatus Temminck & Schlegel, Fauna Japon. Ave., p. 71, pl. 34 (1848) (« Japon »).

Hab. South Japan : Yezo and Kiusiu.

7. *Ægithalos caudatus irbii* (Sharpe & Dresser).

Acredula irbii Sharpe & Dresser, Proc. Zool. Soc. Lond. 1871, p. 312 (1871) (Gibraltar, Spain).

Ægithalos caudatus tyrrhenicus Parrot, Ornith. Jahrb. Vol. 21, p. 155 (1910) (Ajaccio, Corsica).

Fig. Dresser, Birds Europe, Vol. 3, t. 105, fig. sup.

Hab. Iberian Peninsula and Corsica.

8. *Ægithalos caudatus italiae* Jourdain.

Ægithalos caudatus italiae Jourdain, Bull. Brit. Ornith. Club, Vol. 27, p. 39 (1910) (Cremona, Italy).

Hab. Southern and Central Italy, along the Adriatic coast north to Venice; Elba (not in Sardinia); South France. Stragglers have been taken in Southern Tyrol and near Paris.

9. *Ægithalos caudatus siculo* (Whitaker).

Acredula sicula Whitaker, Bull. Brit. Ornith. Club, Vol. 11, p. 52 (1901) (Sicily).

Fig. The Ibis (8), Vol. 2, p. 54, pl. 2.

Hab. Mountains of Sicily.

10. *Ægithalos caudatus major* (Radde).

Acredula tephronota var. *major* Radde, Ornith. Caucas. p. 144, pl. 6, f. 1 (1884) (Tiflis and Shamchor, Caucasus).

Mecistura irbii var. *caucasica* T. Lorenz, Beitr. Ornith. Nordseite Kaukas. p. 60 (1887) (Podkumok, N. Caucasus).

Acredula dorsalis Madarász, Term. Füzet. Vol. 23, p. 202, pl. 7, f. 1 (1900) (Pjatigorsk, N. Caucasus; type examined).

Acredula senex Madarász, ibidem, p. 202, pl. 7, f. 2 (1900) (Pjatigorsk, N. Caucasus; type examined).

Fig. Dresser, Birds Europe, Vol. 9, pl. 655, f. 2.

Hab. Caucasus : northern slopes, Kura valley.

11. *Ægithalos caudatus alpinus* (Hablizl).

Parus alpinus Hablizl, in Pallas, Neue Nord. Beytr. Vol. 4, p. 49 (1783) (« auf dem Samamisischen Gebirge », province Ghilan, N. Persia).

Orites tephronotus Günther, The Ibis (new ser.), Vol. 1, p. 95, pl. 4 (1865) (« Asiatic side of the Bosphorus »).

Mecistura höltzami Severtzow, Izv. Obshch. Moskov. Vol. 8, no. 2, p. 135, pl. 8, f. 1 (1873) (Astrabad, N. Persia).

Fig. Dresser, Birds Europe, Vol. 3, pl. 105, f. 2.

Hab. Environs of Constantinople [Pera, Belgrade 1), Buyukdere, Bagsheishkoë etc.], Asia Minor as far east as the Taurus Mountains, in the north to Lenkoran, and along the south shore of the Caspian Sea through the provinces of Ghilan and Mazanderan to Astrabad, North Persia.

12. *Ægithalos caudatus passekii* (Sarudny).

Acredula tephronota passekii Sarudny, Ornith. Monatsber. Vol. 12, p. 164 (1904) (« bewohnt die Eichenwälder der Gebirge zwischen dem Iranischen Hochlande und der Ebene Mesopotamiens »).

Hab. Oak-forests of the mountains of S. W. Persia (Farsistan : Shiráz, Kaluni etc.).

1) Not Belgrad in Serbia, as erroneously stated by Bianchi.

13. *Ægithalos caudatus glaucogularis* (Moore).

Orites ? glaucogularis 1) Moore, Proc. Zool. Soc. Lond. Vol. 22, 1854, p. 140 (1855) (China).

Mecistura swinhoei (Zeblebor MS.) Pelzeln, Reise Novara, Vol. 1, II, p. 66, pl. 3, f. 1 (1865) (Shanghai; = juv., type examined).

Fig. Gould, Birds Asia, Vol. 2, pl. 69.

Hab. Central China : valley of the Yangtsekiang, Shanghai, Ningpo etc.

14. *Ægithalos caudatus vinaceus* (J. Verreaux).

Mecistura vinacea 2) Verreaux, Nouv. Arch. Mus. Paris. Vol. 6, Bull. p. 39 (1870) (Ourato, Mongolia; cfr. Verreaux, ibidem, Vol. 7, 1871, Bull. p. 56; = juv., type in Paris Museum examined).

Acredula calva Pleske, Bull. Brit. Ornith. Club, Vol. 3, p. 13 (1893) (« Upper Chuan-che, China »).

Fig. Aves Przewalsk. Livr. 4, 1905, pl. 7, f. 1, 2 (= ad.); Verreaux, Nouv. Arch. Mus. Paris, Vol. 8, 1872, Bull. pl. 2, f. 3 (= juv.).

Hab. Mountains of the Upper Chuanche in N. W. China (Kansu) and South Mongolia (Uroto, Alashan).

8. GENUS *ÆGITHALISCUS* CABANIS

Ægithaliscus Cabanis, Mus. Heinean. Vol. 1, p. 90 (1851) (sp. typ. : *Parus erythrocephalus* Vigors).

Acanthiparus Gould, Birds Asia, Vol. 2, Pt. 7, pl. 67 (1855) (sp. typ. : *A. niveogularis* Moore).

Characters. Bill variable as to relative length and shape, in *A. erythrocephalus* and allies very much as in *Ægithalos*, but less compressed, being short, thick, at base distinctly wider than deep, with culmen strongly curved for its entire length, and with gonys conspicuously ascending terminally. *A. niveogularis*, *A. bonvaloti* and *A. iouschistos*, on the other hand, have the bill much more compressed (even more so than in *Ægithalos*), and decidedly longer, with culmen much less curved and gonys straighter, resembling in this respect the American genus *Psaltiriparus*, from which they chiefly differ by having the tail shorter than, or equal to, the wing (instead of longer), and the rectrices as well as the remiges somewhat broader. *A. fuliginosus* being, however, intermediate between the two groups typified by *A. erythrocephalus* and *A. niveogularis*, I deemed it better not to separate the genera *Ægithaliscus* and *Acanthiparus*, since, in other structural details, they are practically identical. Rectal bristles minute, soft, though always present. Nostrils roundish, entirely hidden by antrorse, latero-frontal plumules. Wing rather long, much rounded; fourth, fifth and sixth primaries longest; first primary a little shorter than, or as long as half the second. Tail slightly shorter than, or equal to wing, much rounded and at the same time slightly emarginate, the submedian pair of rectrices being a little longer than the median; the rectrices conspicuously rounded at tip. Tarsus slender, about twice as long as middle toe without claw; acrotarsium distinctly scutellate; outer toe slightly longer than inner one; hallux about as long as outer toe, but much stouter, its claw much shorter than the digit, strongly arched; basal phalanx of middle toe adherent to lateral toes for its entire length. Wing 46-58, tail 44-58 mm.

Coloration. Back slate-grey, olive-grey, or sepia-brown (*A. fuliginosus*); median portion of crown usually different from back, either rufous or fawn-colour, or white anteriorly passing into smoky brown on hind crown and nape, in one species (*A. fuliginosus*) sepia-brown

1) Misprinted *Acredula glaucovirens* Reichenow, Ornith. Monatsber. Vol. 2, 1894, p. 28.

2) Although in juvenile plumage, the type certainly belongs to this form and not to *A. c. glaucogularis* as erroneously admitted in « Tierreich », Livr. 18, p. 118, the dark belly and the large size, besides the locality, leave no doubt whatever.

like back. Eye region and broad superciliary stripe black, or silky grey (*A. fuliginosus*). Throat and foreneck white, throat (in *A. leucogenys* also the chin) often black or grey; remaining under parts buff, ferruginous or vinaceous isabelle, sometimes a brown band across chest. Feet light brown. Bill black.

Geographical Distribution. India, Western- and Southern China. Eleven forms.

Habits and Nidification. — Exactly like *Ægithalos*.

Observations. The members of this genus differ from *Ægithalos* chiefly by having the tail much shorter and far less graduated, the outermost rectrix being about two-thirds as long as the tail. Two groups can easily be arranged, one comprising the rufous-headed species, *A. erythrocephalus*, to which the scarce *A. leucogenys* most likely also belongs, while the other consists of *A. niveogularis*, *A. bonvaloti*, *A. iouschistos* and the somewhat aberrant *A. fuliginosus*.

KEY TO THE SPECIES AND SUBSPECIES OF *ÆGITHALISCUS* ¹⁾

1. Throat black. Bill short and thick, with culmen strongly decurved 2.
- Throat never black, being either white or silvery grey; sometimes the dusky bases of the feathers, especially on sides of throat showing through, without forming, however, a plain, black throat-patch. Bill slender, longer, with culmen much less decurved 7.
2. Chin and throat black; ear coverts greyish brown. (Breast and abdomen buffy isabelline, inclining to deep buff on flanks; pileum pale dull reddish brown.) 6. *A. LEUCOGENYS*.
- Chin white, abruptly contrasted with black of throat. Ear coverts deep black like remainder of sides of head 3.
3. With a distinct white eyebrow from above the eye to sides of neck; under parts below black throat-patch buff, darkening to vinous ochraceous on sides and flanks. (Top of head chestnut-rufous) 1. *A. ERYTHROCEPHALUS ERYTHROCEPHALUS*.
- No distinct white eyebrow, the posterior superciliary region being black, sometimes narrowly streaked with white; black throat-patch followed by a well-defined, pure white jugular crescent; a narrow band across chest as well as sides and flanks ochraceous or ferruginous, abruptly contrasting with white centre of breast and abdomen, or else whole lower parts below white jugular band uniform ferruginous 4.
4. Posterior superciliary region distinctly, though narrowly

¹⁾ *A. sharpei* Rippon, unknown to the author, could not be included in the key. From the short diagnosis: « Similis *A. bonvaloti*, sed regione parotica saturate brunnea, nec postica cinnamomea, et torque collari brunneo distinguendus » (!) it is even impossible to say to which other species this supposed new form might be most nearly allied.

- streaked with white. Whole lower plumage below white jugular crescent deep ferruginous, centre of belly not abruptly white* 2. *A. ERYTHROCEPHALUS MANIPURENSIS*.
- *Posterior superciliary region entirely black or with mere traces of greyish white edges to some of the feathers. A distinct narrow band across chest, sides and flanks ochraceous or ferruginous, abruptly contrasted with the extended white area on middle of belly* 5.
5. *Head above, cross-band on chest as well as sides and flanks paler, ochraceous.* 3. *A. ERYTHROCEPHALUS PULCHELLUS*.
- *Head above, cross-band on chest as well as sides and flanks deeper, ferruginous* 6.
6. *Ferruginous of head paler; cross-band on chest and sides deeper, almost chestnut* 4. *A. ERYTHROCEPHALUS TALIFUENSIS*.
- *Ferruginous of head darker; cross-band on chest and sides clearer, cinnamon-rufous* 5. *A. ERYTHROCEPHALUS CONCINNUS*.
7. *Eye region and broad superciliary stripe somewhat glossy silky grey. Upper parts of the head and back sepia-brown (Throat pale grey, sides of neck and foreneck white; chest sepia-brown, passing into vinous brown on flanks and paling to white on middle of belly.)* 11. *A. FULIGINOSUS*.
- *Eye region and broad superciliary stripe deep black. Back light grey, slightly shaded with olive, central stripe on crown different from colour of back* 8.
8. *Median crown-stripe from forehead to nape fawn-colour. (Chin and throat silvery white, remainder of lower parts clear ferruginous)* 8. *A. IOUSCHISTOS*.
- *Median crown-stripe white anteriorly, becoming smoky brown on posterior portion* 9.
9. *Breast and abdomen pinkish isabelline, separated from the white of throat and foreneck by a distinct, narrow, smoky brown cross-band.* 10. *A. NIVEOGULARIS*.
- *Breast and abdomen bright ferruginous, passing into white on middle of abdomen. No brown cross-band on chest* 9. *A. BONVALOTI*.

1. *Ægithaliscus erythrocephalus erythrocephalus* (Vigors).

Parus erythrocephalus Vigors, Proc. Comm. Zool. Soc. Lond. Vol. 1, p. 23 (1831) (Himalayan Mountains).

Fig. Gould, Birds Asia, Vol. 2, pl. 64.

Hab. Himalayas, from Hazara District to Bhutan, at elevations of from 6000 to 10,000 feet.

2. *Ægithaliscus erythrocephalus manipurensis* Hume.

Ægithaliscus manipurensis Hume, Stray Feath. Vol. 11, p. 254 (1888) (Manipur).

Hab. Assam, south of the Brahmaputra River: Shillong and Naga Hills: Manipur.

3. *Ægithaliscus erythrocephalus pulchellus* Rippon.

Ægithaliscus pulchellus Rippon, Bull. Brit. Ornith. Club, Vol. 11, p. 11 (1900) (Nanoi, Loi Mai, south. Shan States).

Fig. The Ibis (8), Vol. 1, 1901, p. 528, pl. 11, f. 2.

Hab. Burma: Nanoi, Loi Mai, Kalaw, Karennee, Ménetaung, Loi Sali Range, in the southern Shan States, at elevations of from 3000 to 6000 feet.

4. *Ægithaliscus erythrocephalus talifuensis* Rippon.

Ægithaliscus talifuensis Rippon, Bull. Brit. Ornith. Club, Vol. 14, p. 18 (1903) (Gyi-dzin Shan, east of Talifu, W. Yun-nan).

Hab. Mountains east of Talifu, W. Yunnan, S. W. China, and adjoining parts of Upper Burma (Bhamo).

5. *Ægithaliscus erythrocephalus concinnus* (Gould).

Psaltia concinna Gould, Birds Asia, Vol. 2, pl. 65 (1855) (China).

Ægithaliscus anophrys Swinhoe, The Ibis (new ser.), Vol. 4, p. 64 (1868) (Tingchow, W. Fohkien).

Hab. China, south of the Yangtze valley from Tchekiang and Fohkien westward to (?) Szechuen; Hainan; Formosa.

6. *Ægithaliscus leucogenys* (Moore).

Orites? leucogenys Moore, Proc. Zool. Soc. Lond. Vol. 22, 1854, p. 139 (1855) (« Afghanistan, in the woods of Balu Chughur, at 4000 feet elevation »).

Fig. Gould, Birds Asia, Vol. 2, pl. 66.

Hab. North-western portion of Kashmir (Gilgit, Bargo, Singal etc.) and adjoining parts of Afghanistan, at elevations of from 5500 to 7000 feet.

7. *Ægithaliscus sharpei* Rippon.

Ægithaliscus sharpei Rippon, Bull. Brit. Ornith. Club, Vol. 14, p. 84 (1904) (Mt. Victoria, southern Chin Hills).

Hab. Burma: Mount Victoria in the southern Chin Hills.

8. *Ægithaliscus iouschistos* (Hodgson).

Parus iouschistos Hodgson, Journ. Asiat. Soc. Bengal, Vol. 13, II, p. 943 (1844) (Nepal).

Fig. Gould, Birds Asia, Vol. 2, pl. 68.

Hab. Eastern Himalaya: Nepal, Sikkim, Bhutan, at elevations of from 9000 to 10,000 feet.

9. *Ægithaliscus bonvaloti* (Oustalet).

Acridula Bonvaloti Oustalet, Ann. Sc. Nat. Zool. (7), Vol. 12, p. 286, pl. a, f. 1 (1891) (Ta-tsien-lu and Pendjama, Szechuen).

Hab. Western China: Tatsienlu and Pendjama in Western Szechuen.

10. *Ægithaliscus niveogularis* (Moore).

Orites (?) niveogularis Moore, Proc. Zool. Soc. Lond. Vol. 22, 1854, p. 140 (1855) (« North India »).

Fig. Gould, Birds Asia, Vol. 2, pl. 67.

Hab. N. W. Himalaya, Kashmir: Simla, Gulmurg, Dashgam etc. at elevations of from 6000 to 10,000 feet.

11. *Ægithaliscus fuliginosus* (J. Verreaux). (Pl. 3, Fig. 4.)

Mecistura fuliginosa J. Verreaux, Nouv. Arch. Mus. Paris, Vol. 5, Bull. p. 36 (1869) « dans la partie occidentale du Sse-tchuan »; cfr. J. Verreaux, ibidem, Vol. 7, 1871, Bull. p. 57).

Fig. Nouv. Arch. Mus. Paris, Vol. 8, 1872, pl. 5, f. 4.

Hab. Mountains of Western China: Kansu, western Szechuen and southern Tsinling.

9. GENUS PSALTRIA TEMMINCK

Psaltia. Temminck, Pl. Col. pl. 600, f. 4 (1836) (sp. un.: *Psaltia exilis* Temminck).

Characters. Bill much less than half as long as head, rather broad and deep; culmen strongly curved, commissure smooth; gonys nearly straight for basal half, abruptly ascending terminally. Rictal bristles minute. Nostrils lateral, situated in a groove and entirely concealed by the dense, antrorse, latero frontal plumules. Wing short and rounded; fourth, fifth and sixth primaries longest; first primary more than half as long as second; secondaries relatively long, their length somewhat exceeding three-fourths of the whole wing. Tail slightly shorter than wing, much rounded, the outer rectrices being gradually shorter than the median ones. Tarsus

slender, more than twice as long as hind toe without claw; acrotarsium covered in front with scutes which, however, are often fused into a single lamina; outer toe adherent to middle one for its basal phalanx, the inner toe united for a less distance. Wing 40-46, tail 38-48 mm.

Coloration. Head above, wings and tail uniform brown; nape, back and upper tail coverts ashy, here and there tinged with brownish. Cheeks and ear coverts brownish white. Under surface dingy white, sides shaded with brownish. Sexes alike.

Geographical Distribution. Island of Java. *Monotypic*.

Habits. Boie (Journ. f. Ornith. Vol. 6, 1858, p. 365) tells us that, in habits, call-note and food, it closely resembles our Long-tailed Tit. Nothing appears to be known regarding its nidification.

1. ***Psaltria exilis*** Temminck. (**Pl. 2, Fig. 2.**)

Psaltria exilis Temminck, Pl. Col. pl. 600, f. 4 (1836) (Java).

Fig. Gould, Birds Asia, Vol. 2, pl. 63.

Hab. Island of Java.

10. GENUS PSALTRIPARUS BONAPARTE ¹⁾

Psaltriparus Bonaparte, Compt. Rend. Ac. Sc. Paris, Vol. 31, p. 478 (1850) (type : *Parus personatus* Bonaparte = *P. melanotis* Hartlaub).

Pysaltriparus Westermann, Bijdr. Dierk. Vol. 1, no. 3, p. 16 (1851) (err. typogr.).

Psalatrirus J. W. v. Müller, Reise Ver. Staaten, Canada, Mex. Vol. 3, p. 571 (1865) (sp. un. : *P. melanotis*).

Psaltrites Cabanis, Journ. f. Ornith. Vol. 29, p. 333 (1881) (nom. emend.).

Characters. Bill very small, much less than half as long as head, much deeper than broad; culmen strongly curved, gonys less so. Nostril small, roundish or broadly ovate, concealed by the antrorse, latero-frontal plumules. Rictal bristles minute, only visible on close examination. Wing rather long, but much rounded; fourth, fifth and sixth primaries longest, third shorter than sixth, first primary about half as long as second. Tail slightly longer than the wing, the rectrices narrow with broadly rounded tips, much graduated. Tarsus about twice as long as middle toe without claw, slender, the acrotarsium distinctly scutellate; outer toe slightly longer than inner one; basal phalanx of middle toe adherent to outer toe for greater part of its length, to inner toe for some distance. Wing 47-53, tail 50-62 mm.

Coloration. Above plain grey or olive, the pileum sometimes brownish; beneath pale grey or whitish, sometimes tinged with buffy or vinaceous on abdomen; sides of the head sometimes black.

Nidification. Nest a very bulky purse-like structure, suspended to twigs of bushes or small trees, composed of moss, lichens, spider's webs, and other soft materials, the entrance a small hole on one side near top. Eggs immaculate white.

¹⁾ Characters and key taken from Ridgway, Birds North and Middle America, Vol. 3, 1904, pp. 423-436; cfr. also Oberholser, Auk, Vol. 20, 1903, pp. 198-201.

Geographical Distribution. Western United States and temperate parts of Mexico and Guatemala. Nine forms.

Observations. This genus is very nearly related to *Egithaliscus*, from which it mainly differs by rather longer tail, broader remiges and rectices and different style of coloration.

KEY TO THE SPECIES AND SUBSPECIES OF PSALTRIPARUS

1. With black on sides of head	2.
— No black whatever on sides of head	7.
2. Entire sides of head black	3.
— Sides of head only partly black.	5.
3. Back and rump decidedly brown or olive	4.
— Back and rump olive-grey	3. <i>P. MELANOTIS LLOYDI</i> ♂ ad.
4. Back olive-brown, under parts strongly buff	1. <i>P. MELANOTIS MELANOTIS</i> ♂ ad.
— Back olive or greyish olive, under parts dull white, very slightly,
if at all, tinged with buff	2. <i>P. MELANOTIS IULUS</i> ♂ ad.
5. Back and rump decidedly brown or olive	6.
— Back and rump olive-grey	3. <i>P. MELANOTIS LLOYDI</i> ♀ and ♂ juv.
6. Back olive-brown, under parts strongly buff	1. <i>P. MELANOTIS MELANOTIS</i> ♀ and ♂ juv.
— Back olive or olive greyish, under parts dull white or but faintly
tinged with buff	2. <i>P. MELANOTIS IULUS</i> ♀ and ♂ juv.
7. Pileum grey, like back	8.
— Pileum brown, very different from grey of back	9.
8. Upper parts olive-grey, under parts darker	4. <i>P. PLUMBEUS PLUMBEUS</i> .
— Upper parts bluish grey, under parts paler	5. <i>P. PLUMBEUS CECAMENORUM</i> .
9. Back darker and more brownish grey	10.
— Back paler, clearer grey	9. <i>P. MINIMUS GRINDLE</i> .
10. Darker : the sides and flanks strongly smoky brown	11.
— Paler : the sides and flanks more faintly smoky brown	8. <i>P. MINIMUS CALIFORNICUS</i> .
11. Darker	7. <i>P. MINIMUS SATURATUS</i> .
— Paler	6. <i>P. MINIMUS MINIMUS</i> .

1. *Psaltriparus melanotis melanotis* (Hartlaub).

Parus melanotis Hartlaub, Rev. Zool. Vol. 7, p. 216 (1844) (Guatemala).

Psaltriparus personatus Bonaparte, Compt. Rend. Acad. Sc. Paris, Vol. 31, p. 478 (1850) (Mountains of Southern Mexico).

Psaltrites helvicentris Cabanis, Journ. f. Ornith. Vol. 29, p. 333 (1881) (Tehuantepec, Mexico?; = ?).

Fig. Baird, Birds N. America, 1860, p. 396, pl. 53, f. 3; Westermann, Bijdr. Dierk. Vol. 1, no. 3, 1851, p. 16, plate, ff. 2, 3.

Hab. Southern Mexico (Guanajuato, Hidalgo, Mexico, Puebla, Vera Cruz, Michoacan, Oaxaca, Chiapas) and highlands of Guatemala.

2. *Psaltriparus melanotis iulus* Jouy.

Psaltriparus melanotis iulus Jouy, Proc. U. S. Nat. Mus. Vol. 10, p. 776 (1894) (Hacienda El Molino, Jalisco, S. W. Mexico).

Hab. Western- and Central Mexico (Jalisco, Zacatecas, San Luiz Potosi, Tepic).

3. *Psaltriparus melanotis lloydi* Sennett.

Psaltriparus lloydi Sennett, Auk. Vol. 5, p. 43 (Jan. 1888) (Limpia Canon, near Fort Davis, Presidio County, S. W. Texas).

Psaltiriparus santaritæ Ridgway, Proc. U. S. Nat. Mus. Vol. 10, p. 697 (Oct. 1888) (Santa Rita Mts., S. Arizona).
 Hab. S. W. Texas, S. New Mexico, southern Arizona (Chiricahua, Huachuca and Santa Rita Mts.), southward into North Sonora and Chihuahua.

4. ***Psaltiriparus plumbeus plumbeus* (Baird).**

Psaltiria plumbea Baird, Proc. Acad. Nat. Sc. Philad. Vol. 7, p. 118 (1854) (Little Colorado River, Arizona).
 Fig. Baird, Birds N. America, 1860, p. 398, pl. 33, f. 2.
 Hab. Arid interior districts of western United States, north to eastern Oregon and south-western Wyoming, east to Colorado and S. W. Texas, west to W. Nevada and S. E. California.

5. ***Psaltiriparus plumbeus cecaumenorum* Thayer & Bangs.**

Psaltiriparus plumbeus cecaumenorum Thayer & Bangs, Proc. Biol. Soc. Wash. Vol. 19, p. 20 (1906) (Sierra de Antonez, Central Sonora).
 Hab. North Central Sonora; N. Chihuahua(?)

6. ***Psaltiriparus minimus minimus* (Townsend).**

Parus minimus Townsend, Journ. Acad. Nat. Sc. Philad. Vol. 7, II, p. 190 (1837) (Columbia River).
 Fig. Audubon, Birds America, ed. in-8º, Vol. 2, 1841, pl. 130.
 Hab. West slope of coast mountains of Oregon, California and Lower California, north to the Columbia River.

7. ***Psaltiriparus minimus saturatus* Ridgway.**

Psaltiriparus minimus saturatus Ridgway, Proc. Biol. Soc. Wash. Vol. 16, p. 109 (1903) (Mount Vernon, Washington).
 Hab. Vicinity of Puget Sound, Washington.

8. ***Psaltiriparus minimus californicus* Ridgway.**

Psaltiriparus minimus californicus Ridgway, Proc. Biol. Soc. Wash. Vol. 2, p. 89 (1884) (Baird, Shasta Co., California).
 Hab. Interior districts of Oregon and California.

9. ***Psaltiriparus minimus grindæ* Ridgway.**

Psaltiriparus grindæ (Belding MS.) Ridgway, Proc. U. S. Nat. Mus. Vol. 6, p. 155 (1883) (Laguna, Lower California).
 Hab. Cape St. Lucas district of Lower California.

3. SUBFAM. REMIZINÆ

THE PENDULINE TITS

This group comprises the so-called Penduline Tits, small-sized birds with slender, nearly straight, acute bill, even or emarginate tail, and the interorbital septum with a large central foramen.

Characters. Bill slender, much shorter than head, with both culmen and gonys nearly straight, and acute tip. Nostrils basal, roundish, non-operculate, either exposed (*Cephalopyrus*) or concealed by antrorse, latero-frontal plumules. Rictal bristles obsolete. Wing rather long, pointed (*Cephalopyrus*) or rounded; third and fourth, or third, fourth and fifth, primaries longest; second primary variable in length, sometimes (*Cephalopyrus*) nearly as long as third, sometimes conspicuously shorter, but always longer than seventh; first primary also variable in length, sometimes (*Cephalopyrus*) exceedingly small, about half as long as primary coverts, sometimes distinctly

longer than the latter, but always less than half as long as second. Tail shorter than wing, even, emarginate or slightly rounded. Tarsus much longer than exposed culmen; acrotarsium distinctly scutellate; outer toe slightly longer than inner one; basal phalanx of middle toe adherent to outer toe for more than half of its length, to inner toe for its entire length; hallux about equal to inner toe, but much stouter; claw compressed, strongly arched with acute tip. Interorbital septum with a large central foramen. Plumage less soft and copious than in the *Parinae* and *Psaltiriparinae*.

Colorations variable (see genera). Sexes alike or little different.

Geographical Distribution. Palæarctic, Nearctic, Indo-Malayan (one genus in Himalaya) and Ethiopian Regions.

Nidification. The nest, a bulky, globular or retort-shaped structure of twigs etc., with entrance a small hole on one side, is placed among twigs of bushes and low trees. The eggs are either uniform white (*Remiza*, *Anthoscopus*), or pale greenish blue, speckled with reddish brown (*Auriparus*), or uniform dark blue (?) (*Cephalopyrus*).

KEY TO THE GENERA OF REMIZINÆ

1. Nostrils large, exposed. Wing pointed; second primary nearly as long as third and fourth, which are the longest; first primary extremely small and narrow, scarcely half as long as primary coverts. Wing-tip much longer than tarsus. Tail about half as long as wing. Feathers of fore part of crown slightly lengthened and somewhat stiffened, forming a distinct, erect crest (Indian) . . . 14. Genus CEPHALOPYRUS.
- Nostrils small, entirely concealed by antrorse, latero-frontal plumules. Wing rounded; second primary conspicuously shorter than third and fourth; first primary always distinctly longer than primary coverts. Wing-tip very much shorter than tarsus. Tail much more than half as long as wing. Feathers of fore part of crown not forming a crest. 2.
2. First primary reduced to a narrow, lanceolate feather, but little surpassing tip of primary coverts. Tail distinctly emarginate, about four-fifths of the wing (Palæarctic) 11. Genus REMIZA.
- First primary well-developed, nearly half as long as second. 3.
3. Tail nearly as long as wing, slightly rounded. Culmen slightly decurved terminally (Nearctic) 13. Genus AURIPARUS.
- Tail about three-fifths of wing, distinctly emarginate. Culmen not decurved terminally (Ethiopian) 12. Genus ANTHOSCOPIUS.

11. GENUS REMIZA STEJNEGER

Ægithalus (nec *Ægithalos* Hermann 1804!) Boie, Isis, 1822, p. 556 (part.).

Remiza Stejneger, Proc. U. S. Nat. Mus. Vol. 9, pp. 374, 387 (1886) (type: *Parus pendulinus* Linnæus).

Remizus Prazak, in Hennicke, Naumann's Vög. Mitteleur. Vol. 2, p. 240 (1897) (nom. emend.).

Remiz Clark, Proc. U. S. Nat. Mus. Vol. 32, p. 474 (1907) (apparently proposed as a substitute of *Remiza* Stejneger).

Characters. Bill exceedingly slender, much shorter than head, with both culmen and gonys nearly straight; tip in most of the species acute, in *R. macronyx* and subspecies somewhat flattened. Nostrils lateral, very small, circular and entirely hidden by the antrorse, latero-frontal plumules. Rictal bristles obsolete or scarcely indicated. Wing rather long, rounded, first primary reduced to a narrow, lanceolate feather, in length equal to, or but little surpassing, the primary coverts; third and fourth primaries forming the tip, fifth hardly shorter; second primary falling between the sixth and seventh; secondaries long, about four-fifths of whole wing; wing-tip much shorter than tarsus. Tail slightly emarginate, distinctly shorter than the wing, the difference being about equal to length of bill. Tarsus relatively strong, covered in front with very distinctly separated scutes. Toes with strongly curved claws. Outer toe slightly longer than inner one; basal phalanx of middle toe adherent to outer toe for more than half of its length, to inner toe for its entire length; hallux about equal to inner toe, but much stouter.

Coloration. The majority of the species (nos. 1-8) have the upper back clear chestnut, shading into buff on lower back and rump and into buffy or greyish white on upper tail coverts. The upper wing coverts are either clear chestnut, cinnamon-rufous or isabelle, wing- and tail feathers dusky, broadly edged with hoary white. Forehead and sides of the head black, the crown exceedingly variable in coloration, varying from hoary white to chestnut; under parts white, more or less underlaid with cinnamon on chest, and washed with buff on abdomen. The five first forms are undoubtedly geographic races of the same type, and such is also very likely the case with *R. yenisensis*. The Central-Asiatic subspecies differ from the Western ones by their much smaller, weaker bill. *R. pendulina jaxartensis* resembles, as far as coloration is concerned, the European *R. p. pendulina*, in having the lesser upper wing coverts cinnamon-rufous and the black frontal band followed by a narrow, rufous border, while in *R. p. stoliczkae* this line is altogether absent and the colour of the lesser wing coverts much paler, isabelle or cinnamon-buff. *R. yenisensis*, of which only the immature plumage is known, shares the coloration of the wings with *R. p. stoliczkae*, but differs from the corresponding stage of the latter by the much broader and more distinct, buffy white frontal edge, loreal and superciliary streak. *R. macronyx* and allies (nos. 9-11) are somewhat aberrant both in coloration and structure. The bill is larger, flatter and less pointed, the feet are considerably stronger, the spurious primary is somewhat longer. In the adults, the whole head and sometimes even parts of the back and breast are black; however, the immature plumages closely resemble those of the typical forms.

Geographical Distribution. South-eastern Europe and temperate regions of Palæarctic Asia, in the east southwards to the Yangtsekiang and to Southern Japan (Kiusiu).

Habits and Nidification. The members of this genus frequent the banks of rivers and lakes, and marshy places. The nest is usually built on thin twigs of willows, poplars, birches and other trees, often overhanging a river or swamp, but sometimes away from water. It is a beautiful structure of the down of willow catkins or other vegetable down, carefully woven together with stems and fibres; in shape it somewhat resembles a flask, completely domed and thickly woven at the bottom, with one or two openings. The eggs, from five to seven in number, are pure white, without gloss, of remarkably elongated shape, and measure from 14 to 18 by 10 to 11 mm. (Jourdain).

KEY TO THE SPECIES AND SUBSPECIES OF REMIZA ¹⁾

1. Head all round black, throat duller, more greyish black 2.
- Forehead black, crown whitish, pale greyish, buff or chestnut. Sides of the head black. 4.
- No black whatever on forehead and sides of the head, except sometimes an indistinct small dusky patch on the lower portion of the ear coverts. 10.
2. Black above mainly restricted to head and nape. Lower breast and abdomen paler, fulvous 3.
- Black above extended over the greater part of the back. Lower breast and abdomen darker, clear chestnut 11. *R. MACRONYX NIGRICANS* ad.
3. Larger : wing 55-60, tail 48-52 mm. 9. *R. MACRONYX MACRONYX* ad.
- Smaller : wing 55-56, tail 46.5-51 mm. 10. *R. MACRONYX NEGLECTUS* ad.
4. Feathers of the occiput largely black, this colour sometimes half-concealed by white tips, forming, together with the black sides of the head and forehead, a broad, more or less complete band encircling the white centre of the crown 7. *R. CORONATA* ad.
- Feathers of the occiput only at the extreme base dark grey, their apical portions of the same colour as the crown 5.
5. Pileum chestnut 2. *R. PENDULINA CASPIA* ad.
- Pileum deep buff. } 9. *R. MACRONYX MACRONYX* semi ad.
10. *R. MACRONYX NEGLECTUS* semi ad.
11. *R. MACRONYX NIGRICANS* semi ad.
- Pileum dingy whitish or pale greyish. 6.
6. Black frontal band followed by a narrow, but distinct chestnut line. 7.
- No chestnut line behind black frontal band 9.
7. Chestnut line continued along upper margin of the black sides of head as far back as posterior end of ear coverts 2. *R. PENDULINA CASPIA* semi ad.
- Chestnut line bordering black frontal band and continued to above the eye. 8.
8. Bill much larger as well as longer : 10-12 mm. 1. *R. PENDULINA PENDULINA* ad.
- Bill much smaller and shorter : 7.5-9 mm. 3. *R. PENDULINA JAXARTENSIS* ad.
9. Pileum pale ashy with narrow, but distinct dusky short-lines. Wing longer : 55-57 mm. 5. *R. PENDULINA CONSOBRINA* ad.
- Pileum uniform dingy white. Wing shorter : 52-54 mm. 4. *R. PENDULINA STOLICZKÆ* ad.
10. Pileum darker, greyish brown. Feet stronger, bill very large, flattened towards the tip } 9. *R. MACRONYX MACRONYX* juv.
10. *R. MACRONYX NEGLECTUS* juv.
11. *R. MACRONYX NIGRICANS* juv.
- Pileum paler, dull or greyish buff. Feet weaker, bill smaller, distinctly acute 11.
11. Bill larger, longer : 10-11 mm. 1. *R. PENDULINA PENDULINA* juv.
- Bill weaker and smaller : 7.5-9 mm. 12.
12. Narrow frontal edge whitish, followed by a distinct chestnut line. Pale superciliary streak scarcely indicated 3. *R. PENDULINA JAXARTENSIS* juv.
- Broad frontal band, lores, and a very distinct superciliary stripe buffy white. No chestnut line behind frontal band 6. *R. YENISEENSIS* juv.

1. *R. ssaposhnikowi*, unknown to the author, is not included in the key.

1. *Remiza pendulina pendulina* (Linnaeus).

Motacilla Pendulinus Linnaeus, Syst. Nat. ed. 10, p. 189 (1758) («Habitat in Polonia, Lithuania, Hungaria, Italia, missa a DD. Montio»).

Parus narbonensis Gmelin, Syst. Nat. Vol. 1, II, p. 1014 (1789) (based on «La Penduline» Buffon, Hist. Nat. Ois. Vol. 5, p. 433, and Daubenton, Pl. Enl. 708, f. 1 : Languedoc, South France).

Pendulinus Polonicus Brehm, Handb. Naturg. Vög. Deutschl. p. 476 (1831) («lebt in den Rohrwäldern Polens, selten an den rohrrreichen See- und Flusssufern Deutschlands»).

Pendulinus medius Brehm, ibidem, p. 477 (1831) («kommt bei Wien vor»).

Pendulinus maerouvus (sic) Brehm, ibidem, p. 477 (1831) («sie lebt an der Donau, zeigt sich auf der Wanderung in der Nähe von Wien»).

Parus minimus Gloger, Gemeinnütz. Hand- und Hilfsbuch Naturg. p. 281 (1842) (new name for *Motacilla Pendulinus* Linnaeus).

Remizus pendulinus raddei Prazak, in Hennicke, Naumann's Naturg. Vög. Mitteleur. Vol. 2, p. 242 (1897) (South Europe [South Russia, Eastern Galicia]).

Fig. Dresser, Birds Europe, Vol. 3, pl. 110.

Hab. Southern Europe : eastern parts of Spain, southern France, Italy, the Plains of the Danube, westwards as far as Vienna (Austria), Hercegovina (Utovo Blato), Galicia, Poland, S. W. Russia (Poltava etc.). Formerly breeding at various localities in Germany, nowadays only sparingly to be met with in Silesia.

2. *Remiza pendulina caspia* (Poelzsch). (Pl. 2, Fig. 3.)

Ægithalus caspius Poelzsch, Protok. Kazan. Univ. Vol. 1, p. 141 (1870) (Astrakhan).

Ægithalus castaneus Severtzow, Izv. Obshch. Moskov. Vol. 8, no. 2, p. 136 (1873) (Astrakhan; Zeitschr. ges. Ornith. Vol. 4, 1887, p. 104 transl.).

Ægithalus galliardi d'Hamonville, Cat. Ois. Europe, p. 38 (1876) (based on *Ægithalus* sp. Olphe-Galliard, The Ibis (3), Vol. 5, 1875, pp. 268, 269 : «Russie méridionale»).

Fig. Dresser, Birds Europe, Vol. 3, pl. 117.

Hab. Delta of the Volga (Astrakhan) and the countries on the northern shore of the Caspian Sea, northwards as far as Orenburg.

3. *Remiza pendulina jaxartensis* Sushkin.

Ægithalus pendulinus var. *jaxartica* Severtzow, Izv. Obshch. Moskov. Vol. 8, no. 2, p. 135, pl. 9, f. 2 (1873) (no description, plate uncoloured and not recognizable : hence nomen nudum).

Remiza pendulina jaxartensis Sushkin, Bull. Brit. Ornith. Club, Vol. 14, p. 45 (1904) («Turkestan»; the types, examined by me, are from Tshinaz on the Syr-Darja).

Hab. West Turkestan : valley of the Syr-Darja (Tshinaz, Perovsk).

4. *Remiza pendulina stoliczkae* (Hume).

Ægithalus stoliczkae Hume, Stray Feath. Vol. 2, p. 521 (1874) (No locality. Terra typica is : Bora south of Kashgar, Eastern Turkestan. Type in Brit. Mus. examined).

Remiza pendulina centralasiæ Sushkin, Bull. Brit. Ornith. Club, Vol. 14, p. 45 (1904) («Asia centralis». Terra typica is : Sa-tchou, in S. E. Mongolia. Types in St. Petersburg Museum examined).

Fig. Scient. Res. Sec. Yarkand Miss. Aves, pl. 7; Bianchi, Aves Przewalsk. Livr. 4, 1905, pl. 10, ff. 1, 2.

Hab. East Turkestan (Kashgar, Nija- and Tjertjen Darja, Sa-tchu), Dsungaria (R. Urungu, Bulugun, Bulun-tochoi) and Mongolia (Urot).

5. *Remiza pendulina consobrina* (Swinhoe) 1).

Ægithalus consobrinus Swinhoe, Proc. Zool. Soc. Lond. 1870 p. 133 (1870) (Sha-shi on the Yangtzekiang, below Ichang, China. Type in Brit. Mus. examined).

Remiz consobrinus suffusus Clark, Proc. U. S. Nat. Mus. Vol. 32, p. 474 (1907) (Fusan, Corea).

Remiz consobrinus japonicus Clark, ibidem, p. 475 (1907) (Japan).

Fig. Gould, Birds Asia, Vol. 2, pl. 70.

Hab. Middle China : Valley of the Yangtzekiang; Corea (Fusan); South Japan : Kiu-siu (Nagasaki).

1) Mr. Clark loc. cit. separates the Corean- and Japanese representatives from the typical Chinese *R. p. consobrina*. Adult ♂♂ from Nagasaki (British and St. Petersburg Museum) I cannot distinguish from Swinhoe's type, either in size or coloration. Although I have not seen the Corean bird, its distinctness appears scarcely possible in view of the fact that examples from Kiu-shiu (Nagasaki) and China prove to be identical.

6. *Remiza yeniseensis* Sushkin.

Remiza yeniseensis Sushkin, Bull. Brit. Ornith. Club, Vol. 14, p. 44 (1904) («Mongolizæ septentrionalis pars inter juga Sayan et Tannu-ola posita, ad cursum superiorem fluminis Yenisei»; type examined).

Hab. Central Siberia : Upper Yenisey (Kemchik River, Mount Chaircham).

Obs. Doubtful form. If anything it will prove to be a geographical race of *R. pendulina*. No adult males are known; the types — immature ♂♂ — differ from the corresponding plumage of *R. p. jaxartensis*, with which they share the shortness of the bill and general coloration, by lacking the chestnut line behind the whitish frontal band.

7. *Remiza coronata* (Severtzow).

Ægithalus coronatus Severtzow, Izv. Obshch. Moskov. Vol. 8, no. 2, p. 136, pl. 9, f. 3 (1873) (Naw near Chodjent, on the Syr-Darja, Samarkand); Zeitschr. ges. Ornith. Vol. 4, 1887, p. 103 (transl.).

Ægithalus atricapillus Severtzow, ibidem, p. 137, pl. 9, ff. 4, 5 (1873) (Syr-Darja near Perowsk; also near Djimkent and in the Oigoum Mountains, not far from Tashkent); Zeitschr. ges. Ornith. Vol. 4, 1887, p. 105 (transl.).

Hab. Transcaspia (Tedshe, Merw), West Turkestan (Guldja, north of the Alai Range, Amu Darja, Syr-Darja, Sarafshan), south to adjoining parts of Afghanistan and Eastern Persia; in winter migrating as far southwards as Kohat and Sindh in Western India.

8. *Remiza ssaposhnikowi* (Johansen).

Anthoscopus ssaposhnikowi Johansen, Ornith. Jahrb. Vol. 18, p. 201 (1907) (Shore of Lake Balkash, west of the River Karatal).

Fig. Johansen, Vogel des Siebenstromgebietes und Turkestans, gesammelt von der Exped. des Prof. W. W. Ssaposhnikow im Jahre 1902 (Tomsk, 1908, pl. 1).

Hab. South shore of Lake Balkash, west of the River Karatal.

Obs. This little-known form requires further confirmation. According to Johansen it agrees in the length of the spurious (first) primary with *R. macronyx*, but differs widely in coloration: having only the forehead and sides of the head black, the pileum chestnut, the nape and lower back buff, the interscapulum cinnamon-rufous, the throat white, rest of under parts pale buff, shaded with pink on the chest. It would thus seem to be very similar to *R. p. caspia* in coloration, still it may turn out to represent a stage of the next form.

9. *Remiza macronyx macronyx* (Severtzow).

Ægithalus macronyx Severtzow, Izv. Obshch. Moskov. Vol. 8, no. 2, p. 137, pl. 9, f. 8 (1873) (Djimkent, Syr-Darja); Zeitschr. ges. Ornith. Vol. 4, 1887, p. 106 (transl.).

Ægithalus rutilans Severtzow, ibidem, p. 137, pl. 9, ff. 6, 7 (*A. rutilans* var. *cutellata* and var. *pectoralis* on the plate) (1873) (Djimkent, Syr-Darja); Zeitschr. ges. Ornith. Vol. 4, 1887, p. 107 (transl.).

Hab. West Turkestan: valleys of the Syr- and Amu-Darja.

10. *Remiza macronyx neglecta* (Sarudny).

Anthoscopus rutilans neglectus Sarudny, Ornith. Monatsber. Vol. 16, p. 163 (1908) (Reeds of the south shore of the Caspian Sea).

Hab. Reeds of the south shore of the Caspian Sea near Lenkoran, and in the provinces of Ghilan, Mazanderan and Asterabad, Northern Persia.

11. *Remiza macronyx nigricans* (Sarudny).

Anthoscopus rutilans nigricans Sarudny, Ornith. Monatsber. Vol. 16, p. 162 (1908) (Seistan, East Persia).

Hab. Reeds of the Hilmand River, Lakes Chamoon-i-Suwaran and Chamoon-i-Farrakh etc. in Seistan, Eastern Persia.

12. GENUS ANTHOSCOPUS CABANIS

Anthoscopus Cabanis, Mus. Heinean. Vol. 1, p. 89 (1851) (sp. typ. : *Sylvia minuta* Shaw).

Characters. Bill much shorter than head, with acute tip; culmen rounded, nearly straight, but little decurved terminally; gonys straight. Nostrils small, roundish, completely hidden by dense, antrorse latero-frontal plumules. No rictal bristles. Wing relatively long, rather rounded, third, fourth and fifth primaries longest, sixth somewhat shorter, but much longer than second;

first primary well developed, though rather narrower than the other primaries, about half as long as second. Tail much shorter than wing, slightly emarginate. Tarsus rather strong, decidedly longer than middle toe with claw; acrotarsium conspicuously scutellate; middle toe longest, inner toe slightly shorter than outer one; hallux intermediate in length between lateral toes, but much stouter. The structure of the feet is exactly as in *Remiza*, further details being, therefore, unnecessary. Wing 50-56, tail 30-38 mm.

Coloration. Above plain olive-grey, olive-green or yellowish green, forehead sometimes bright yellow, sometimes washed with pale ochraceous, in most species obsoletely or distinctly spotted or punctulated with dusky. Under parts whitish, yellow or ochraceous, throat and chest in several species conspicuously paler than lower belly. Bill and feet blackish or dusky.

Geographical Distribution. Tropical Africa (Ethiopian Region). Thirteen forms are at present known.

Habits and Nidification exactly as in *Remiza*.

Observations. This genus, while closely allied to the Palæarctic Penduline Tits (*Remiza*), differs by its relatively shorter tail and by having a well-developed and much longer first primary. Besides, the style of coloration is very different in the two genera.

KEY TO THE SPECIES AND SUBSPECIES OF ANTHOSCOPUS

1. Under parts with some isabelle or ochraceous buff, either the whole lower surface (except throat) or lower abdomen and under tail coverts being of that colour. Upper parts greyish. 2.
- Under parts never isabelle or ochraceous buff, being either whitish or yellow. 6.
2. Throat, foreneck and chest white, shading gradually into ochraceous-buff on belly and under tail coverts 3.
- Whole under surface nearly uniform isabelle-colour, only on upper throat passing into buffy white 5.
3. Upper tail coverts pale brownish grey like back. Isabelle-colour of belly paler and more restricted to anal region 10. *A. MUSCULUS*.
- Upper tail coverts distinctly washed with ochraceous-buff. Lower breast, abdomen and under tail coverts ochraceous-buff 4.
4. Upper parts sandy grey. Axillaries and under wing coverts creamy buff: 6. *A. CAROLI CAROLI*.
- Upper parts clear brownish grey. Axillaries and under wing coverts pure white. 7. *A. CAROLI ROBERTSI*.
5. Upper parts, including rump and upper tail coverts, purely ashy grey, forehead decidedly washed with ochraceous. Under parts paler. Wing 51,5 mm. 8. *A. CAROLI ROTHSCILDI*.
- Upper parts olivaceous-grey, forehead barely, rump and upper tail coverts distinctly shaded with ochraceous. Under parts deeper. Wing 55-59 mm. 9. *A. CAROLI SYLVIELIA*.
6. Forehead more or less brightly yellow, with or without dusky apical spots to the feathers 9.
- Feathers of forehead black edged or punctulated with white at tip. 7.
7. Breast and abdomen darker, dull ochreous-yellow; upper parts dark ashy, on rump and upper tail coverts olivaceous. 1. *A. MINUTUS MINUTUS*.
- Breast and abdomen light sulphur-yellow; upper parts clear olivaceous-grey. 8.
8. Upper parts more washed with olive 2. *A. MINUTUS SMITHI*.

- Upper parts more purely grey 3. *A. MINUTUS DAMARENSIS*.
 9. Bill more powerful, stouter, longer : 9 mm. or more. Wing 54 mm. or more. 10.
 — Bill slender, weak, shorter : 8 mm. or less. Wing not more than 52 mm. 11.
 10. Under parts pale dingy yellow. 11. *A. FLAVIFRONS*.
 — Under parts dirty white, without any yellow. 12. *A. ANSORGEL*.
 11. Forehead with distinct blackish spots 12.
 — Forehead with scarcely traces of minute, greyish apical spots; head above and
 back bright olive-green; under parts pale yellowish 4. *A. ROCCATII*.
 12. Upper parts greyish olive-green; under parts white, flanks shaded with pale greyish. 5. *A. PUNCTIFRONS*.
 — Upper parts bright yellowish green; under parts uniform pale lemon-yellow. 13. *A. PARVULUS*.

1. ***Anthoscopus minutus minutus*** (Shaw & Nodder) 1).

Sylvia minuta Shaw & Nodder, Natur. Miscell. Vol. 23, pl. 997 (1812) (based on Levaillant, Ois. d'Afr. Vol. 3, pl. 134, ff. 1, 2 : « Le Figuier Becque Fleur », « aux environs du Heere-Logement, et de là jusqu'à la Rivière-des-Eléphants », i. e. Cape Colony).

Phyllopus antophila Boie, Isis, Vol. 21, p. 321 (1828) (based on Levaillant, Ois. d'Afr. Vol. 3, pl. 134, ff. 1, 2).
A[anthoscopus] m[inutus] levaillanti Reichenow, Vög. Afr. Vol. 3, p. 526 (1905) (new name for *A. minutus* apud Sharpe,

The Ibis (8), Vol. 4, 1904, pl. 8, f. 1).

Fig. The Ibis (8), Vol. 4, 1904, pl. 8, f. 1.

Hab. South Africa : Cape Colony (Oliphant's River, Deelfontein, Kingwilliamstown, Port Elizabeth, Nel's Port etc.).

2. ***Anthoscopus minutus smithii*** (Jardine).

Ægithalus Smithii Jardine, Edinb. Journ. Nat. Geogr. Sc. Vol. 3, p. 212, pl. 5, f. 1 (1831) (South Africa, type collected by Dr. A. Smith).

Fig. Gadow, Cat. Birds Brit. Mus. Vol. 8, pl. 1, f. 2; Sharpe, The Ibis (8), Vol. 4, 1904, pl. 8, f. 2.

Hab. South-eastern Africa : Transvaal, from Potchefstroom and Rustenburg northwards to Mashonaland.

3. ***Anthoscopus minutus damarensis*** Reichenow.

A[anthoscopus] m[inutus] damarensis Reichenow, Vög. Afr. Vol. 3, p. 526, in text (1905) (Damaraland, no type locality specified).

Hab. S. W. Africa : Damaraland, north to Mossamedes (Huxel).

4. ***Anthoscopus roccatii*** Salvadori 2).

Anthoscopus Roccatii Salvadori, Boll. Mus. Zool. Anat. Comp. Torino, Vol. 21, no. 542, p. 2 (1906) (Entebbe, Uganda).

Fig. Trans. Zool. Soc. Vol. 19, pl. 13, f. 2.

Hab. British East Africa, Uganda Protectorate : Entebbe (north shore of Victoria Nyansa) and Mokia (south-eastern slope of Mount Ruwenzori).

5. ***Anthoscopus punctifrons*** (Sundevall).

Ægithalus punctifrons Sundevall, Oefv. Vet. Akad. Förh. Vol. 7, no. 5, p. 129 (1850) (Sennar).

Hab. North-east Africa : on the Upper White Nile (Khartum, Shendi, Jebel-Ahmed-Agha, Goz-Abu-Gumar); also recorded from « Sennar » and « Abyssinia ».

6. ***Anthoscopus caroli caroli*** (Sharpe).

Ægithalus caroli Sharpe, The Ibis (3), Vol. 1, p. 415 (1871) (Ovaquenyama, Damara Land).

Fig. Cat. Birds Brit. Mus. Vol. 8, pl. 1, f. 1.

Hab. S. W. Africa (Damaraland). [The records from Swaziland, N. E. Rhodesia and Karonga (Nyasa-land) are most certainly referable to the following subspecies.]

1) Although Levaillant's figure leaves much to desire yet the explicit statement that he met with the species only in the localities given above enables us to strictly refer the name *minutus* to the form of the Cape Colony.

2) This species I have not seen. Mr. Ogilvie-Grant, however, informs me that the British Museum possesses a series from Mokia, S. E. Ruwenzori, and has favoured me with the following note : « In the colour of the under parts *A. roccatii* is intermediate between *A. punctifrons* and *A. capensis* (i. e. *A. minutus smithii*). On the upper surface it is darker olive-green than *A. punctifrons*. From both species it is very easily distinguished by having the fore part of the forehead yellow and with scarcely a trace of the black spots characteristic of both *A. punctifrons* and *A. capensis*. »

7. *Anthoscopus caroli robertsi* Haagner.

Anthoscopus robertsi Haagner, Ann. Transvaal Mus. Vol. 1. no. 4. p. 234 (1909) (Villa Pereira, Boror District, Portuguese East Africa).

Hab. S. E. Africa : Boror district, north of the Zambezi, Portuguese East Africa. Apparently also in Eastern Transvaal (= Swaziland : Lijdenburg), North-east Rhodesia (Salisbury, Ganyani R.), and North Nyasaland (Karonga).

8. *Anthoscopus caroli rothschildi* Neumann.

Anthoscopus rothschildi Neumann, Journ. f. Ornith. Vol. 55. p. 597 (1907) (Simba, Brit. East Africa).

Hab. Southern British East Africa : Simba in Ukamba province.

9. *Anthoscopus caroli sylviella* Reichenow.

Anthoscopus sylviella Reichenow, Ornith. Monatsber. Vol. 12. p. 27 (1904) (Malangali in Usafua).

Anthoscopus sharpei Hartert, Bull. Brit. Ornith. Club, Vol. 15. p. 75 (1905) (Usambiró, south of Victoria Nyanza; type examined).

Anthoscopus colomanni Madarasz, Archiv. Zool. Vol. 1. p. 177 (1910) (Ngare-Dowash).

Fig. Reichenow, Vög. Afrikas, Vol. 3, pl. [23], f. 1.

Hab. German East Africa : Usafua, Usambiró, Ngare Dowash.

10. *Anthoscopus musculus* (Hartlaub).

Ægithalus musculus Hartlaub, Ornith. Centralbl. Vol. 7. p. 91 (1882) (Ladó).

Fig. Shelley, Birds Africa, Vol. 2, 1900, pl. 11, f. 2.

Hab. Eastern Africa : from Southern Somaliland (Djardjam, Damaso, Anole, Haud etc.) and South Ethiopia (Hawasch) to the upper White Nile (Ladó) and the Kilimandjaro District (Taweta, Ndjiri).

11. *Anthoscopus flavifrons* (Cassin).

Ægithalus flavifrons Cassin, Proc. Acad. Nat. Sc. Philad. Vol. 7. 1854. p. 325 (1855) (Moonda River, Gaboon).

Rhaphidornis flavifrons Reichenow, Ornith. Monatsber. Vol. 5. p. 123 (1897) (Bipinde, Cameroons).

Ægithalus cameroonensis Shelley, Birds Africa, Vol. 2. p. 251 (1900) (Bipinde, Cameroons).

Fig. Proc. Acad. Nat. Sc. Philad. 1858, pl. 1, f. 2.

Hab. Western Africa : Gaboon, Cameroons.

12. *Anthoscopus ansorgei* Hartert. (Pl. 3, Fig. 5.)

Anthoscopus ansorgei Hartert, Bull. Brit. Ornith. Club, Vol. 15. p. 74 (1905) (Mangonga River, Benguella).

Hab. S. W. Africa : Angola (Bihé, Benguella, Cacondá).

13. *Anthoscopus parvulus* (Heuglin).

Ægithalus ? parvulus Heuglin, Journ. f. Ornith. Vol. 12. p. 260 (1864) (« in der Waldregion in Bongo »).

? *Ægithalus calotropiphilus* Rochebrune, Bull. Soc. Philom. Paris (7), Vol. 7. p. 166 (1883) (Senegambia); Faune Ség. Oiseaux, 1884, p. 188, pl. 16.

Fig. Hartlaub, Zool. Jahrb. Vol. 2, 1887, pl. 12, f. 3.

Hab. Only known from Senegambia (St. Louis) and the Upper White Nile (Bongo, Redjaf, Kiri).

13. GENUS AURIPARUS BAIRD

Auriparus Baird, Review Amer. Birds, p. 85 (1864) (type : *Ægithalus flaviceps* Sundevall).

Characters. Bill much shorter than head, with nearly straight outlines and acute tip; culmen very faintly curved terminally. Nostrils as in *Remiza*. Rictal bristles obsolete. Wing relatively long, but rounded; third, fourth and fifth primaries longest; second primary equal to, or longer than, seventh; first (spurious) primary, though small and narrow, much longer than in *Remiza*, about half as long as second. Tail somewhat shorter than the wing, slightly

rounded, not emarginate as in *Remiza*. Tarsus about twice as long as culmen, decidedly longer than middle toe with claw; acrotarsium distinctly scutellate. Outer toe slightly longer than inner one; basal phalanx of middle toe adherent to outer toe for more than half of its length, entirely adherent to inner toe.

Coloration. Above dingy grey, below uniform greyish white. Adult birds with the top and sides of the head olive- or gamboge-yellow, brighter on forehead, duller on occiput, and lesser upper wing coverts clear chestnut-rufous.

Geographical Distribution. South-western districts of United States and northern states of Mexico.

Habits and Nidification. Resembles in habits and nidification the Palearctic Penduline Tits (*Remiza*). The nest, a bulky globular or retort-shaped structure of thorny twigs, with entrance a small hole in side, is placed among twigs of thorny trees and bushes. The eggs are pale greenish blue, speckled with reddish brown, hence different from those of *Remiza*.

KEY TO THE SUBSPECIES OF AURIPARUS

1. Larger : wing ♂ 50-55, ♀ 49-53; tail ♂ 46-50, ♀ 43.5-48 mm.
Yellow of head duller in adults. Young with upper parts uniform greyish brown, abdomen and under tail coverts whitish 1. *A. FLAVICEPS FLAVICEPS*.
2. Smaller : wing ♂ 48.5-52, ♀ 47-51; tail ♂ 39.5-44, ♀ 39-44 mm.
Yellow of head brighter in adults. Young with upper parts strongly olivaceous, abdomen and under tail coverts olive yellowish 2. *A. FLAVICEPS LAMPROCEPHALUS*.

1. *Auriparus flaviceps flaviceps* (Sundevall). (Pl. 2, Fig. 4.)

Ægithalus flaviceps Sundevall, Oefv. Vet. Akad. Förh. Stockholm, Vol. 7, no 5, p. 129 (1850) (« Sitka vel California »).
Controsternum ornatum Lawrence, Ann. Lyc. Nat. Hist. New York, Vol. 5, p. 112, pl. 5, f. 1 (1852) (Rio Grande, Texas).

Fig. Ann. Lyc. Nat. Hist. New York, Vol. 5, pl. 5, f. 1.

Hab. Southern Texas, New Mexico, Arizona, S. W. Utah, S. Nevada, and S. California; Northern Lower California; also in Mexican States of Sonora, Chihuahua, Durango, Coahuila, Nuevo Leon and Tamaulipas.

2. *Auriparus flaviceps lamprocephalus* Oberholser.

Auriparus flaviceps ornatus (nec *C. ornatum* Lawrence 1852) W. E. Bryant, Zoc. Vol. 1, p. 149 (1890) (part. : Lower California).

Auriparus flaviceps lamprocephalus Oberholser, Auk, Vol. 14, p. 391 (1897) (same locality).

Hab. Cape St. Lucas district of Lower California and opposite parts of Southern Sonora (Guaymas, Alamos etc.).

14. GENUS CEPHALOPYRUS BONAPARTE

Cephalopyrus Bonaparte, Compt. Rend. Acad. Sc. Paris, Vol. 38, p. 62 (1854) (sp. typ. : *Parus flammiceps* Burton).

Characters. Bill slender, much shorter than head, with both culmen and gonys nearly straight, culmen above rounded, and with acute tip. Nostrils basal, round, very large (much larger than in the other genera of the subfamily), entirely exposed (not hidden by antrorse,

latero-frontal plumules). Rictal bristles obsolete. Wing rather long, pointed; third and fourth primaries equal and longest; second and fifth but slightly shorter; first primary obsolete, being reduced to a minute, lanceolate feather, scarcely half as long as primary coverts; secondaries short, somewhat less than two-thirds of whole wing; wing-tip very much longer than tarsus. Tail even, extremely short, about half as long as wing, rectrices broad, with rounded tip. Tarsus longer than exposed culmen, but much less than twice its length; acrotarsium distinctly scutellate; proportion of toes as in *Remiza*; claws rather shorter and more slender than in the last-named genus. Wing 60-62, tail 30-34 mm. Feathers of forehead conspicuously elongated, slightly stiffened, forming, together with the likewise lengthened, but not stiffened feathers of the crown, a distinct, erect crest.

Coloration. Erect feathers of forehead and fore part of crown, as well as lores bright fiery orange-red; rest of pileum and back light yellowish olive-green, more yellowish on rump and upper tail coverts; wing coverts and quills dusky, broadly edged with dull olive-yellowish; rectrices dusky, with narrow, pale yellowish margins. Sides of head, throat, foreneck and chest bright golden yellow, washed with reddish orange on chin, passing into clear yellow on belly, and to buff on anal region. The females and young birds lack the fiery red forehead and are more greenish on the back, with chin and throat duller, greenish yellow, and belly paler yellow. Bill and feet horn-colour.

Geographical Distribution. Himalayas and adjoining parts of Afghanistan.

Habits and Nidification. Very little is known regarding its habits. It is said to nest in holes of trees and to lay uniform dark blue eggs! If there is no mistake about this subject the species would radically differ in that respect from all other members of the subfamily.

1. *Cephalopyrus flammiceps* (Burton).

Ægithalus flammiceps Burton. Proc. Zool. Soc. Lond. Vol. 3, 1835, p. 153 (1836) («apud montes Himalayenses»).
Dicœum sanguinifrons (A. Hay MS.) Blyth, Journ. Asiat. Soc. Bengal, Vol. 15, p. 44 (1846) («neighbourhood of Simla»).

Fig. Gould, Birds Asia, Vol. 2, pl. 71; Contrib. Ornith. 1850, pl. 66, fig. inf.

Hab. Himalayas, from Gilgit and Murree to Bhutan, and adjoining parts of Afghanistan, at elevations of from 3000 to 9000 feet. In winter descending to the plains of India (Cawnpore, Etawah, Aligarh, Raipur, Nagpur, Sangor etc.).

4. SUBFAM. PARADOXORNITHINÆ

THE CROW-TITS

Characters. Bill much shorter than the head, either equal to, or slightly longer than. inner toe (without claw), very much compressed, being much deeper than broad, sometimes even deeper than long (*Paradoxornis*), with outlines strongly convex; culmen rounded above, sometimes excessively so, strongly curved for its entire length; maxillary and mandibular tomia more or less distinctly sinuated; gonys abruptly ascending terminally. Rictal bristles obvious, though not very numerous. Nostrils very small, nearly circular, completely concealed by setose, antrorse latero-frontal plumules. Wing of moderate length, about three times as long as tarsus,

rounded; fourth to seventh primaries longest; third primary conspicuously shorter, about equal to eighth or ninth, second equal to secondaries; first primary well-developed, much more than half as long as second. Tail very variable as to relative length, either longer or shorter than the wing, rounded or graduated. Tarsus strong, much more than twice as long as middle toe (without claw); acrotarsium scutellate, the scutes rarely fused into a single lamina; middle toe longest, outer toe slightly longer than inner one; basal phalanx of middle toe united to inner toe for entire length, to outer toe for about half its length; hallux about equal to inner toe, but much stouter, its claw much shorter than the digit, more strongly arched than claws of anterior toes. Plumage remarkably soft and copious. Sexes alike, young very little different from adults, not spotted nor streaked.

Geographical Distribution. Southern and Eastern Asia. Mostly Indo-Malayan, but a few species extend their range into the Palæarctic Region. Six genera with about thirty-five species and subspecies.

Habits. The Crow-Tits are reported to resemble the Titmice in habits and food. About their nidification very little is yet known. The few species whose breeding-habits have been described build an open, cup-shaped nest of dry stems of grasses, branches, bamboo-leaves etc. in bushes or trees, and lay three eggs which are either uniform blue or spotted and blotched with brownish and grey on a white ground colour.

Bibliography. Oates, Fauna Brit. India, Birds, Vol. 1, 1889, pp. 60 ff.

KEY TO THE GENERA OF PARADOXORNITHINÆ

1. Outer toe abortive, reduced to a short, clawless stump	16. Genus CHOLORNIS.
— Outer toe normal	2.
2. Tail decidedly longer than the wing	3.
— Tail decidedly shorter than the wing	5.
3. Tail slightly graduated, the outermost tail-feather being about 10 mm. shorter than the longest. Bill longer, less convex, gonys but slightly ascending. Larger : wing 120 mm. and more.	20. Genus CONOSTOMA.
— Tail much graduated, the outermost tail feather being half as long as the central (longest) one. Bill shorter, more elevated. Smaller : wing never exceeding 100 mm.	4.
4. Bill deeper than long. Cutting edge of upper mandible with a strong sigmoid curve	15. Genus PARADOXORNIS.
— Bill not deeper than long. Cutting edge of upper mandible without or with merely slight indication of sigmoid curve	17. Genus SUTHORA.
5. Larger : wing more than 80 mm. Culmen strongly convex, somewhat elevated, slightly rounded above; mandible with terminal half of gonys slightly ascending	19. Genus PSITTIPARUS.
— Smaller : wing not more than 55 mm. Culmen much less convex, with the meso-rhinium much broadened and flattened; mandible swollen, with basal half of gonys nearly straight, its terminal half abruptly turned upward, almost in a vertical line	18. Genus NEOSUTHORA.

15. GENUS PARADOXORNIS GOULD

Paradoxornis Gould, Proc. Zool. Soc. Lond. Vol. 4, p. 17 (1836) (sp. un.: *Paradoxornis flavirostris* Gould).

Bathyrhynchus McClelland, Quart. Journ. Calcutta Soc. no. 4, p. 531 (1837) (sp. un.: *B. brevirostris* McClelland).

Anacrites Gistel, Naturg. Thierr. p. 10 (1848) (new name for *Paradoxornis* Gould).

Calamornis (subgenus) Gould, Birds Asia, Vol. 3, p. 73 (1874) (sp. un.: *Paradoxornis heudei* David).

Characters. Bill much compressed laterally, decidedly deeper than long; culmen, from the base to the tip, strongly curved, ending in an acute point; cutting edge of upper mandible with a deep sigmoid curve to which corresponds a distinct sinuation in the lower mandible, the latter being somewhat swollen, with the apical half rather abruptly ascending. Nostrils very small, circular and completely hidden by the dense nasal plumules. Wing short and much rounded, its tip being formed by the fourth, fifth and sixth primaries; first primary considerably more than half as long as second. Secondaries well developed, more than five-sixth of the total length of the wing. Tail very much graduated and much longer than the wing. Metatarsus covered in front with scutes, exceeding twice the length of hind toe without claw. Claws strong, distinctly curved. Plumage exceedingly soft and copious, the feathers of the hindneck especially so. Sexes alike.

Coloration. The two typical species, *P. flavirostris* and *P. guttaticollis*, have the top of the head and nape rufous-brown, the remaining upper parts brown, the quills dusky with rufescent brown edges, the tail pale brown. There is more or less black on the chin, the throat is either banded with black and white (*P. flavirostris*) or uniform whitish, resp. sandy buff (*P. guttaticollis*); rest of lower parts fulvous-brown, paler in the middle of belly, chest in *P. flavirostris* blackish. *P. heudei*, which may be not strictly congeneric with those two species, differs very markedly in coloration. Forehead and middle of crown are light grey, bordered laterally by a blackish stripe from the bill to the nape. Sides of the head ashy white. Nape and upper back light grey, washed with pale vinaceous; lower back and upper tail coverts bright fulvous-brown. Quills blackish, edged with light chestnut and buffy white. Outermost rectrix white, the central one pale fulvous, the remaining ones black, with the tip of the outer web greyish, and that of the inner web white. Chin and throat white, foreneck rosy or pale vinaceous, remainder of belly pale fulvous, shading into chestnut on sides of breast. Besides, *P. heudei* has the tail very much longer and more graduated, so that the recognition of a genus *Calamornis* might be justifiable.

Geographical Distribution. The species of *Paradoxornis* are found in Northern India (Eastern Himalayas, Assam) and Western and Southern China.

Habits and Nidification. Very little is known regarding their habits and nidification. They are said to frequent thickets of reeds and to feed on insects. *P. flavirostris* builds an open, cup-shaped nest, its eggs are described by Mr. C. C. Stuart Baker as white spotted and blotched with brownish and grey.

KEY TO THE SPECIES OF PARADOXORNIS

1. Head above light ashy grey, along the sides of the head a black stripe; outer tail feathers with a white apical patch. 1. *P. HEUDEI*.

- Head above rufous brown; outer tail feathers without white markings 2.
 2. Chin black, throat barred with black and white; a broad black band across the chest. 2. *P. FLAVIROSTRIS*.
 — Chin black, throat dingy white, lower throat and chest washed with sandy buff; jugulum
 with a few, narrow, arrow-head-shaped black marks 3. *P. GUTTATICOLLIS*.

1. ***Paradoxornis heudei*** A. David. (Pl. 3, Fig. 2.)

Paradoxornis Heudei A. David, Compt. Rend. Acad. Sc. Paris, Vol. 74, p. 1450 (1872) (Nanking, Lower Yangtze-kiang).

Fig. Nouv. Arch. Mus. Paris, Vol. 9, Bull. pl. 4, f. 2; David & Oustalet, Ois. Chine, pl. 63.

Hab. Inhabits the reeds of the Lower Yangtze-kiang near Nanking, Eastern China.

2. ***Paradoxornis flavirostris*** Gould 1).

Paradoxornis flavirostris Gould, Proc. Zool. Soc. Lond. Vol. 4, p. 17 (1836) «in Nepaliâ».

Bathyrhynchus brevirostris McClelland, Quart. Journ. Calcutta Soc. no. 4, p. 531, with plate, f. 1 (Dec. 1837) (Assam).

Fig. Gould, Birds Asia, Vol. 3, pl. 75.

Hab. Eastern Himalaya (from Nepal to Bhutan); also in the Khasia-, Shillong- and Naga Hills and Cachar, in Upper Assam, south of the Brahmaputra River.

3. ***Paradoxornis guttaticollis*** A. David 1).

Paradoxornis guttaticollis A. David, Nouv. Arch. Mus. Paris, Vol. 7, Bull. p. 14 (1871) (Szechuen and Mupin, W. China).

Paradoxornis Austeni Gould, Birds Asia, Vol. 3, pl. 73 (1874) (Assam, Kuchai-, Naga- and Shillong Hills).

Fig. David & Oustalet, Ois. Chine, pl. 64.

Hab. Western- and Southern China (Szechuen, Kansu, Fokien); Assam: hilly districts south of the Brahmaputra River (Khasia-, Shillong-, Naga Hills, Sylhet), southwards to Loi Moheng, in the southern Shan States, South Burma. Lives in the mountains at altitudes of 4000 feet and more.

16. GENUS CHOLORNIS J. VERREAUX

Cholornis J. Verreaux, Nouv. Arch. Mus. Paris, Vol. 6, 1870, Bull. p. 35 (sp. un. : *C. paradoxa*, J. Verreaux); ibidem, Vol. 7, 1871, Bull. p. 33 (detailed description).

Characters. Bill short, deep, laterally much compressed; culmen strongly convex, ending in a sharp point; lower edge of upper mandible without any trace of sigmoid curve; gonys strongly ascending in apical half. Nostrils very small, circular and completely hidden by dense, bristle-like plumes. At the base of the bill a number of rather stiffened rictal bristles. Wing less rounded than in the other genera of the subfamily, with the fifth and sixth primaries forming the tip; first primary somewhat longer than half the second. Tail strongly graduated and considerably longer than the wing. Acrotarsium covered with distinct scutes. Toes long and robust, with moderately curved claws; outer toe abortive, reduced to a short clawless stump, adherent to the middle toe for less than half of its length. Plumage exceedingly soft and copious, especially on the back. Feathers of the pileum somewhat lengthened, so as to form a slight crest.

Coloration. Top of the head greyish brown, forehead rather paler, inclining to white brown. Lores and a broad stripe above the eye and ear coverts as far back as the sides of the nape dark brown. A rim round the eye white. Sides of the head pale brown, shaded with vinaceous and streaked with dingy whitish. Back pale reddish brown, here and there washed

1) Although one feels tempted to consider the two species as mere geographical representatives, such does not appear to be the case, for they occur side by side in the Khasia- and Naga Hills. I have examined several specimens of both from this district in the British Museum.

with ashy. Quills greyish brown, outwardly margined with rufescent brown. Rectrices dull greyish brown, with the shafts pale rufescent brown. Chin and upper throat dark brown with paler edges; remaining under parts pale greyish brown, the centre of abdomen purer greyish, the flanks darker brownish. Bill yellow, eye whitish. Sexes alike. Wing 92-96, tail 105-115, bill 14 mm.

Geographical Distribution. Mountains of Western China (Moupin, Kansu).

Habits. According to A. David this remarkable bird, in its habits, closely resembles the species of the genus *Suthora*.

1. ***Cholornis paradoxa*** J. Verreaux. (Pl. 2, Fig. 5.)

Cholornis paradoxa J. Verreaux, Nouv. Arch. Mus. Paris, Vol. 6, Bull. p. 35 (1870) («Montagnes du Thibet chinois», sc. Moupin, W. China: cfr. J. Verreaux, ibidem, Vol. 7, 1871, p. 34).

Fig. Nouv. Arch. Mus. Paris, Vol. 7, pl. 1, f. 1: David & Oustalet, Ois. Chine, pl. 62.

Hab. Mountains of Western China.

17. GENUS SUTHORA HODGSON

Suthora Hodgson, Ind. Review, Vol. 2, p. 32 (1838) (sp. un. : *Suthora nipalensis* Hodgson).

Temnoris Hodgson, Journ. Asiat. Soc. Bengal, Vol. 10, 1, p. 29 (1841) (new name for *Suthora* Hodgson).

Heteromorpha (nec Kirby 1825, *Coleoptera* !) Hodgson, Journ. Asiat. Soc. Bengal, Vol. 12, 1, p. 448 (1843) (sp. un. : *Heteromorpha unicolor* Hodgson).

Chleuasicus Blyth, Journ. Asiat. Soc. Bengal, Vol. 14, 11, p. 578 (1845) (sp. un. : *Chleuasicus ruficeps* Blyth).

Hemirhynchus Hodgson, Proc. Zool. Soc. Lond. Vol. 13, p. 31 (1845) (new name for *Temnoris* Hodgson).

Temnorhis Agassiz, Nomencl. Zool., Index, p. 363 (1846) (nom. emend. for *Temnoris* Hodgson).

Characters. Bill short, thick, longer than deep. Culmen strongly curved, commissure nearly straight; gonys broad, rounded, in apical half abruptly ascending. Tip of bill never acute, always more or less blunt. Nostrils remarkably small, circular and entirely hidden by antrorse, latero-frontal plumules; near base of bill a certain number of soft bristles to be observed. Wing relatively short and rounded. First (spurious) primary well developed, about two-thirds as long as second; fifth, sixth and seventh primaries forming the tip of the wing, the sixth slightly exceeding the two others. Tail, composed of narrow, elongated feathers, strongly graduated, the outermost feather being about half as long as central rectrix, and decidedly, in several species even much, longer than the wing. Tarsus nearly twice as long as middle toe without claw. Acrotarsium distinctly scutellate, the scutes sometimes fused into a single lamina. Toes moderately long, basal phalanx of middle toe adherent to outer toe for most, if not the whole of its extent; claws strongly curved. Plumage soft and copious. Pileum often with a short, but full crest. Sexes alike.

Geographical Distribution. The species of this genus are distributed over India, Burma and China, frequenting forests at elevations of from 3000 to 10,000 feet, with the exception of the races of *S. webbiana*, which are found at lower altitudes.

Habits. They are said to resemble the Tits in their habits, feeding on insects, for which they search the branches and leaves of trees. About their nidification very little is known. M. D. La Touche tells us, that *S. g. gularis* and *S. w. suffusa* build cup-shaped nests in bushes

and that the eggs of the latter species are uniform blue, while those of *S. g. gularis* have grey and brownish spots on a whitish ground-colour.

Observations. While admitting that several species, e. g. *S. r. ruficeps*, *S. r. atrosuperciliaris*, *S. f. fulvifrons*, *S. f. cyanophrys* etc. have a much blunter bill than the various races of *S. webbiana* or *S. conspicillata*, I find *S. poliotis* and allies so completely intermediate in the shape of the bill that I have not ventured to draw a line between *Suthora* and *Chleuasius*. *S. unicolor* has perhaps better claims for generic separation, on account of its large size and uniform coloration, though I do not see why it should not be included in the present genus. Still I have serious doubts as to whether the group as here defined is a natural one. The proportions of wing and tail are not the same in all species. In *S. nipalensis*, *S. gularis* and allies, and *S. poliotis* with its relatives, the tail but little exceeds the wing, while this organ is much more elongated in *S. przewalskii*, *S. fulvifrons*, *S. conspicillata*, *S. alphonsiana* and the races of *S. webbiana*. Yet *S. ruficeps* stands between the two groups, so that I have deemed it best not to make any subdivision. On the other hand, *S. davidiana* and *S. thompsoni* are very different in structural characters from all the species here included in *Suthora*.

KEY TO THE SPECIES AND SUBSPECIES OF SUTHORA

1. Larger : wing more than 80, tail about 100 mm. Upper parts brown, pileum tinged with vinaceous, lores and superciliary streak blackish, throat and sides of neck greyish brown, breast and abdomen dull fulvous, chin washed with vinaceous 1. *S. UNICOLOR*.
- Middle-sized : wing 70-75, tail 80-85 mm. Top and sides of the head, and nape clear ferruginous, strongly contrasting with the pale olive-brown of the back and the white of the throat. 2. (*S. RUFICEPS*).
- Smaller : wing considerably less than 70 mm. 3.
2. No black streak over the eye. Under parts white, faintly shaded with creamy on chest and sides 2. *S. RUFICEPS RUFICEPS*.
- A narrow black streak over the eye. Under parts tinged all over with deep buff 3. *S. RUFICEPS ATROSUPERCILIARIS*.
3. With a large black patch on the throat, sometimes half-concealed by white or rusty apical margins 4.
- No black whatever on the throat 11.
4. Top of the head smoky grey, broad superciliaries from forehead to nape black; throat-feathers black, edged with rusty, rest of under parts orange-fulvous 1. *S. NIPALENSIS*.
- Top of the head never grey, either orange-ochraceous or olive-yellowish. Throat-feathers either uniform black or edged with white; rest of under parts whitish, more or less shaded with greyish or fulvous across chest, flanks washed with greyish, fulvous or yellowish brown. 5.
5. With a long, broad superciliary stripe of black 6.
- No black superciliary stripe 9.
6. Ear coverts bright orange. Black superciliaries broader and confluent on forehead 9. *S. POLIOTIS HUMII*.

- *Ear coverts ashy grey. Black superciliaries narrower and separated from each other, the forehead being orange-ochraceous like the crown* 7.
7. *Chest, sides and under tail coverts bright fulvous* 8. *S. RIPPONI.*
- *Flanks and under tail coverts only bright fulvous* 12. *S. POLIOTIS FEE.*
- *Flanks pale ashy, under tail coverts white* 8.
8. *Chin and throat uniform black, the feathers of the latter scarcely fringed with white at the tip, breast and sides pale ashy grey, middle of abdomen and under tail coverts white* 10. *S. POLIOTIS POLIOTIS.*
- *Chin- and throat-feathers black at base, with long white tips, almost completely hiding the black ground-colour; rest of under parts sordid white, only the flanks tinged with greyish.* 11. *S. POLIOTIS DAFLAENSIS.*
9. *General colour of upper parts darker, bright ochraceous-brown.* 10.
- *General colour of upper parts paler, light yellowish olive, brightening to dull ochraceous-yellow on forehead and fore part of crown* 6. *S. GULARIS MORRISONIANA.*
10. *Bill smaller. Breast, middle of abdomen and under tail coverts silky white, flanks washed with deep ochraceous* 5. *S. GULARIS GULARIS.*
- *Bill longer and stouter. Chest pale grey, sides of breast and abdomen extensively bright ochraceous-brown* 7. *S. GULARIS CRADDOCKI.*
11. *Top of the head clear ochreous-yellow, this colour bordered laterally by a broad greyish olive or slate-grey stripe, reaching from above the eye to the sides of the nape. Anterior under parts deep ochreous-yellow.* 12. (*S. FULVIFRONS*).
- *Top of the head never ochreous yellow, either ashy grey (S. przewalskii), vinaceous or rufous-brown* 13.
12. *Stripe on the sides of the crown greyish olive.* 13. *S. FULVIFRONS FULVIFRONS.*
- *Stripe on the sides of the crown slate-grey.* 14. *S. FULVIFRONS CYANOPHRYS.*
13. *Crown and nape ashy grey; forehead, lores and broad superciliary stripe as far back as the sides of the nape deep rufous-brown. Underparts cinnamonaceous, sides of breast shaded with greyish, flanks pale brownish* 15. *S. PRZEWALSKII.*
- *Upper part of the head deep vinaceous-brown or cinnamon-rufous. Lower surface, at least anterior parts, pale vinaceous, pink or whitish, with or without brown streaks on throat and foreneck.* 14.
14. *A narrow rim of silky white feathers round the eye (= eyelid). Top of the head deep vinaceous-brown* 16. *S. CONSPICILLATA.*
- *No white rim round the eye. Top of the head and nape cinnamon-rufous.* 15.
15. *Sides of the head and neck brownish ashy, strongly contrasting with colour of pileum and throat.* 17. *S. ALPHONSIANA.*
- *Sides of the head and neck pale or bright cinnamon, not strongly contrasting with adjoining parts* 16. *S. (WEBBIANA).*
16. *Top and sides of the head rather deep and bright cinnamon-rufous. Quills exteriorly edged with pale brown (= colour of back).* 17.
- *Top of the head light, rather dull cinnamon, sides of the head distinctly paler, shading into vinaceous-cinnamon or pink. Quills exteriorly edged with bright chestnut* 18.

17. Throat and foreneck very pale pink, nearly whitish, with strongly defined shaft-streaks of rufescent brown; belly paler. 23. *S. WEBBIANA STYANI*.
 — Throat and foreneck decidedly pale vinaceous or vinous-pink, with merely traces of brownish shaft-lines; belly darker, especially flanks more brownish 22. *S. WEBBIANA BRUNNEA*.
 18. Edges to inner secondaries buff or brownish buff. Back and flanks averaging lighter. 18. *S. WEBBIANA MANTSCHURICA*.
 — Edges to inner secondaries deep rufescent brown or chestnut. Back and flanks averaging darker. 19.
 19. Bill larger and stouter : 9-9.5 mm. Tail shorter : about 58 mm. 21. *S. WEBBIANA BULOMACHUS*.
 — Bill smaller and slenderer : 7.5-9 mm. Tail longer : 58-67 mm. 20.
 20. Cinnamon of pileum and nape brighter, sides of the head vinaceous-cinnamon 20. *S. WEBBIANA SUFFUSA*.
 — Cinnamon of pileum and nape duller, sides of the head distinctly paler than pileum, vinaceous-pink. 19. *S. WEBBIANA WEBBIANA*.

1. ***Suthora unicolor*** (Hodgson).

Heteromorpha unicolor Hodgson, Journ. Asiat. Soc. Bengal, Vol. 12, 1, p. 448 (1843) (Nepal).

Fig. Gould, Birds Asia, Vol. 3, pl. 76.

Hab. Eastern Himalaya (Nepal, Sikkim) and Mountains of Western China (Mupin, Ta-tsien-lu at elevations of from 7000 to 10,000 feet).

2. ***Suthora ruficeps ruficeps*** (Blyth).

Chleuasiscus ruficeps Blyth, Journ. Asiat. Soc. Bengal, Vol. 14, II, p. 578 (1845) (Darjiling, Sikkim).

Suthora oatesi Sharpe, Hand-List of Birds, Vol. 4, p. 70 (1903) (nom. emend.).

Hab. Eastern Himalaya : Sikkim.

3. ***Suthora ruficeps atrosuperciliaris*** (Godwin-Austen).

Chleuasiscus ruficeps var. *atrosuperciliaris* Godwin-Austen, Proc. Asiat. Soc. Bengal, 1877, p. 147 (1877) (Sadiya, Upper Assam).

Fig. Anderson, Results Yunnan Exp. Vol. 2, pl. 47, fig. inf.

Hab. Mountains of Upper Assam (North Cachar : Baladhan, Margherita, Sadiya; Ponsee near the frontier of Yunnan).

4. ***Suthora nipalensis*** Hodgson.

Suthora nipalensis Hodgson, Ind. Review, Vol. 2, p. 32 (1838) (Nepal).

Temnoris atrifrons Hodgson, Proc. Zool. Soc. Lond. Vol. 13, p. 31 (1845) (Nepal).

Fig. Gould, Birds Asia, Vol. 3, pl. 70, fig. sup.; Hodgson, Journ. Asiat. Soc. Bengal, Vol. 12, 1, 1843, plate to p. 450.

Hab. Eastern Himalaya : Nepal.

5. ***Suthora gularis gularis*** J. Verreaux.

Suthora gularis J. Verreaux, Nouv. Arch. Mus. Paris, Vol. 6, Bull. p. 35 (1870) (« Thibet chinois », the type came from Western Szechuen; cfr. loc. cit. Vol. 7, Bull. p. 36).

Suthora verreauxi Sharpe, Cat. Birds Brit. Mus. Vol. 7, p. 488 (1883) (new name for *S. gularis* Verreaux).

Fig. Nouv. Arch. Mus. Paris, Vol. 8, Bull. pl. 3, f. 1.

Hab. Mountains of Szechuen and N. W. Fokien in Southern China.

6. ***Suthora gularis morrisoniana*** Ogilvie-Grant.

Suthora morrisoniana Ogilvie-Grant, Bull. Brit. Ornith. Club, Vol. 16, p. 119 (1906) (Mount Morrison, Formosa).

Hab. Island of Formosa : Mounts Morrison and Arizan, at altitudes of 9000 feet.

7. ***Suthora gularis craddocki*** Bingham.

Suthora craddocki Bingham, Bull. Brit. Ornith. Club, Vol. 13, p. 54 (1903) (Loi-Pang-Nan, Shan States).

Fig. The Ibis 81, Vol. 3, 1903, pl. 11, f. 1.

Hab. Upper Burma : Loi-Pang-Nan, east of Kengtung, in the valley of the Mekong River, southern Shan States, at elevations of 8500 feet.

8. ***Suthora ripponi*** Sharpe.

Suthora ripponi Sharpe, Bull. Brit. Ornith. Club, Vol. 15, p. 96 (1905) (Mt. Victoria, southern Chin Hills).

Hab. Upper Burma : Mount Victoria, in the southern Chin Hills. (Doubtful form.)

9. ***Suthora poliotis humii*** Sharpe.

Suthora humii Sharpe, Cat. Birds Brit. Mus. Vol. 7, p. 487 (1883) (« Eastern Himalayas »; we fix Sikkim as type locality).

Temnoris vel *Suthora pictifrons* (ex Hodgson MS.) Oates, Fauna Brit. India, Birds, Vol. 1, p. 65, in text (1889) (Darjiling, Sikkim).

Hab. Eastern Himalaya : At and above Darjiling, Sikkim.

10. ***Suthora poliotis poliotis*** Blyth.

Suthora poliotis Blyth, Journ. Asiat. Soc. Bengal, Vol. 20, p. 522 (1851) (Cherra Punji, Khasia Hills, Assam).

Suthora munipurensis Godwin-Austen & Walden, The Ibis (3), Vol. 5, p. 250 (1875) (Karakul, Manipur Hills).

Fig. Gould, Birds Asia, Vol. 3, pl. 69.

Hab. Assam, south of the Brahmaputra River : Khasia (Cherra Poonjee), Naga (Samma) and Manipur Hills (Karakul); Upper Burma (Bhamo, Kauri-Kachin).

11. ***Suthora poliotis daflaensis*** Godwin-Austen.

Suthora daflaensis Godwin-Austen, Ann. Mag. Nat. Hist. (4), Vol. 17, p. 32 (1876) (Dafla Hills).

Fig. Journ. Asiat. Soc. Bengal, Vol. 45, II, 1876, pl. 3.

Hab. N. E. Himalaya : Dafla Hills (= Darrang), north of the Brahmaputra R., at elevations of from 5000 to 7000 feet.

12. ***Suthora poliotis feæ*** Salvadori.

Suthora feæ Salvadori, Ann. Mus. Stor. Nat. Genova, Vol. 27, p. 363 (1889) (Karennee, Burma).

Hab. South Burma : Karennee.

13. ***Suthora fulvifrons fulvifrons*** (Hodgson).

Temnoris fulvifrons Hodgson, Proc. Zool. Soc. Lond. Vol. 13, p. 31 (1845) (Nepal).

Fig. Gould, Birds Asia, Vol. 3, pl. 71.

Hab. Eastern Himalayas : Nepal and Sikkim at high elevations.

14. ***Suthora fulvifrons cyanophrys*** A. David & Oustalet.

Suthora cyanophrys A. David & Oustalet, Ois. Chine, p. 213 (1877) (S. E. Chensi, China; types in Paris Museum examined).

Fig. David & Oustalet, Ois. Chine, pl. 66.

Hab. Mountains of Western China : Southern Shen-si, at altitudes of 5400 feet.

15. ***Suthora przewalskii*** Berezowski & Bianchi.

Suthora Przewalskii Berezowski & Bianchi, Av. Exp. Potanini, p. 67, pl. 2, f. 1 (1891) (Southern Kansu); Deditius, Journ. f. Ornith. Vol. 45, 1897, p. 69 (transl.)

Hab. N. W. China : Mountains of Southern Kansu.

16. ***Suthora conspicillata*** David. (Pl. 3, Fig. 3.)

Suthora conspicillata David, Nouv. Archiv. Mus. Paris, Vol. 7, Bull. pp. 9, 14 (1871) (« Kokonoor », N. W. China).

Fig. David & Oustalet, Ois. Chine, pl. 65.

Hab. Mountains of North-west China : Kukunoor, South Kansu, Tsinling, Szechuen.

17. ***Suthora alphonsiana*** J. Verreaux.

Suthora alphonsiana J. Verreaux, Nouv. Arch. Mus. Paris, Vol. 6, Bull. p. 35 (1870) (« Thibet chinois », the type was obtained near « Tchentou »; cfr. loc. cit. Vol. 7, Bull. p. 35).

Fig. Nouv. Arch. Mus. Paris, Vol. 8, Bull. pl. 3, f. 2.

Hab. Mountains of S. W. China : Szechuen and Yunnan.

18. ***Suthora webbiana mantschurica*** Taczanowski.

Suthora webbiana, mantschurica Taczanowski, Bull. Soc. Zool. Fr. Vol. 10, p. 470 (1885) (Alamanowka in Ussuriland).
Hab. S. E. Siberia : Ussuriland.

19. ***Suthora webbiana webbiana*** Gray.

Suthora Webbiana Gray, Proc. Zool. Soc. Lond. Vol. 20, 1852, p. 70 Aves. pl. 49 (May 1854) (Shanghai; type examined).

Suthora fulvicauda C. W. Campbell, The Ibis (6), Vol. 4, p. 237 (1892) (Chemulpo, Corea; = juv.; type in Brit. Mus. examined).

Suthora longicauda C. W. Campbell, ibidem, p. 237 (1892) (« thirty miles south-east of Sëoul, Corea »; = ♀ ad.; type in Brit. Mus. examined).

Fig. Gould, Birds Asia, Vol. 3, pl. 72.

Hab. Eastern China (Shanghai, Ningpo), apparently also in Hupeh and Kansu : Corea.

20. ***Suthora webbiana suffusa*** Swinhoe.

Suthora suffusa Swinhoe, Proc. Zool. Soc. Lond. 1871, p. 372 (1871) (« about the mountainous sides of the gorges of the upper Yangtze »).

Hab. Central China : valley of the Yangtze kiang (Kiukiang, Ichang, Shashi southwards to Fohkien.

21. ***Suthora webbiana bulomachus*** Swinhoe.

Suthora bulomachus Swinhoe, The Ibis (new ser.) Vol. 2, p. 300, pl. 9 (1886) (Formosa).

Hab. Island of Formosa.

22. ***Suthora webbiana brunnea*** Anderson.

Suthora brunnea Anderson, Proc. Zool. Soc. Lond. 1871, p. 211 (1871) (Momien, Yunnan).

Fig. Anderson, Results Yunnan Exp. Vol. 2, pl. 49, fig. inf.

Hab. S. W. China : Momien in Western Yunnan, west of the Salween River.

23. ***Suthora webbiana styani*** Rippon.

Suthora styani Rippon, Bull. Brit. Ornith. Club, Vol. 13, p. 54 (1903) (Tali Valley, W. Yunnan).

Hab. S. W. China : Tali Valley in Western Yunnan, east of the Mékong River.

18. GENUS NEOSUTHORA NOV. GEN.

Characters. Bill very much larger and quite differently shaped, as compared with the members of the genus *Suthora*. Upper mandible much deeper, culmen less convex, with the mesorhinium much broadened and flattened, and not distinctly curved towards the tip; commissure, as in *Suthora* and *Psittiparus*, with scarcely an indication of a slight sigmoid curve; lower mandible of nearly the same shape as in *Suthora*, but more swollen, deeper and in the apical portion even more abruptly turned upwards. Tip of bill conspicuously blunt and obtuse, even more so than in the species of the extreme *Chleuasiscus*-type. Wings more rounded than in *Suthora*, the fourth to seventh primaries being the longest. First primary well developed, more than half as long as the longest remex. Tail, composed of rather narrow, pointed feathers, much shorter than in *Suthora*, about three-fourths as long as the wing and, instead of being strongly graduated, but slightly rounded; the outermost rectrix falling short of the other tail-feathers, which are nearly equal, by about the length of the hind toe without claw. Legs and feet decidedly stronger and more robust than in *Suthora*. Plumage less copious and not so soft. Sexes alike. Type of the genus : *Suthora davidiana* Slater.

Coloration. Top and sides of the head bright cinnamon-rufous; back pale slate-grey, with or without olive tinge; wings and tail-feathers dusky, exteriorly margined with bright

rufescent brown; chin and upper throat black; lower throat and chest greyish, washed with buffish on middle of breast; flanks, abdomen and lower tail coverts clear brownish ochraceous. Bill yellow. Wing 50-52, tail 36-38 mm.

Geographical Distribution. Mountain-ranges of Southern China (Fohkien), and of southern Shan States in Burma.

KEY TO THE SUBSPECIES OF NEOSUTHORA

1. *Black throat-feathers with distinct white apical spots. Cinnamon-rufous of head clearer and extending on to the upper back* 1. *N. DAVIDIANA DAVIDIANA.*
- *Throat-feathers uniform black. Cinnamon-rufous of head deeper and restricted to pileum and nape* 2. *N. DAVIDIANA THOMPSONI.*

1. *Neosuthora davidiana davidiana* (Slater). (Pl. 3, Fig. 1.) 92

Suthora davidiana Slater, The Ibis (7), Vol. 3, p. 172, pl. 4, f. 1 (1889) (Kuatun, N. W. Fohkien).

Hab. Mountains of N. W. Fohkien, South China.

2. *Neosuthora davidiana thompsoni* (Bingham).

Suthora thompsoni Bingham, Bull. Brit. Ornith. Club, Vol. 13, p. 63 (1903) (Kyatpyin near Paunglaung stream, Loilong, southern Shan States).

Fig. The Ibis (8), Vol. 3, 1903, pl. 11, f. 2.

Hab. Upper Burma, southern Shan States : Kyatpyin near the Paunglaung River in the Loilong State, at altitudes of 2500 feet.

19. GENUS PSITTIPARUS HELLMAYR

Scæorhynchus (nec E. B. Wilson 1881, *Pycnogonidae*!) E. W. Oates, Fauna Brit. India, Birds, Vol. 1, p. 68 (1889) (sp. typ. : *Paradoxornis ruficeps* Blyth).

Psittiparus Hellmayr, Tierreich, Livr. 18, p. 163 (1903) (same type).

Characters. In general structure the members of this genus are not unlike *Neosuthora*, but, besides being much larger, they have the tail proportionately longer and a differently shaped bill. The culmen is far more convex and in its apical portion strongly curved, the mesorhinium not flattened at all, being somewhat elevated and decidedly rounded; the sigmoid curve of the commissure rather more pronounced; the lower mandible less high and not so swollen, with the gonys not abruptly ascending; the tip of the bill, though not acute, distinctly pointed, not blunt. In the wing the fifth, sixth and seventh primaries are the longest, the first primary somewhat more than half as long as the wing. Tail about four-fifths of the length of the wing, slightly rounded; the outermost rectrix being from 10 to 15 mm. shorter than the central one; the penultimate rectrix about 6 mm. longer, but a little shorter than the third and so on. Legs and feet relatively stronger than in *Neosuthora*, apparently more adapted to terrestrial habits.

Coloration. Back and wings clear olive or pale rufescent brown, tail duller, more greyish. In one species (*P. ruficeps*) the top and sides of the head are bright ferruginous, in the other (*P. gularis*) the upper part of the head is ashy grey, with a well-defined black frontal- and superciliary stripe, while the lores, cheeks and ear coverts are white, more or less shaded with pale cinereous. Bill (in skin) bright yellow.

Geographical Distribution. The species of *Psittiparus* inhabit the mountains of India, Burma, Southern China and the island of Hainan, at elevations of from 2500 to 8000 feet.

Habits. These birds frequent bamboo-thickets, reeds and tall grasses. They construct a cup-shaped nest of grass-stalks, coated externally with a few cobwebs and lined inside with stripes of bamboo-stems; its eggs, three in number, are white, spotted and blotched with grey and pale brown.

KEY TO THE SPECIES AND SUBSPECIES OF PSITTIPARUS

1. Top and sides of the head and neck clear ferruginous. Throat and foreneck white or buff 2. (*P. RUFICEPS*).
- Crown and nape cinereous; narrow frontal band and long superciliaries black. Lores and cheeks white, ear coverts and sides of the neck whitish or pale cinereous. A black patch on the throat 3. (*P. GULARIS*).
2. Bill smaller : 14, wing averaging shorter : 85-88 mm. Under surface of body white, chest and flanks faintly shaded with pale buff 1. *P. RUFICEPS RUFICEPS*.
- Bill larger : 16-17, wing averaging longer : 87-95 mm. Under surface of body strongly tinged with deep buff or fulvous buff. 2. *P. RUFICEPS BAKERI*.
3. Under surface of body strongly suffused with fulvous buff. Wing 83-88 mm. 4. *P. GULARIS TRANSFLUVIALIS*.
- Under surface of body white. 4.
4. Black throat-patch smaller and higher up on the chin. Subocular region and ear coverts white or greyish white. Wing 90-95 mm. 3. *P. GULARIS GULARIS*.
- Black throat-patch larger and lower down, leaving a distinct white space on the chin. Subocular region and cheeks cinereous 5.
5. Larger : wing 97-100, tail 88-90 mm. 5. *P. GULARIS FOKIENSIS*.
- Smaller : wing 84-87, tail 80-83 mm. 6. *P. GULARIS HAINANUS*.

1. *Psittiparus ruficeps ruficeps* (Blyth).

Paradoxornis ruficeps Blyth, Journ. Asiat. Soc. Bengal, Vol. 11, I, p. 177 (1842) (« Bootan »).

Fig. Gould, Birds Asia, Vol. 3, pl. 78.

Hab. Eastern Himalayas : Sikkim and Bhutan.

2. *Psittiparus ruficeps bakeri* (Hartert).

Scacorchynchus ruficeps bakeri Hartert, Novit. Zool. Vol. 7, p. 548 (1900) (Hungrum, North Cachar).

Hab. Assam : hills south of the Brahmaputra (Khasia hills, Cachar) and Burma, southwards to Karennee, and Tenasserim (as far south as Thoungyah).

3. *Psittiparus gularis gularis* (Gray).

Paradoxornis gularis Gray, Genera Birds, Vol. 2, p. 389, pl. 94, f. 2 (1845) (no locality; we fix Sikkim as type locality).

Paradoxornis caniceps Blyth, Journ. Asiat. Soc. Bengal, Vol. 18, II, p. 810 (1849) (Darjiling).

Fig. Gould, Birds Asia, Vol. 3, pl. 77.

Hab. Eastern Himalaya : Sikkim and Bhutan, at elevations of from 3000 to 6000 feet.

4. *Psittiparus gularis transfluvialis* (Hartert).

Scacorchynchus gularis transfluvialis Hartert, Novit. Zool. Vol. 7, p. 548 (1900) (Guilang, North Cachar).

Hab. Assam : hill ranges south of the Brahmaputra R. (Khasia hills, Cachar); Burma (Karennee, Loilong, southern Shan States).

5. *Psittiparus gularis fokiensis* (David).

Heteromorpha Fokiensis David, Ann. Sc. Nat. Zool. 15, Vol. 10, art. no. 9, p. 4 (1874) (« à Koatén, dans le Fokien occidental »).

Fig. David & Oustalet, Ois. Chine, pl. 61.

Hab. South China : Mountains of West Fokien.

5. *Psittiparus gularis hainanus* Rothschild.*Psittiparus gularis hainanus* Rothschild, Bull. Brit. Ornith. Club, Vol. 14, p. 7 (1903) (Mount Wuchi, Hainan).

Hab. Mountains of the Island of Hainan.

20. GENUS *CONOSTOMA* HODGSON*Conostoma* Hodgson, Journ. Asiat. Soc. Bengal, Vol. 10, 11, p. 856 (1841) (sp. un. : *C. æmodius*).

Characters. Bill longer and less elevated than in the preceding genera, with the culmen not so strongly convex; commissure without the slightest trace of a sigmoid curve, gonys straight, at the tip slightly ascending. Wing rounded; sixth and seventh primaries forming the tip, the first (spurious) quill somewhat exceeding two-thirds of the second primary. Tail slightly graduated, and distinctly longer than the wing. Acrotarsium covered in front with large scutes. Toes long and robust, the hind toe with rather long, strongly curved claw. Plumage long and soft. Sexes alike.

Coloration. Upper parts dull rufescent brown, forehead brownish white; lores and feathers in front of the eye dark brown. Wings greyish brown, outer webs of secondaries on basal portion bright rufescent brown. Tail-feathers greyish brown, along the shaft washed with rufescent brown. Under surface dingy greyish brown, more brownish on flanks, more greyish in the middle of the belly; throat with indistinct whitish longitudinal streaks. Axillaries and under wing coverts light buff. Bill dark yellow. Wing 120-130, tail 130-140, bill 23-24 mm.

Geographical Distribution. Eastern Himalaya (Nepal and Sikkim) at elevations of from 10,000 to 11,000 feet, and high mountains of Western China (Szechuen, Kansu).

Habits. « Constructs a hemispherical nest of dry stems and blades of grass and bamboo-leaves on a branch of a bamboo in May. The eggs, probably three in number, are dull white, blotched and streaked with yellowish brown and spotted about the larger end with dark purple » (Oates).

1. *Conostoma æmodium* Hodgson.*Conostoma æmodius*, *C. oemodius*, *C. omadius*, Hodgson, Journ. Asiat. Soc. Bengal, Vol. 10, 11, pp. 856, 857, with plate (1841) (« Northern Region of Nepal »).

Fig. Gould, Birds Asia, Vol. 3, pl. 31.

Hab. Eastern Himalaya (Nepal, Sikkim) and high Mountains of Western China (Szechuen, Kansu).

N. B. I have not seen specimens from any Chinese locality.

5. SUBFAM. PANURINÆ

THE BEARDED TITS

Characters. Bill very short, about as long as inner toe without claw, broadened at base, where its width slightly exceeds its depth; culmen rounded, abruptly decurved in apical half, with uncinat tip; maxillary commissure distinctly convex; gonys but little ascending terminally. Nasal fossæ large, roundish operculate, the slit-like, nasal opening situated near lower edge and entirely concealed by the dense, antrorse, bristly latero-frontal plumules. Rictal bristles well developed, though rather short and soft, not reaching beyond basal third of bill.

Tongue horny, obtuse, divided at the end, terminating in a few horny bristles. Wing moderately long, narrow and somewhat pointed, third, fourth and fifth primaries longest and nearly equal in length, sixth a little shorter; second as long as sixth; first primary rudimentary, reduced to an excessively narrow, lanceolate feather, even shorter than primary coverts. Tail much lengthened, very much longer than wing, exceedingly graduated, outermost rectrix scarcely half as long as median; rectrices narrow, attenuated at tip. Under tail coverts remarkably well-developed, in length equal to outermost rectrix. Tarsus strong, about twice as long as middle toe without claw; acrotarsium distinctly scutellate; middle toe longest, outer toe slightly longer than inner one; claws slender, compressed, acute; hallux stouter and shorter than the other toes, its claw much stronger. Wing 57-63, tail 75-90 mm.

Coloration. Plumage soft, though less copious than in the *Parinae*. Sexes different, the male ornamented by a broad black moustache of elongated feathers. The adult male is a very elegantly coloured creature. Top of the head, nape and ear coverts delicate pale grey, passing into white on frontal edge and sides of neck. Lores, cheeks and moustache deep velvety black. Back and rump deep cinnamon-buff; upper tail coverts brownish pink; scapulars white; wing coverts black, broadly edged with colour of back; primary coverts and bastard-feathers blackish, with broad white edges; primaries dark grey-brown, the outer ones with white, the remaining with isabelle margins; secondaries dark greyish brown, broadly edged with deep cinnamon-buff; the three innermost with a broad black stripe along the shaft and nearly white on inner web. Rectrices isabelle-colour, below more cinnamon, the two outer pairs black on basal portion and with a long white tip. Throat and breast white, sides of breast washed with pale pink, flanks cinnamon-buff; under tail coverts deep velvety black. The female differs by having the head above and nape pale brownish, the sides of the head dingy white, without the black mystacial stripe, and the under tail coverts very pale buff. The black of the outer rectrices, too, is less pronounced. The young have the middle of the back and the rectrices (except the median pair) mostly blackish; the first primary is well developed, of normal shape and almost half as long as second. Bill yellow.

Geographical Distribution. South- and Western Europe, and Palæarctic Asia eastward to Northern China and Amoorland. One species with two subspecies.

Habits and Nidification. The Bearded Tit lives exclusively in extended reed-thickets and marshes. Its call-note and song are not unlike those of the true *Parinae*, which it also resembles in habits and food. The nest, an open, cup-shaped, loose structure of dried reed-stems, grasses, leaves etc., inside lined with various soft material, feathers etc., is placed on or near the ground. The clutch consists of from five to seven roundish eggs, which are glossy or buffy white, speckled with blackish brown. Two broods: one in April and May, the second from June to the beginning of August.

21. GENUS PANURUS C. L. KOCH

Panurus C. L. Koch, Syst. Baier. Zool. p. 201 (1816) (sp. un. : *P. biarmicus*).

Calamophilus Leach, Cat. Mamm. Birds Brit. Mus. p. 17 (1816) (sp. un. : *C. biarmicus*).

Mystacinus Boie, Isis. p. 556 (1822) (sp. typ. : *M. barbatus*).

Hypenites Gloger, Gemeinn. Naturg. Vögl. Deutschl. p. 281 (1842) (sp. un. : *H. barbatus*).

Characters, Habits, Nidification as those of the Subfamily.

KEY TO THE SUBSPECIES OF PANURUS BIARMICUS

1. Back and rump deeper, cinnamon-brown; upper tail coverts faintly washed with pink 1. *P. BIARMICUS BIARMICUS*.
 — Back and rump paler, more cinnamon-buff; upper tail coverts decidedly washed with pink 2. *P. BIARMICUS RUSSICUS*.

1. *Panurus biarmicus biarmicus* (Linnæus). (Pl. 2, Fig. 10.)

Parus biarmicus Linnæus, Syst. Nat., ed. 10, p. 190 (1758) («Habitat in Europa»); based on Albin, Avium, Vol. 1, p. 46, pl. 48, and Edwards, Nat. Hist. Birds, Vol. 2, p. 55, pl. 55. Albin's figure is barely recognizable, while that of Edwards unquestionably refers to the dark-coloured western bird. Moreover, the latter author expressly states that the specimens described were brought alive from Copenhagen and adds having seen others «shot among the reeds in marshes near London»).

Parus barbatus Pallas, Zoogr. Rosso-Asiat. Vol. 1, p. 549 (1827) (new name for *P. biarmicus* Linnæus).

Mystacinus arundinaceus Brehm, Handb. Naturg. Vög. Deutschl. p. 474 (1831) («bewohnt den Nordosten der alten Welt, wandert aber im Herbst und kommt dann an die Küste der deutschen Ostsee, häufig nach Holland, sogar, jedoch selten an den Eisleber und andere grosse Seen unseres Vaterlandes»). Pure hypothetical speculations, for the Bearded Tit never occurred in any part of N. E. Europe; the birds said to have nested on the salt-lakes near Eisleben, Thuringia, most certainly belonged to the western race.

Mystacinus dentatus Brehm, ibidem, p. 474 (1831) (Holland).

Panurus biarmicus occidentalis Tschusi, Ornith. Jahrb. Vol. 15, p. 228 (1904) (Venetia).

Fig. Dresser, Birds Europe, Vol. 3, pl. 102.

Hab. South Europe (Italy, north to Venetia and Lombardy, Southern France, Eastern Spain); England (nowadays only breeding in Norfolk); Holland; formerly breeding in the marshes of Northern Germany as far east as Mecklenburg. It was probably this form that is reported to have nested on the salt-lake near Eisleben, Thuringia.

2. *Panurus biarmicus russicus* (Brehm).

Mystacinus Russicus Brehm, Handb. Naturg. Vög. Deutschl. p. 472 (1831) («sie lebt in Russland, kommt im Herbst und Winter nach Ungarn und in die Nähe von Wien»).

Calamophilus sibiricus Bonaparte, Compt. Rend. Acad. Sc. Paris, Vol. 43, p. 414 (1856) («Kamtschatka», locality erroneous).

Panurus biarmicus raddei Prazák, Journ. f. Ornith. Vol. 45, p. 288 (1897) (based on Radde [Ornis, Vol. 3, 1887, p. 477 : Astara near Lenkoran, Caspian Sea], who described a young bird as adult).

Hab. Breeding in Eastern Europe (East Galicia, Hungary, Roumania, South Russia), Asia Minor, Persia, West Siberia, Turkestan (Zaidam, Kookonor, Ordos), Manchooria as far east as Sidemi, Amoor Bay, in S. E. Siberia. It is probably this form that appears in Greece during the winter months.

6. SUBFAM. CERTHIPARINÆ

It is proposed to associate, in this group, the three New Zealand genera *Mohoua*, *Certhiparus* and *Finschia*, although I must confess that I have serious doubts as to whether they really have any close relations to the *Paridae*, and whether the last-named genus may not ultimately prove to be altogether different from the two others. Yet the three species agree *inter se* in the exceedingly long, rather robust tarsus, a character which separates them at a glance from all the other members of the family of Tits. *Mohoua*, furthermore, differs very markedly in the proportions of the toes, while *Finschia* and *Certhiparus* resemble, in this respect, the true Tits. The last-named genus and *Mohoua*, on the other hand, present another striking character in the pointed rectrices with the shafts stiffened and acuminate, indicating arboreal habits, whereas

Finschia has soft, rounded tail-feathers, as well as a much smaller, slenderer bill. Dr. Finsch considers *Mohoua* to be nearly allied to the Timeline genus *Orthonyx*, and refers the two others to the *Paridae*. Until careful anatomical investigations of the three types have been made every classificatory attempt must necessarily be regarded as provisional.

Characters. Bill much shorter than head, about equal to middle toe (without claw), at base as wide as, or even wider than deep, distinctly compressed, at least for terminal portion; culmen conspicuously decurved terminally; gonys nearly straight, but slightly ascending towards the tip. Rictal bristles obvious. Nostrils basal, distinctly operculate, posteriorly overhung by antrorse, latero-frontal plumules. Wing short, either somewhat pointed (*Mohoua*, *Certhiparus*) or distinctly rounded (*Finschia*); fourth and fifth, or fifth and sixth, primaries longest; first primary much more than half as long as second; wing-tip very much less than length of tarsus. Tail graduated, extremely variable as to relative length and shape of rectrices. Tarsus robust, fully twice as long as middle toe (without claw); acrotarsium scutellate or booted; proportion of toes variable (see key); middle toe adherent to outer one for greater part of basal phalanx, to inner toe for a less distance. Claws very strong, much curved, with acute tip. Plumage soft and copious as in the *Paridae*.

Coloration variable. *Mohoua* and *Certhiparus* have the head of the same colour as the under parts, yellow in the former, dingy white in the latter; back and wings brown, rectrices dull olive in *Mohoua*, pale brown in *Certhiparus*. *Finschia* has the crown, upper tail coverts and the tail rufous-brown, the latter crossed by a blackish band, the sides of head and nape dark ashy, the back brown, the lower parts isabelline-buff.

Geographical Distribution. New Zealand.

KEY TO THE GENERA OF CERTHIPARINÆ

1. Tail much shorter than the wing, rectrices with shafts stiffened and distinctly projecting. Outer and middle toes equal in length, much longer than inner toe. 22. Genus *MOHOUA*.
— Tail equal to, or longer than, the wing. Middle toe longest, outer toe slightly longer than the inner one 2.
2. Bill rather broadened at base, where its width decidedly exceeds its depth, slightly compressed terminally. Tail about equal to wing, with rectrices acuminate at tip 23. Genus *CERTHIPARUS*.
— Bill slender, much compressed laterally, at base fully as deep as wide. Tail decidedly longer than wing, with rectrices soft and broadly rounded at tip 24. Genus *FINSCHIA*.

22. GENUS *MOHOUA* LESSON

Mohoua Lesson. Compl. Œuvr. Buffon, Vol. 9, p. 139 (1837) (sp. typ. : *Mohoua hua* Lesson).

Clitonyx Reichenbach. Avium Syst. pl. 38 (1849) (sp. typ. : *Clitonyx ochrocephalus* Gmelin).

Characters. Bill much shorter than head, somewhat broadened at base, where its width decidedly exceeds its depth, much compressed terminally; culmen distinctly ridged, strongly decurved in apical portion; gonys nearly straight. Nostrils basal, operculate, only posteriorly

concealed by antrorse latero-frontal plumules. Rictal bristles distinct, though soft and short, not reaching beyond anterior end of nasal fossa. Wing long, rather pointed; fourth and fifth primaries longest, sixth but little shorter, though conspicuously longer than third; second falling between eighth and ninth; first primary well developed, broad, much more than half as long as second. Tail much shorter than wing, graduated, rectrices somewhat pointed at tip, with the shafts stiffened and distinctly projecting. Tarsus robust, very long, much longer than middle toe with claw; acrotarsium scutellate, the scutes, however, often fused into a single lamina, the divisions being obliterated. Toes long, outer and middle toes equal in length, and conspicuously longer than inner toe; outer toe adherent to middle toe for its entire basal phalanx; hallux about equal to outer toe or slightly longer, but much stouter; claws robust, strongly curved, especially that of hallux, which is scarcely shorter than the digit. Wing 80-84, tail 62-70, tarsus 25-28, bill about 13 mm.

Coloration. Sexes alike. Plumage soft and copious. Head all round, foreneck, breast and abdomen bright lemon-yellow, sides and flanks dull olive-brownish; under tail coverts dingy white, with dusky bases. Back, rump and upper tail coverts dull greenish olive-brown. Wings dusky, edged with olive-brown. Tail dull greenish olive, paler beneath, with shafts above reddish brown, below whitish. Bill black. Feet brown. The young birds differ from the adult ones in having the yellow portions of the plumage duller, and the head above obscured by dusky olive edges to the feathers.

Geographical Distribution. New Zealand.

Observations. The systematic position of this bird is still very uncertain. In structural characters, it shows a great likeness to the Australian genus *Orthonyx*, commonly referred to the *Timeliidae*, and I should not be surprised if it would ultimately prove to belong to this group rather than to the *Paridae*. From the latter it very markedly differs by its very long, thick tarsus, the proportion of the toes and by having the shafts of the rectrices stiffened and projecting.

1. **Mohoua ochrocephala** (Gmelin). (Pl. 3, Fig. 6)

Muscicapa ochrocephala Gmelin, Syst. Nat. Vol. 1, II, p. 944 (1789) (based on « Yellow-headed Flycatcher », Latham, Gen. Syn. Birds, Vol. 2, I, p. 342 : « Queen Charlotte's Sound, in New Zealand »).

Certhia heteroclitus Quoy & Gaimard, Voyage Astrolabe, Vol. 1, p. 223, Ois. pl. 17, f. 1 (1830) (« habite la baie Tasman »).

Mohoua hua Lesson, Compl. Oeuv. Buffon, Vol. 9, p. 139 (1837) (Nouvelle-Zélande).

Orthonyx icterocephalus Lafresnaye, Rev. Zool. Vol. 2, p. 257 (1839) (« in insulis les Marquises dictis », errore!).

Parus heteroclytus Lafresnaye, Mag. Zool. Cl. 2, Ois. pl. 8 (1839) (Nouvelle-Zélande).

Muscicapa chloris Forster, Descr. Anim. Austr. p. 87 (1844) (« in insula australi Novæ Zeelandiæ »).

Fig. Buller, Hist. Birds New Zeal., ed. 2, Vol. 1, 1887, pl. 6.

Hab. South Island of New Zealand.

23. GENUS CERTHIPARUS LAFRESNAYE

Certhiparus Lafresnaye, Rev. Zool. Vol. 5, p. 69 (1842) (sp. typ. : *Parus senilis* Dubus).

Certhioparus Agassiz, Nomencl. Zool., Index, p. 75 (1846) (nom. emend.).

Phyllodytes (nec Wagler 1830, *Amphibia*!) Finsch, Journ. f. Ornith. Vol. 21, p. 397 (1873) (nom. emend. pro *Certhiparus* Lafresnaye).

Characters. Bill similar in shape to that of *Mohoua*, but rather slenderer. Nostrils basal, operculate and posteriorly concealed by the antrorse, latero-frontal plumules, exactly as in *Mohoua*. Rictal bristles equally short, but somewhat stronger and stiffer. Wing long, pointed; fifth and sixth primaries longest, fourth and seventh but a little shorter; third falling between seventh and eighth; second about equal to tenth, scarcely longer than secondaries; first primary conspicuously longer than half the second. Tail very long, about equal to wing, strongly graduated; rectrices rather pointed, with the shafts acuminate and slightly projecting, but much less stiffened than in *Mohoua*. Tarsus much slenderer than in *Mohoua*, conspicuously longer than middle toe with claw; acrotarsium booted, sometimes a few obsolete scutes on lower portion. Toes more slender than in *Mohoua*; middle toe longest, outer toe slightly longer than inner one; hallux about as long as outer toe, but stouter, its claw decidedly shorter than the digit. Claws shorter and much more compressed than in *Mohoua*, strongly arched. Wing 70-75, tail 70-73, tarsus about 26, bill 12 mm.

Coloration. Plumage soft and copious. Sexes alike. Head all round, breast and middle of abdomen white, shaded with greyish on crown, with buffy on belly; flanks washed with brownish. Back pale reddish brown; lesser upper wing coverts paler brown, the median and greater series dusky, with broad whitish brown edges; remiges and rectrices brown, the former exteriorly edged with paler brown. Bill and feet black. Young birds are duller in colour, the white of the pileum is mixed with brown and the under parts are less purely white.

Geographical Distribution. New Zealand.

Observations. While closely resembling *Mohoua* in shape of bill and tail as well as in style of coloration, yet *Certhiparus* is easily distinguished by its relatively longer tail, different proportion of the toes and different wing-formula.

1. ***Certhiparus albicilla*** (Lesson). (Pl. 3, Fig. 8.)

Fringilla albicilla Lesson, Voy. Coquille, Vol. 1, n. p. 662 (1828) « à la baie des Iles à la Nouvelle-Zélande ».

Parus senilis Dubus, Bull. Acad. Bruxelles, Vol. 6, 1, p. 297 (1839) (Nouvelle-Zélande).

Clitonyx albicapilla W. L. Buller, Hist. Birds New Zeal., ed. 2, Vol. 1, p. 53 (1887) (nom. emend.).

Certhiparus cinerea Ellman, The Zoologist, Vol. 19, p. 7465 (1861) (nom. nud.).

Fig. Buller, loc. cit. pl. 6.

Hab. North Island of New Zealand.

24. GENUS FINSCHIA HUTTON

Finschia Hutton, The Ibis (8), Vol. 3, p. 319 (sp. type: *Certhiparus novae zealandiae* auct.).

Characters. Bill very short, about half as long as head, slender, much compressed, its width at base being equal to its depth; culmen decidedly convex; gonys nearly straight. Rictal bristles numerous, well-developed, reaching almost to tip of bill. Nostrils basal, distinctly operculate, almost completely hidden by antrorse, latero-frontal plumules. Wing moderately long, rounded; fifth and sixth primaries longest, fourth little shorter, but decidedly longer than seventh; third falling between seventh and eighth, second equal to tenth; first primary conspicuously longer than half the second. Tail much longer than wing, strongly graduated, with rectrices soft and broadly rounded at tip, shafts not stiffened nor projecting. Tarsus shorter

than in the preceding genera, though still conspicuously longer than middle toe with claw; acrotarsium booted or very indistinctly scutellate. Toes slender and of the same proportions as in *Certhiparus*, the middle toe being longest, the outer toe slightly longer than inner one; hallux about as long as inner toe, but much stouter. Claws as in *Certhiparus*. Wing 60-65, tail 65-70, tarsus 22-23, bill about 11 mm.

Coloration. Plumage exceedingly lax and copious. Sexes alike. Forehead and crown dull rufous; sides of the head and neck, as well as a broad band round the nape, dark ashy grey; behind the eye a more or less distinct greyish white streak. Back and upper wing coverts warm rufescent brown, remiges dusky, edged with rufescent brown. Upper tail coverts and rectrices cinnamon-brown, the latter (except the two middle pairs) with a broad blackish band across inner web. Under parts buff, palest on throat, deepest on belly. Bill and feet pale brown.

Geographical Distribution. New Zealand.

Observations. The genus *Finschia* is very distinct from *Mohoua* and *Certhiparus*, though agreeing with the latter in proportion of toes. It may be recognized by its very much smaller bill, and by having the tail distinctly longer than the wing, with the rectrices broadly rounded, not acuminate at tip.

1. *Finschia novæ-seelandiæ* (Gmelin). (Pl. 3, Fig. 7.)

Parus novæ Seelandiæ Gmelin, Syst. Nat. Vol. 1 II, p. 1013 (1789) (based on « New Zealand Titmouse ». Latham. Gen. Syn. Birds, Vol. 2, II, p. 558 : « Dusky Bay, New Zealand »).

Certhiparus maculicaudus G. R. Gray, in E. Dieffenbach, Travels in N. Zealand. Vol. 2, p. 189 (1843) (New Zealand).

Parus urostigma G. R. Forster, Descr. Anim. Austr. p. 90 (1844) (« in insula australi Novæ Zeelandiæ »).

Fig. Buller, Hist. Birds New Zeal., ed. 2, Vol. 1, 1887, pl. 6.

Hab. South Island of New Zealand.

EXPLANATION OF PLATES

PLATE I

- Fig. 1. Head of *Penthornis semilarvatus*.
 — 2. Head of *Parus rex* ♂ ad.
 — 3. Head of *Parus funereus*.
 — 4. Head of *Parus ater cypriotes*.
 — 5. Head of *Parus ater ledouci*.
 — 6. Foot of *Parus major major*.
 — 7. Entire figure of *Parus nigriloris*.
 — 8. Head of *Parus atricapillus montanus*.
 — 9. Head of *Parus palustris communis*.
 — 10. Head of *Parus superciliosus*.
 — 11. Head of *Parus cyanus cyanus*.
 — 12. Head of *Parus cyanus tianschanicus*.

PLATE 2

- Fig. 1. Head of *Aphelocephala leucopsis leucopsis*.
 — 2. Head of *Psalttria exilis*.
 — 3. Head of *Remiza pendulina caspia*.
 — 4. Head of *Auriparus flaviceps flaviceps*.
 — 5. Foot of *Cholornis paradoxa*.
 — 6*a*. Head of *Melanochlora sultanea sultanea* ♂ ad.
 — 6*b*. Tail of *Melanochlora sultanea sultanea*.
 — 7*a*. Head of *Parisoma plumbeum plumbeum*.
 — 7*b*. Foot of *Parisoma plumbeum plumbeum*.
 — 8. Entire figure of *Parus varius owstoni*.
 — 9. Tail of *Parus major major*.
 — 10. Tail of *Panurus biarmicus biarmicus*.

PLATE 3

- Fig. 1. Head of *Neosuthora davidiana davidiana*.
 — 2. Head of *Paradoxornis heudei*.
 — 3. Head of *Suthora conspicillata*.
 — 4. Entire figure of *Ægithaliscus fuliginosus*.
 — 5. Entire figure of *Anthoscopus ansorgei*.
 — 6. Foot of *Mohoua ochrocephala*.
 — 7. Foot of *Finschia novæ-seelandiæ*.
 — 8. Foot of *Certhiparus albicilla*.
 — 9. Tail of *Ægithalos caudatus caudatus*.

Munich, 15th October 1911.

FAM. PARIDÆ

1. PENTHORNIS SEMILARVATUS. 2. PARUS REX ♂ AD. 3. PARUS FUNEREUS. 4. PARUS ATER CYPRIOTES.
 5. PARUS ATER LEDOUCL. 6. FOOT OF PARUS MAJOR MAJOR. 7. PARUS NIGRILORIS. 8. PARUS ATRICAPILLUS MONTANUS.
 9. PARUS PALUSTRIS COMMUNIS. 10. PARUS SUPERCILIOSUS. 11. PARUS CYANUS CYANUS. 12. PARUS CYANUS FIANSCHIANICUS.

FAM. PARIDÆ

1. APHELOCEPHALA LEUCOPSIS LEUCOPSIS. 2. PSALTRIA EXILIS. 3. REMIZA PENDULINA CASPIA.
 4. AURIPARUS FLAVICEPS FLAVICEPS. 5. FOOT OF CHOLORNIS PARADOXA. 6a. MELANOCHLORA SULTANEA SULTANEA ♂ AD.
 6b. TAIL OF MELANOCHLORA SULTANEA SULTANEA. 7a. PARISOMA PLUMBEUM PLUMBEUM.
 7b. FOOT OF PARISOMA PLUMBEUM PLUMBEUM. 8. PARUS VARIUS OWSTON. 9. TAIL OF PARUS MAJOR MAJOR.
 10. TAIL OF PANCRUS BIARMICUS BIARMICUS.

FAM. PARIDÆ

1. NEOSUTHORA DAVIDIANA DAVIDIANA. 2. PARADOXORNIS HEUDEL. 3. SUTHORA CONSPICILLATA.
 4. ÆGITHALISCUS FULIGINOSUS. 5. ANTHOSCOPUS ANSORGEI. 6. FOOT OF MOHOVA OCHIROCEPHALA.
 7. FOOT OF FINSCHIA NOVÆ-SEELANDIÆ. 8. FOOT OF CERTHIPARUS ALBICILLA. 9. TAIL OF ÆGITHALOS CAUDATUS CAUDATUS.

19TH PART

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BY L. BRASIL

THE *Gruidæ* or Cranes are large wading-birds. They form in the Order *Grues*, *Gruiformes*, or *Alectorides* a well-characterised Family.

Characters. The neck is long. The bill is straight, rather compressed, moderate in length, with nasal furrows, which reach beyond the middle of the upper mandible; the nostrils are elongated or oval, closed posteriorly by a large membran; the lower mandible is provided on each side with a lateral groove. The legs are very long. The tibiæ are partly bare. The metatarsi are slender, scutellated in front, reticulated behind. The toes are four in number; they are rather short, strong, and furnished with sharp hooked claws; the hallux is small, much elevated. The wings are ample and powerful; the inner secondaries exceed the primaries and are generally composed of drooping feathers with dissociated webs; sometimes the innermost are enormously lengthened. The tail is short; there are twelve rectrices. Feathers have an aftershaft.

Powder-down patches are absent. The oilgland is tufted.

The ambiens, semi-tendinosus, and accessory muscles are always present. The trachea is always convoluted, more or less, with the exception of *Balearica*. The gallbladder is present. The cæca are variable in length, from 7 to 20 cm. The skull is schizognathous, without basipterygoid processes and has occipital foramina. The impressions for the supra-occipital glands are slight and hard to see from above. The sternum is generally perforated in front when the trachea is convoluted.

Habits and Reproduction. Cranes, for the most part, are mainly vegetable-feeders, but they eat greedily mollusks and earthworms, and they pick up also any small mammal, reptile, amphibian or fish that comes in their way. They prefer usually to stay near water, in the neighbourhood of marshes or lagoons, also they are found on large open plains, sandy flats or on the sea-shore. Their voice is generally a sonorous trumpet-like note. Cranes are gregarious birds and form usually very large flocks, which in winter, for the northern species, migrate southwards. In the breeding season flocks break up into pairs. Nuptial ceremonies consisting mainly of special dances are sometimes found. Cranes are said to pair for life; they return

annually to the same breeding haunts. The nest is made in shallow water or on ground; it is a large conical mass of aquatic plants, a hole or a slight depression on the dry and bare ground. In rule two eggs are laid, sometimes, though rarely, they are three in number. The eggs are creamy white, olive brown or buff, more or less streaked and blotched with reddish brown, red or purplish grey spots. The nestling is covered with down and able to run soon after it is hatched.

Sexual characters are very slight. The male is usually larger, with the naked parts, if any, more conspicuous.

Range. The *Gruide* inhabit all the great zoogeographical Regions, except the New Zealand one and, in the Neotropical, south of Mexico. Nor are they never found in Malayan Archipelago, Papuasias and Polynesian Islands.

Bibliography. Tegetmeier Blyth, Nat. Hist. Cranes (1881); Sharpe, Cat. Birds Brit. Mus., Vol. 23, pp. 248-277 (1894); Blaauw, Monog. Cranes (1897); Sharpe, Hand-list Birds, Vol. 1, pp. 176-179 (1899); Dresser, Man. Pal. Birds, Vol. 2, pp. 717-723 (1903); Chalmers Mitchell, Proc. Zool. Soc. Lond. 1904, Vol. 2, pp. 200-205.

Two Subfamilies can be distinguished.

SUBFAM. A. GRUINÆ

Bill equal to or longer than the head. Nostrils linear. No tuft of straw-like bristles on the nape. Trachea convoluted.

The *Gruinæ* contain eight Genera.

SUBFAM. B. BALEARICINÆ

Bill shorter than the head. Nostrils oval and oblique. A tuft of straw-like bristles on the nape. Trachea without convolutions.

The *Balearicinæ* contain only a single Genus.

A. SUBFAM. GRUINÆ

KEY TO THE GENERA

A. *Crown of head naked.*

a. *Ears-coverts feathered like the cheeks and sides of neck.*

a'. *The cheeks wholly feathered* 1. Genus GRUS.

b'. *The cheeks more or less naked.*

a''. *Entire crown and whole of cheeks naked* 2. Genus LIMNOGERANUS.

b''. *Hinder crown and hinder cheeks feathered* 3. Genus LEUCOGERANUS.

b. *Ears-coverts represented by a patch of feathers* 4. Genus ANTIGONE.

B. *Crown of head feathered.*c. *The head wholly feathered.*c'. *Ears-coverts represented by moderately lengthened feathers* . . . 5. GENUS TETRAPTERYX.d'. *Ears-coverts represented by a very long tuft of silky feathers.* . . . 6. GENUS ANTHROPOIDES.d. *The head with a naked region.*e'. *The naked region confined at the base of the bill* 7. GENUS BUGERANUS.f'. *The naked region extending behind the ears* 8. GENUS PSEUDOGERANUS.

1. GENUS GRUS PALLAS

Grus Pallas, *Miscell. Zool.* pp. 66-67 (1766).Synonym : *Megalornis* Gray, *List Gen. Birds* (2. ed.), p. 85 (1841).Type : *Grus grus grus* (Linnæus).

Characters. Crown of head bare. Ears-coverts feathered and the cheeks feathered like them. Inner secondaries falcated and pointed, not much produced and consisting of more or less decomposed feathers. General colour grey or white.

Geographical Distribution. Europe. Northern Asia with China, Northern India and Japan. Northern Africa. Northern America from Alaska to Mexico inclusive.

KEY TO THE SPECIES AND SUBSPECIES

A. *Tail grey with or without the terminal part blackish.*a. *Throat grey.*a'. *General colour dark ashy grey including the inner secondaries* . . . 1. G. GRUS GRUS.b'. *General colour pearly grey, the inner secondaries lighter* . . . 2. G. GRUS LILFORDI.b. *Throat white.*c'. *Upper part of the neck grey.*a''. *Smaller. Tarsus not more than 22 cm* 3. G. CANADENSIS CANADENSIS.b''. *Larger. Tarsus more than 25 cm.* 4. G. CANADENSIS MEXICANA.d'. *Upper part of the neck white* 5. G. MONACHUS.B. *Tail blackish.* 6. G. NIGRICOLLIS.C. *Tail pure white* 7. G. JAPONENSIS.1. **Grus grus grus** (Linnæus) (Plate I, Fig. 1-3).Europe, N. and N. E.
Africa.*Ardea grus* Linnæus, *Syst. Nat.* ed. x. 1, p. 141 (1758).*Grus communis* Bechstein, *Naturg. Deutschl.* Vol. 3, p. 60 (1793).*Grus cinerea* Meyer & Wolf, *Taschenb.* Vol. 2, p. 350 (1810).*Grus vulgaris* Pallas (part.), *Zoogr. Rosso-Asiat.* Vol. 2, p. 106 (1811).*Megalornis grus* Gray, *List Gen. Birds*, ed. II, p. 85 (1841).*Grus communis* Tegetmeier & Blyth, *Nat. Hist. Cranes*, p. 59 (1881).*Grus grus* Sharpe, *Cat. Birds Brit. Mus.* Vol. 23, p. 250 (1894).*Grus communis* Blaauw (part.), *Monog. Cranes*, p. 1, pl. 1 (1897).*Grus grus* Sharpe, *Hand-list Birds* Vol. 1, p. 176 (1899).2. **Grus grus lilfordi** Sharpe.N. Asia to N. W. India
China and Hainan.*Grus vulgaris* Pallas (part.), *Zoogr. Rosso Asiat.* Vol. 2, p. 106 (1811).*Grus longirostris* Blyth (nec Temm. & Schleg.), *Birds Burm.* p. 157 (1875).*Grus communis* var. *orientalis* Tegetmeier & Blyth (nec Frankl.), *Nat. Hist. Cranes*,
p. 50 (1881).

Grus lilfordi Sharpe, Cat. Birds Brit. Mus. Vol. 23, p. 252 (1894).
Grus communis Blaauw (part.), Monog. Cranes, p. 1 (1897).
Grus lilfordi Sharpe, Hand-list Birds Vol. 1, p. 176 (1899).

3. ***Grus canadensis canadensis*** (Linnaeus).

N. E. Siberia, Arctic
 America, W. United
 States.

Ardea canadensis Linnæus, Syst. Nat. ed. x, 1, p. 141 (1858).
Grus fusca Vieillot, Nouv. Dict. d'Hist. Nat. Vol. 13, p. 558 (1817).
Grus fraterculus Baird, Cassin & Lawrence, Birds N. Am., p. 596 (1858).
Grus canadensis Tegetmeier & Blyth (part.), Nat. Hist. Cranes, p. 72 (1881).
Grus canadensis Sharpe, Cat. Birds Brit. Mus. Vol. 23, p. 256 (1894).
Grus canadensis Blaauw (part.), Monog. Cranes, p. 21 (1897).
Grus canadensis Sharpe, Hand-list Birds Vol. 1, p. 177 (1899).
Grus nirdiecki Reichenow, Ornith. Monatsber. Vol. 14, p. 256 (1906).

4. ***Grus canadensis mexicana*** (P. L. S. Müller).

United States to Mexico

Ardea (Grus) mexicana P. L. S. Müller, Syst. Nat. Suppl., p. 110 (1776).
Grus poliophaca Wagler, Syst. Av. Grus sp. 7 (1827).
Grus americana Gray (part.), Gen. Birds Vol. 3, p. 552 (1845).
Grus cinerea longirostris Temminck & Schlegel, Faun. Jap., p. 117, pl. 72 (1850).
Grus canadensis Tegetmeier & Blyth (part.), Nat. Hist. Cranes, p. 72 (1881).
Grus mexicana Sharpe, Cat. Birds Brit. Mus. Vol. 23, p. 254 (1894).
Grus canadensis Blaauw (part.), Monog. Cranes, p. 21 (1897).
Grus mexicana Sharpe, Hand-list Birds Vol. 1, p. 176 (1899).

5. ***Grus monachus*** Temminck.

E. Siberia, China, Japan.

Grus monachus Temminck, Pl. Col. Vol. 5, pl. 555 (1835).
Grus monacha Tegetmeier & Blyth, Nat. Hist. Cranes, p. 71 (1881).
Grus monachus Sharpe, Cat. Birds Brit. Mus. Vol. 23, p. 257 (1894).
Grus monachus Blaauw, Monog. Cranes, p. 15, pl. 4 (1897).
Grus monachus Sharpe, Hand-list Birds Vol. 1, p. 177 (1899).

6. ***Grus nigricollis*** Prjevalsky.

S. W. China.

Grus nigricollis Prjevalsky, Mong. Tang. Vol. 2, p. 135 (1876).
Grus nigricollis Prjevalsky, Rowley's Orn. Misc. Vol. 2, p. 436, pl. 6 (1877).
Grus nigricollis Tegetmeier & Blyth, Nat. Hist. Cranes, p. 70, pl. 11881).
Grus nigricollis Sharpe, Cat. Birds Brit. Mus. Vol. 23, p. 258 (1894).
Grus nigricollis Blaauw, Monog. Cranes, p. 8, pl. 2 (1897).
Grus nigricollis Sharpe, Hand-list Birds Vol. 1, p. 177 (1899).

7. ***Grus japonensis*** (P. L. S. Müller).

E. Siberia, Corea, China,
 Japan.

Ardea (Grus) japonensis P. L. S. Müller, Syst. Nat. Suppl., p. 110 (1776).
Antigone montignesia Bonaparte, C. R. Ac. Sc. Vol. 38, p. 661 (1854).
Grus leucogeranus Dybowski & Parvex, Journ. f. Orn. 1868, p. 337.
Grus viridirostris Tegetmeier & Blyth, Nat. Hist. Cranes, p. 53 (1881).
Grus japonensis Sharpe, Cat. Birds Brit. Mus. Vol. 23, p. 258 (1894).
Grus japonensis Blaauw, Monog. Cranes, p. 2, pl. 3 (1897).
Grus japonensis Sharpe, Hand-list Birds Vol. 1, p. 177 (1899).

2. GENUS LIMNOGERANUS SHARPE

Limnogeranus Sharpe, Bull. Brit. Ornith. Club, Vol. 1, p. xxxvii (1893).

Type : *Limnogeranus americanus* (Linnaeus).

Characters. Crown of head, forehead, cheeks and lores wholly devoid of feathers. Forehead provided with hair-like black bristles which hide the skin. Similar bristles on cheeks and lores but less numerous. Skin of the crown completely naked and flesh-coloured. Inner secondaries lengthened, pointed, decomposed and pendent.

Geographical Distribution. The same as that of the only Species.

1. **Limnogeranus americanus** (Linnæus) (Plate 1, Fig. 5).

Interior of N. America,
south to Florida and
Central Mexico.

- Ardea americana* Linnæus, Syst. Nat. ed. x. 1, p. 142 (1758).
Grus clamator Bartram, Trav. Florida. p. 292 (1791).
Grus struthio Wagler, Syst. Av. Grus sp. 6 (1827).
Grus hoyanus Dudley, Proc. Philad. Acad. Vol. 7, p. 64 (1864).
Grus americana Tegetmeier & Blyth, Nat. Hist. Cranes, p. 54 (1881).
Limnogeranus americanus Sharpe, Cat. Birds Brit. Mus. Vol. 23, p. 259 (1894).
Grus americanus Blauw, Monog. Cranes, p. 17, pl. 5 (1897).
Limnogeranus americanus Sharpe, Hand-list Birds Vol. 1, p. 178 (1899).

3. GENUS LEUCOGERANUS BONAPARTE

Leucogeranus Bonaparte, C. R. Acad. Sc. Paris, Vol. 40, p. 720 (1855).

Synonym : *Sarcogeranus* Sharpe, Bull. Brit. Orn. Club, Vol. 1, p. xxxvii (1893).

Type : *Leucogeranus leucogeranus* (Pallas).

Characters. Skin of the head devoid of feathers only on the fore part, till just behind the eyes; hinder crown and hinder cheeks consequently feathered.

Geographical Distribution. The same as that of the only Species.

1. **Leucogeranus leucogeranus** (Pallas) (Plate 1, Fig. 4).

E. Europe, N. and C. Asia,
Japan, N. W. India.

- Grus leucogeranus* Pallas, Reise Russ. Reichs. Vol. 2, p. 714, tab. F (1773).
Ardea gigantea S. G. Gmelin, Reise Russl. Vol. 2, p. 189 (1774).
Leucogeranus leucogeranus Bonaparte, C. R. Acad. Sc. Paris, Vol. 40, p. 720 (1855).
Grus polii Yule, Book Ser Marco Polo Vol. 1, p. 262 (1871).
Grus leucogeranus Tegetmeier & Blyth, Nat. Hist. Cranes, p. 38 (1881).
Sarcogeranus leucogeranus Sharpe, Cat. Birds Brit. Mus. Vol. 23, p. 261 (1894).
Grus leucogeranus Blauw, Monog. Cranes, p. 53, pl. 14 (1897).
Sarcogeranus leucogeranus Sharpe, Hand-list Birds Vol. 1, p. 178 (1899).

4. GENUS ANTIGONE REICHENBACH

Antigone Reichenbach, Handb. Spec. Orn., p. xxiii (1852).

Synonym : *Mathewsia* Iredale, Bull. Brit. Orn. Club, Vol. 27, p. 47 (1911).

Type : *Antigone antigone* (Linnæus).

Characters. Head and upper part of neck bare, except at the ears, which are covered by a patch of feathers. Coarse granulations on the hind neck. Inner secondaries pointed, not decomposed, visibly produced beyond the primaries.

Geographical Distribution. India, Burma, Cochinchina, Malay Peninsula, Australia.

KEY TO THE SPECIES

A. Upper neck naked on a large space.

- a. A white collar round the neck. Inner secondaries white 1. A. ANTIGONE.
 b. No white collar round the neck. Inner secondaries grey. 2. A. SHARPEI.

B. Upper neck naked on a very small space.

- c. Darker above and below 3. A. RUBICUNDA RUBICUNDA.
 d. Paler above and below 4. A. RUBICUNDA ARGENTEA.

1. **Antigone antigone** (Linnaeus) (Plate 2, Fig. 1.)

N. and C. India.

- Ardea antigone* Linnaeus, Syst. Nat. ed. 8, 1, p. 142 (1758).
Grus collaris Boddaert, Tabl. Pl. Enl., p. 52 (1783).
Grus torquata Vieillot, Nouv. Dict. d'Hist. Nat. Vol. 13, p. 500 (1817).
Grus antigone Tegetmeier & Blyth (part.), Nat. Hist. Cranes, p. 47 (1881).
Antigone collaris Sharpe, Cat. Birds Brit. Mus. Vol. 23, p. 262 (1894).
Grus collaris Blaauw, Monog. Cranes, p. 26, pl. 7 (1897).
Antigone antigone Sharpe, Hand-list Birds Vol. 1, p. 178 (1899).

2. **Antigone sharpei** Blanford.Burma, CochinChina,
Malay Peninsula.

- Grus antigone* Tegetmeier & Blyth (part.), Nat. Hist. Cranes, p. 47 (1881).
Antigone antigone Sharpe, Cat. Birds Brit. Mus. Vol. 23, p. 264 (1894).
Grus (Antigone) sharpei Blanford, Bull. Brit. Orn. Club Vol. 5, p. vi (1895).
Grus antigone Blaauw, Monog. Cranes, p. 29, pl. 8 (1897).
Antigone sharpei Sharpe, Hand-list Birds Vol. 1, p. 178 (1899).

3. **Antigone rubicunda rubicunda** (Perry).

E. and S. Australia.

- Ardea rubicunda* Perry, Arcana June 1810 (*vide* Mathews, Novit. Zool. Vol. 17, p. 499, 1910).
Grus australasiana Gould, Birds Austral. Vol. 6, pl. 48 (1848).
Grus australasianus Tegetmeier & Blyth, Nat. Hist. Cranes, p. 51 (1881).
Antigone australasiana Sharpe, Cat. Birds Brit. Mus. Vol. 23, p. 265 (1894).
Grus australasiana Blaauw, Monog. Cranes, p. 33, pl. 9 (1897).
Antigone australasiana Sharpe, Hand-list Birds Vol. 1, p. 178 (1899).
Mathewsia rubicunda Iredale, Bull. Brit. Orn. Club Vol. 27, p. 47 (1911).

4. **Antigone rubicunda argentea** (Mathews).

N. W. Australia.

- Mathewsia rubicunda argentea* Mathews, Novit. Zool. Vol. 18, p. 227 (1912).

5. GENUS TETRAPTERYX THUNBERG

Tetrapteryx Thunberg, K. Vet. Akad. Forh. Stockh. 1818, p. 242.Synonym : *Geranus* Bonaparte, C. R. Acad. Sc. Paris, Vol. 38, p. 661 (1854).Type : *Tetrapteryx paradisea* (Lichtenstein).

Characters. The head wholly feathered. Feathers of cheeks, ears and nape lengthened, dense and loose. No caruncles at the base of the bill. Innermost secondaries enormously prolonged and nearly touching the ground. Feathers of the lower throat and chest elongated and lanceolate as in Herons.

Geographical Distribution. The same as that of the only Species.

1. **Tetrapteryx paradisea** (Lichtenstein) (Plate 2, Fig. 2-3).S. Africa to Mashonaland
and Damaraland.

- Ardea paradisea* Lichtenstein, Cat. Rer. Rariss. Hamb. p. 28 (1793).
Tetrapteryx capensis Thunberg, K. Vet. Akad. Forh. Stockh. 1818, p. 242, t. 8.
Anthropoides stanleyanus Vigors, Zool. Journ. Vol. 2, p. 234, pl. 8 (1826).
Grus caffra Fritsch, Drei Jahre Sud-Afr., p. 108 (1868).
Grus paradisea Tegetmeier & Blyth, Nat. Hist. Cranes, p. 23 (1881).
Tetrapteryx paradisea Sharpe, Cat. Birds Brit. Mus. Vol. 23, p. 268 (1894).
Anthropoides paradisea Blaauw, Monog. Cranes, p. 41, pl. 11 (1897).
Tetrapteryx paradisea Sharpe, Hand-list Birds Vol. 1, p. 178 (1899).

6. GENUS ANTHROPOIDES VIEILLLOT

Anthropoides Vieillot, Analyse, p. 59 (1816).Synonyms : *Philorchemon* Gloger, Handb. Naturg., p. 438 (1842).*Scops* Gray, Gen. Birds, Vol. 3, p. 553 (1845).Type : *Anthropoides virgo* (Linnaeus).

Characters. The head wholly feathered. The ears covered with a very long tuft of silky feathers. Feathers of the lower throat elongated and pendent. Innermost secondaries immensely elongated, falcated and pendent.

Geographical Distribution. The same as that of the only Species.

1. **Anthropoides virgo** (Linnaeus) (Plate 2, Fig. 4).

S. Europe, Africa to Natal,
S. W. Asia to N. China
and N. W. India.

Ardea virgo Linnaeus, Syst. Nat. ed. x. 1. p. 141 (1758).

Grus ornata Brehm, Vogelf. p. 291 (1855).

Grus virgo Tegetmeier & Blyth, Nat. Hist. Cranes, p. 26 (1881).

Anthropoides virgo Sharpe, Cat. Birds Brit. Mus. Vol. 23. p. 269 (1894).

Anthropoides virgo Blaaui, Monog. Cranes, p. 35, pl. 10 (1897).

Anthropoides virgo Sharpe, Hand-list Birds Vol. 1, p. 179 (1899).

7. GENUS BUGERANUS GLOGER

Buggeranus Gloger, Handb. Naturg., p. 440 (1842).

Synonym : *Laomedontia* Reichenbach, Handb. Spec. Orn., p. xxiii (1852).

Type : *Buggeranus carunculatus* (Gmelin).

Characters. The head wholly feathered except at the base of the bill, which is naked and warted. A feathered lappet on each side of the throat. Inner secondaries enormously produced and pendent.

Geographical Distribution. The same as that of the only Species.

1. **Buggeranus carunculatus** (Gmelin) (Plate 2, Fig. 5).

S. Africa, W. to Congo,
E. to Shoa and Soma-
liland.

Ardea carunculata Gmelin, Linn. Syst. Nat. ed. xiii, 1, p. 643 (1788).

Ardea palearis Forster, Descr. Anim. p. 47 (1844).

Grus carunculata Tegetmeier & Blyth, Nat. Hist. Cranes, p. 33 (1881).

Buggeranus carunculatus Sharpe, Cat. Birds Brit. Mus. Vol. 23. p. 267 (1894).

Anthropoides carunculata Blaaui, Monog. Cranes, p. 45, pl. 12 (1897).

Buggeranus carunculatus Sharpe, Hand list Birds Vol. 1, p. 178 (1899).

8. GENUS PSEUDOGGERANUS SHARPE

Pseudoggeranus Sharpe, Bull. Brit. Orn. Club, Vol. 1, p. xxxvii (1893).

Type : *Pseudoggeranus leucauchen* (Temminck).

Characters. Forehead, base of the bill and region round the eyes devoid of feathers, the naked skin extending behind the ears, which are covered by a patch of feathers moderate in length as in *Antigone*. Inner secondaries moderately lengthened and pendent.

Geographical Distribution. The same as that of the only Species.

1. **Pseudoggeranus leucauchen** (Temminck) (Plate 2, Fig. 6).

E. Siberia, Corea, N. E.
China, Japan.

Grus leucauchen Temminck, Pl. Col. Vol. 5, pl. 449 (1838).

Scops vipio Gray, Gen. Birds Vol. 3, p. 553 (1845).

Grus leucauchen Tegetmeier & Blyth, Nat. Hist. Cranes, p. 35 (1881).

Pseudoggeranus leucauchen Sharpe, Cat. Birds Brit. Mus. Vol. 23. p. 266 (1894).

Anthropoides leucauchen Blaaui, Monog. Cranes, p. 49, pl. 13 (1897).

Pseudoggeranus leucauchen Sharpe, Hand-list Birds Vol. 1, p. 178 (1899).

B. SUBFAM. BALEARICINÆ

Only a single Genus 9. GENUS BALEARICA.

9. GENUS BALEARICA BRISSON

Balearica Brisson, Orn., Vol. 5, p. 511 (1760).

Synonym : *Geranarchus* Gloger, Handb. Naturg., p. 438 (1842).

Type : *Balearica pavonina pavonina* (Linnaeus).

Characters. Bill thick, a little shorter than the head. Nostrils oval and oblique. Crown of the head covered with a patch of velvety black feathers. A large tuft of straw-like bristles on the nape. Throat and sides of the face bare. Bare sides of the face particoloured white and red or pinkish. A more or less large red-coloured wattle on the lower throat. Feathers of chest and lower part of the neck lengthened, lanceolated and pendent. Inner greater wing-coverts straw-coloured and desintegrated. Innermost secondaries somewhat decomposed.

Geographical Distribution. Africa, Southern Europe accidentally, Persian Gulf?

KEY TO THE SPECIES AND SUBSPECIES

- A. *Upper part of the bare cheek-patch white, the lower part pinkish. Throat-wattle small. Neck feathers dark slaty grey.*
- a. *Size larger. General colour lighter. Bill horn-coloured at the tip.*
White part of the bare cheek-patch larger 1. *B. PAVONINA PAVONINA.*
 - b. *Size smaller. General colour darker. Bill wholly black. White part of the bare cheek-patch smaller.* 2. *B. PAVONINA CECILIAE.*
- B. *Bare cheek-patch white with a small upper portion red. Throat-wattle large and pendent. Neck feathers pearly grey.*
- c. *Upper margin of the bare cheek-patch rounded* 3. *B. REGULORUM REGULORUM.*
 - d. *Upper margin of the bare cheek-patch with a knob-like process* 4. *B. REGULORUM GIBBERICEPS.*

1. ***Balearica pavonina pavonina* (Linnaeus) (Plate 3, Fig. 1).** W. and Equatorial Africa.

Ardea pavonina Linnaeus, Syst. Nat. ed. X, 1, p. 141 (1758).

Grus balearica Vieillot, Nouv. Dict. d'Hist. Nat. Vol. 13, p. 557 (1817).

Balearica pavonina Tegetmeier & Blyth, Nat. Hist. Cranes, p. 16 (1881).

Balearica pavonina Sharpe, Cat. Birds Brit. Mus. Vol. 23, p. 272 (1894).

Balearica pavonina Blaaup, Monog. Cranes, p. 57, pl. 15 (1897).

Balearica pavonina Sharpe, Hand-list Birds Vol. 1, p. 179 (1899).

Balearica pavonina Chalmers Mitchell, Proc. Zool. Soc. Lond. 1904 Vol. 2, p. 201, fig. 3a.

2. ***Balearica pavonina ceciliae* Chalmers Mitchell (Plate 3, Fig. 2).** White Nile.

Balearica ceciliae Chalmers Mitchell, Abstr. Proc. Zool. Soc. Lond. 1904, n° 10, p. 13.

Balearica ceciliae Chalmers Mitchell, Proc. Zool. Soc. Lond. 1904 Vol. 2, p. 204, fig. 4a.

3. *Balearica regulorum regulorum* (Bennett) (Plate 3, Fig. 3).

S. Africa to Uganda.

Anthropoides regulorum Bennett, Proc. Zool. Soc. Lond. 1833, p. 118.*Balearica chrysopelargus* Tegetmeier & Blyth, Nat. Hist. Cranes, p. 15 (1881).*Balearica chrysopelargus* Sharpe, Cat. Birds Brit. Mus. Vol. 23, p. 274 (1894).*Balearica regulorum* Blaauw (part.), Monog. Cranes, p. 61, pl. 16 (1897).*Balearica regulorum* Sharpe, Hand-list Birds Vol. 1, p. 179 (1899).*Balearica regulorum* Chalmers Mitchell, Proc. Zool. Soc. Lond. 1904 Vol. 2, p. 200, fig. 37.4. *Balearica regulorum gibbericeps* Reichenow.

E. Africa.

Balearica gibbericeps Reichenow, Journ. f. Orn. 1892, p. 125.*Balearica gibbericeps* Sharpe, Cat. Birds Brit. Mus. Vol. 23, p. 275 (1894).*Balearica regulorum* Blaauw (part.), Monog. Cranes, p. 62 (1897).*Balearica gibbericeps* Sharpe, Hand-list Birds Vol. 1, p. 179 (1899).*Balearica gibbericeps* Chalmers Mitchell, Proc. Zool. Soc. Lond. 1904 Vol. 2, p. 201, fig. 38.

EXPLANATION OF PLATES

PLATE I

Fig. 1. *Grus grus grus*.

— 2. — — — (the head).

— 3. — — — (the foot).

— 4. *Leucogeranus leucogeranus* (the head).— 5. *Limnogeranus americanus* (the head).

PLATE 2

Fig. 1. *Antigone antigone* (the head).— 2. *Tetrapteryx paradisea*.

— 3. — — — (the head).

— 4. *Anthropoides virgo* (the head).— 5. *Bugeranus carunculatus* (the head).— 6. *Pseudogeranus leucauchen* (the head).

PLATE 3

Fig. 1. *Balearica pavonina pavonina*.— 2. — — *pavonina ceciliæ* (the head).— 3. — — *regulorum regulorum* (the head).

FAM. GRUIDÆ

1. GRUS GRUS GRUS. 2. HEAD OF GRUS GRUS GRUS. 3. FOOT OF GRUS GRUS GRUS. 4. HEAD OF LEUCOGERANUS LEUCOGERANUS. 5. HEAD OF LIMNOGERANUS AMERICANUS.

FAM. GRUIDÆ

1. HEAD OF ANTIGONE ANTIGONE 2. TETRAPTERIX PARADISEA. 3. HEAD OF TETRAPTERIX PARADISEA. 4. HEAD OF ANTHROPOIDES VIRGO. 5. HEAD OF BUGERANUS CARUNCULATUS. 6. HEAD OF PSEUDOGGERANUS LEUCAUCHEN.

FAM. GRUIDÆ

1. BALEARICA PAVONINA PAVONINA. 2. HEAD OF BALEARICA PAVONINA CECILIÆ. 3. HEAD OF BALEARICA REGULORUM REGULORUM.

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THE *Casuariidæ*, or Cassowaries, show with *Emeus* many important points of resemblance, but they can be immediately distinguished by the more hair-like appearance of the feathers, the spine-shape of the degenerate remiges, the presence upon the head of a horny helmet, and the great development of the inner claw, so that, if Cassowaries and *Emeus* are united in the same Order *Casuarii* or *Casuariiformes*, they form there two very distinct Families, the *Casuariidæ* and the *Dromaiidæ*.

The different forms of Cassowaries have been studied chiefly by Sclater, Salvadori, Oustalet, and, above all, by Walter Rothschild whose splendid monograph is the finest and the most useful work made on these birds.

Characters. The *Casuariidæ* are robust and large flightless *Palæognathæ*, smaller however than *Ostriches* and *Emeus*: a full-developed individual of the tallest species stands about 150 centim. high and the dwarf form *Casuarus casuarus chimera* is yet as large as a turkey. The fore-limb is rudimentary, and, with the exception of four or five very modified remiges, quite undistinguishable exteriorly.

The head, moderate in size, is bare and bears a more or less high horny helmet, which is of various shapes, being laterally compressed and freely developed behind, or posteriorly depressed and then almost pyramidal, or reduced and very low. The neck is rather long, strong, and also bare on its greater part; the naked space extends more in front and behind, and, in many species, laterally very far. The head and neck naked skin is brightly and diversely coloured, mainly with blue, and much adorned with caruncles and folds in various places; in most cases the fore-neck bears one or two more or less large wattles. The naked skin shows also scattered hairs, which are chiefly numerous and strong upon the rim of the ear-opening. Eye-lashes are present and well-developed. The bill is moderate in length, generally shorter than the head, strong, laterally compressed, with the culmen curved near the tip and overlapping that of the under mandible. The nostrils are placed in a broad membranous groove; their opening is oval and relatively anterior in situation. A well-marked sternal callosity is present.

The wing is quite rudimentary; the remiges, five or six in number, are black, long, cylindrical and rigid shafts, like porcupine spines, without any indication of webs; two or three are attached to the manus and can be considered as primaries, the others being secondaries; when six of these degenerate remiges are present, the first is far the smallest; an ala spuria is wanting; the other wing feathers are not distinguishable from the general plumage; a blunt claw is often present, not always. Rectrices are not apparent, but generally the posterior body feathers are more elongated and can feign a sort of pendent tail. The tibiae are feathered, being naked only on their very extreme distal part. The metatarsi, which are shorter than in most other flightless *Palaeognathae*, are very robust and covered with variously shaped scutes, with large hexagonal ones on their greater part, with small dense roundish scales at the proximal end, with large transverse scutes below in front near the toes. The toes are three in number, of which the middle one is the longest, the inner one the smallest; they are covered with large transverse scutes; the claws are robust, the middle and outer ones curved, the inner of an unusual considerable length, straight, pointed, and constituting a powerful and dangerous weapon. The body is clothed with stiff hair-like feathers, in which the aftershaft is as long as the main shaft. Adult birds have an entirely black plumage, young ones are brown, nestlings when hatched are more or less pale brown with longitudinal black stripes.

According to Pycraft, the pterylosis shows an apterion spinale which sometimes is wanting, a more or less well-marked apterion mesogastræi including the sternal callosity and extending backwards to within a short distance of the cloacal aperture, and an apterion trunci laterale principally represented by the naked under surface of the wing. An oil gland is wanting.

The duodenum is wide and is provided with a diverticulum into which pancreatic and hepatic ducts open; the caeca are relatively short and of a uniform thickness throughout; the rectum is short and nearly straight. The right lobe of the liver is larger than the left; a spigelian lobe is present; there is a gall bladder. The lower end of the trachea is slightly dilated above the bronchi and the last few tracheal rings are incomplet behind, the space left between them being continuous with a membrana tympaniformis; there is neither pessulus nor intrinsic muscles; the outer vocal cord is well-developed. According to the high degree of degeneration of the fore-limb, the wing musculature is very reduced; the following points can be marked out: both rhomboidei are present, but they arise from ribs; the biceps originates only from the coracoid; the coraco-brachialis internus is entirely tendinous; the subscapularis arises only from the scapula. In the thigh the semitendinosus and its accessory are well-developed, the femoro-caudal is slender, its accessory is enormous in size, the ambiens, if this muscle is present, is quite reduced and imperfect. *Casuarinus*, as *Dromaius*, possesses a strongly developed dermo-dorsalis. As in the *Dromaius* skull, to which that of *Casuarinus* is very alike in essential characters, the vomer is of considerable length, extending forwards the distal extremity of the parasphenoidal rostrum, but it is only slightly expanded between the maxillo-palatines; the palatines are unfenestrated and anchylosed with the pterygoids and vomer; the mesethmoid, nasals, and more or less of frontals contribute to form the prominent casque. The sternum is relatively elongated and posteriorly pointed. Rudimentary clavicles are said to be present. In the pelvis, the pectineal process is not very important, the interobturator process is well-marked but do not reach the pubis, the pubis and the ischium are united at their distal extremity only by cartilage. Only one carpal, the radial, is distinguishable; the three metacarpals are wholly

fused together; the index is alone retained, being represented only by a vestigial phalanx. The femur is non-pneumatic; the ungual phalanx of the inner toe is very elongated.

The females are similar to the males but larger.

Habits and Reproduction. Cassowaries are inhabitants of wooded country, in the densest part of which they remain during the day-time. As, in addition, they are wary and timid, their habits are badly known. It seems they live usually solitary or in pairs, however small flocks can be constituted after breeding by the relatively long union of young birds with parents, and possibly also by the combination of two families. Though entirely diurnal, Cassowaries leave the cover only in the morning and evening, then they are found where they have their favourite feeding and also in the neighbourhood of water; these birds are indeed very fond of bathing, being powerful swimmers, which can cross wide rivers, and even, as it would appear, narrow sea channels. They run with great swiftness, though rather heavily, and can leap over obstacles as much as two meters high. Usually, as Emeus, they rest on the whole metatarsus. Cassowaries are very pugnacious, even both sexes fighting each other when it is not the breeding season; attacked or only angry, they kick forwards or sideways with their feet, or strike with the rigid shafts of their degenerate wings, using also the beak at the same time; the powerful claw of their inner toe makes the kicking very dangerous. According to Rothschild who has possessed and observed in life most of Cassowaries, « the voice is a curious sort of snorting, grunting, and bellowing, usually not very loud, and differing according to the species »; the note most often uttered by the male of the Australian form consists of quickly-repeated croaking sounds, audible at a considerable distance. All sort of vegetable matters are eaten, insects and crustaceans being also picked up, but fruits seem by much the preferred food. The nest is made in the densest part of the cover; it is merely a depression on the soil provided with fallen leaves and grass. The eggs, which appear to be from three to eight in number, are of a light green colour, with close-set granulations of dark bright green. The cock, it seems, incubates alone, though some say that the hen assists him, and he tends the young birds when hatched. The disproportion in the sexes pointed out by Rothschild who has found only 6 males among 180 living Cassowaries secured in the usual manner « by shooting the old male and catching his brood of chicks when still in down », is really a very conspicuous thing if the duties of incubation are performed solely by the cock and if only one female lays in each nest.

Range. Moluccan and Papuan Sub-Regions, Northern Australia.

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The *Casuariidae* consist of a single Genus.

GENUS CASUARIUS BRISSON

Casuarius Brisson, Ornith. Vol. 5, p. 10 (1760).

Synonyms : *Rhea* Lacépède (non Latham), Mém. Inst. Fr. Paris, Vol. 3, p. 519 (1801).

Cela Oken, Lehrb. Naturgesch. Vol. 3, Zool. (2) p. 646 (1816) (*Cela* Moehring, Geslacht. Vogelen, p. 43, 1758).

Oxyporus Brookes, Catal. Mus. J. Brookes, Pt. 2, p. 95 (1828).

? *Thrasys* Billberg, Syn. Faunæ Scand. Vol. 1, Pars 2, tab. A (1828).

Hippalectryo Gloger, Hand- u. Hilfsb. p. 452 (1842).

Type : *Casuarius casuarius casuarius* (Linnaeus).

Characters. The same as those of the Family.

Geographical Distribution. Moluccan and Papuan Sub-Regions, Northern Australia.

KEY TO THE SPECIES AND SUBSPECIES

A. Only two wattles, which are on the same level.

a. Very small, as a turkey. 9. *C. CASUARIUS CHIMERA*.

b. Larger, at least as a Rhea.

a'. Wattles close together.

a''. Size large.

a'''. Wattles very large, above 125 mm.
long.

a¹. Sides of neck anteriorly bright
blue 7. *C. CASUARIUS SCLATERI*.

b¹. Sides of neck anteriorly bluish
purple 8. *C. CASUARIUS JOHNSONII*.

b'''. Wattles middle-sized, at most 80 mm.
long.

c¹. Casque low, but very large; sides
of neck anteriorly blue, poste-
riorly scarlet 2. *C. CASUARIUS BECCARII*.

d¹. Casque low, not very large.

a⁵. Sides of neck anteriorly
purplish blue, poste-
riorly red 1. *C. CASUARIUS CASUARIUS*.

b⁵. Sides of neck anteriorly
purplish mauve, poste-
riorly scarlet 5. *C. CASUARIUS VIOLICOLLIS*.

b''. Size relatively small.

c'''. Casque very high 6. *C. CASUARIUS ALTIJUGUS*.

d'''. Casque middle-sized.

e¹. A fleshy-red ridge on each side
of foreneck 4. *C. CASUARIUS BISTRATUS*.

f¹. No ridges on foreneck 3. *C. CASUARIUS SALVADORII*.

b'. Wattles far apart on the sides of the neck 10. *C. BICARUNCULATUS*.

B. *A single wattle at the inferior edge of the foreneck without or with additional wattles.*

c. *Without additional wattles.*

c'. *Foreneck orange or yellow.*

c''. *No yellow occipital patch* 11. C. UNAPPENDICULATUS UNAPPENDICULATUS.

d''. *A yellow occipital patch.*

e'''. *Casque depressed posteriorly.*

g'. *Casque low* 12. C. UNAPPENDICULATUS ROTHSCILDII.

h'. *Casque very high* 13. C. UNAPPENDICULATUS OCCIPITALIS.

f'''. *Casque not depressed posteriorly* 15. C. UNAPPENDICULATUS AURANTIACUS.

d'. *Foreneck crimson.*

e''. *Casque depressed* 16. C. UNAPPENDICULATUS SUFFUSUS.

f''. *Casque very high* 18. C. UNAPPENDICULATUS MITRATUS.

e'. *Foreneck blue.*

g''. *Sides of neck entirely blue* 14. C. UNAPPENDICULATUS IAGLAIZEI.

h''. *Sides of neck inferiorly crimson* 19. C. PHILIPPI.

f'. *Foreneck blue and red* 17. C. UNAPPENDICULATUS RUFOTINCTUS.

d. *With one or two additional wattles.*

g'. *A small additional wattle above the principal one.* 20. C. DOGGETTI.

h'. *A pair of additional wattles.*

i''. *Foreneck blue; sides of neck purple* 21. C. JAMRACHI.

j''. *Foreneck yellow; sides of neck yellow* 22. C. HAGENBECKI.

C. *No wattle, only sometimes a small knob on the naked part of the foreneck.*

e. *Front of the neck pink or rosy-red.*

i'. *Foreneck entirely pink; hindneck yellow* 28. C. ROSEIGULARIS.

j'. *Foreneck partly pink or rosy-red; hindneck not yellow.*

k''. *Foreneck pink and scarlet* 29. C. LORLÆ.

l''. *Front of the neck almost entirely covered by a large rosy-red patch* 30. C. KEYSSERI.

f. *Front of the neck blue or violet-blue.*

k'. *Hindneck not entirely blue.*

m''. *Occiput and sides of the face black; lower part of the hindneck orange-chrome* 25. C. CLAUDII.

n''. *Occiput and sides of the face white; lower part of the hindneck scarlet.*

g'''. *No black and pink patch below ear* 23. C. PAPUANUS PAPUANUS.

h'''. *A black and pink patch below ear* 24. C. PAPUANUS EDWARDSI.

l'. *Hindneck entirely blue.*

o''. *Head whitish-blue.*

i'''. *Foreneck blue with a red patch in centre* 26. C. PICTICOLLIS PICTICOLLIS.

j'''. *Foreneck blue without a red patch* 27. C. PICTICOLLIS HECKI.

p''. *Head dark blue.*

k^{'''}. Foreneck without a round dark crimson

patch 31. *C. BENNETTI BENNETTI*.

l^{'''}. Foreneck with a round dark crimson

patch 32. *C. BENNETTI MACULATUS*.

1. ***Casuarius casuarius casuarius* (Linnaeus) (Plate 1, Fig. 1-4; Plate 2, Fig. 1).** Ceram.

Struthio casuarius Linnæus, Syst. Nat. Ed. 10, 1, p. 155 (1758).

Casuarius galeatus Bonnaterre, Enc. Méth. Vol. 1, p. 4, pl. 14, fig. 2 (1790).

Casuarius galeatus Salvadori, Cat. Birds Brit. Mus. Vol. 27, p. 592 (1895).

Casuarius casuarius Sharpe, Hand-list Birds, Vol. 1, p. 3 (1899).

Casuarius casuarius Rothschild, Trans. Zool. Soc. Lond. Vol. 15, p. 113, pl. 22 (1900).

Casuarius casuarius casuarius Rothschild, Verhandl. V. Intern. Ornith. Kongr. p. 161 (1912).

Casuarius casuarius Rothschild, Bull. Brit. Ornith. Club, Vol. 20, p. 52 (1912).

2. ***Casuarius casuarius beccarii* Sclater.**

Wokan Island, Aru Is-
lands.

Casuarius beccarii Sclater, Proc. Zool. Soc. Lond. 1875, p. 87, fig. 1-2 (p. 86).

Casuarius beccarii Salvadori (part.), Cat. Birds Brit. Mus. Vol. 27, p. 596 (1895).

Casuarius beccarii Sharpe, Hand-list Birds, Vol. 1, p. 3 (1899).

Casuarius casuarius beccarii Rothschild, Trans. Zool. Soc. Lond. Vol. 15, p. 116, pl. 23 (1900).

Casuarius casuarius beccarii Rothschild, Verhandl. V. Intern. Ornith. Kongr. p. 151 (1912).

Casuarius casuarius beccarii Rothschild, Bull. Brit. Ornith. Club, Vol. 20, p. 52 (1912).

3. ***Casuarius casuarius salvadorii* Oustalet (Plate 2, Fig. 4).**

Coast of Geelvink Bay,
N. W. New Guinea.

Casuarius salvadorii Oustalet, Bull. Assoc. Sc. France, n° 539, p. 350 (1878).

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Casuarius salvadorii Sharpe, Hand-list Birds, Vol. 1, p. 3 (1899).

Casuarius casuarius salvadorii Rothschild, Trans. Zool. Soc. Lond. Vol. 15, p. 120, pl. 24 (1900).

Casuarius casuarius salvadorii Rothschild, Verhandl. V. Intern. Ornith. Kongr. p. 151 (1912).

Casuarius bicarunculatus salvadorii Rothschild, Bull. Brit. Ornith. Club, Vol. 20, p. 52 (1912).

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Coast of central New Gui-
nea.

Casuarius casuarius bistriatus van Oort, Notes Leyden Mus. Vol. 29, p. 204, pl. 8 (1907).

Casuarius casuarius bistriatus Rothschild, Verhandl. V. Intern. Ornith. Kongr. p. 151 (1912).

Casuarius casuarius altijugus Rothschild, Bull. Brit. Ornith. Club, Vol. 20, p. 52 (1912).

5. ***Casuarius casuarius violicollis* Rothschild.**

Trangan Island, Aru Is-
lands.

Casuarius casuarius violicollis Rothschild, Bull. Brit. Ornith. Club, Vol. 8, p. 27 (1899).

Casuarius violicollis Sharpe, Hand-list Birds, Vol. 1, p. 3 (1899).

Casuarius casuarius violicollis Rothschild, Trans. Zool. Soc. Lond. Vol. 15, p. 122, pl. 26 (1900).

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6. ***Casuarius casuarius altijugus* Sclater (Plate 2, Fig. 3).**

Arfak Peninsula, N. W.
New Guinea.

Casuarius altijugus Sclater, Nature, Vol. 17, p. 375 (1878).

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Casuarius casuarius intensus Rothschild, Bull. Brit. Ornith. Club, Vol. 8, p. 21 (1899).

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7. **Casuarus casuarus sclateri** Salvadori. S. E. New Guinea.
Casuarus sclateri Salvadori, Ann. Mus. Stor. Nat. Genova, Vol. 12, p. 422 (1878).
Casuarus beccarii Salvadori (part.), Cat. Birds Brit. Mus. Vol. 27, p. 596 (1895).
Casuarus casuarus sclateri Rothschild, Trans. Zool. Soc. Lond. Vol. 15, p. 118, fig. 1 (1900).
Casuarus casuarus sclateri Rothschild, Verhandl. V. Intern. Ornith. Kongr. p. 151 (1912).
Casuarus casuarus sclateri Rothschild, Bull. Brit. Ornith. Club, Vol. 29, p. 52 (1912).
8. **Casuarus casuarus johnsonii** F. Müller, (Plate 2, Fig. 2). North Queensland.
Casuarus australis Wall (non Shaw), Sydney Herald 3rd June 1854.
Casuarus johnsonii Müller, Proc. Zool. Soc. Lond. 1867, p. 242.
Casuarus australis Salvadori, Cat. Birds Brit. Mus. Vol. 27, p. 594 (1895).
Casuarus australis Sharpe, Hand-list Birds, Vol. 1, p. 3 (1899).
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Casuarus casuarus australis Rothschild, Verhandl. V. Intern. Ornith. Kongr. p. 151 (1912).
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9. **Casuarus casuarus chimæra** Rothschild. German New Guinea.
Casuarus casuarus chimæra Rothschild, Bull. Brit. Ornith. Club, Vol. 14, p. 39 (1904).
Casuarus casuarus chimæra Rothschild, Verhandl. V. Intern. Ornith. Kongr. p. 152 (1912).
Casuarus bicarunculatus chimæra Rothschild, Bull. Brit. Ornith. Club, Vol. 29, p. 52 (1912).
10. **Casuarus bicarunculatus** Sclater (Plate 2, Fig. 6). Islands of Wamner and Kabroor, Aru Islands.
Casuarus bicarunculatus Sclater, Proc. Zool. Soc. Lond. 1860, p. 211.
Casuarus bicarunculatus Salvadori, Cat. Birds Brit. Mus. Vol. 27, p. 591 (1895).
Casuarus bicarunculatus Sharpe, Hand-list Birds, Vol. 1, p. 3 (1899).
Casuarus bicarunculatus Rothschild, Trans. Zool. Soc. Lond. Vol. 15, p. 129, pl. 28 (1900).
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11. **Casuarus unappendiculatus unappendiculatus** Blyth (Plate 1, Fig. 5). Salwatti Island.
Casuarus unappendiculatus Blyth, Journ. Asiat. Soc. Beng. Vol. 29, p. 112 (1860).
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12. **Casuarus unappendiculatus rothschildi** Matschie (Plate 3, Fig. 1). Arfak Peninsula, N. W. New Guinea.
Casuarus unappendiculatus Rothschild (non Blyth), Trans. Zool. Soc. Lond. Vol. 15, p. 132, pl. 29-30 (1900).
Casuarus unappendiculatus rothschildi Matschie, Journ. f. Ornith. Vol. 49, p. 26 (1901).
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Casuarus unappendiculatus rothschildi Rothschild, Bull. Brit. Ornith. Club, Vol. 29, p. 52 (1912).
13. **Casuarus unappendiculatus occipitalis** Salvadori (Plate 3, Fig. 2). Jobi Island.
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Casuarus occipitalis Oustalet, Nouv. Arch. Mus. Hist. Nat. Paris (3), Vol. 8, p. 264, pl. 14 (1896).
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14. **Casuarus unappendiculatus laglaizei** Oustalet. Jobi Island.
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Casuarus laglaizei Oustalet, Nouv. Arch. Mus. Hist. Nat. Paris (3), Vol. 8, p. 265, pl. 15 (1896).
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15. **Casuarus unappendiculatus aurantiacus** Rothschild. German New Guinea.
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Casuarus unappendiculatus aurantiacus Rothschild, Trans. Zool. Soc. Lond. Vol. 15, p. 136, pl. 32 (1900).
Casuarus unappendiculatus aurantiacus Rothschild, Verhandl. V. Intern. Ornith. Kongr. p. 152 (1912).
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16. **Casuarus unappendiculatus suffusus** Rothschild. N. W. New Guinea.
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23. **Casuarius papuanus papuanus** Schlegel (Plate 3, Fig. 4). Arfak Peninsula, N. W. New Guinea.
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24. **Casuarius papuanus edwardsi** Oustalet. Coast of Gelvink Bay, N. W. New Guinea.
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Casuarius picticollis Salvadori (part.), Cat. Birds Brit. Mus. Vol. 27, p. 600 (1895).
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Casuarius picticollis hecki Rothschild, Trans. Zool. Soc. Lond. Vol. 15, p. 144, pl. 37 (1900).
Casuarius picticollis hecki Rothschild, Verhandl. V. Intern. Ornith. Kongr. p. 152 (1912).
Casuarius picticollis hecki Rothschild, Bull. Brit. Ornith. Club, Vol. 29, p. 52 (1912).
28. **Casuarius roseigularis** Rothschild. Admiralty Islands?
Casuarius roseigularis Rothschild, Bull. Brit. Ornith. Club, Vol. 15, p. 32 (1905).
Casuarius roseigularis Rothschild, Verhandl. V. Intern. Ornith. Kongr. p. 152 (1912).
Casuarius roseigularis Rothschild, Bull. Brit. Ornith. Club, Vol. 29, p. 52 (1912).
29. **Casuarius lorizæ** Rothschild (Plate 3, Fig. 5). Owen Stanley Mountains, British New Guinea.
Casuarius picticollis Salvadori (part.), Cat. Birds Brit. Mus. Vol. 27, p. 600 (1895).
Casuarius lorizæ Rothschild, Novit. Zool. Vol. 5, p. 513 (1898).
Casuarius lorizæ Sharpe, Hand-list Birds, Vol. 1, p. 4 (1899).
Casuarius lorizæ Rothschild, Trans. Zool. Soc. Lond. Vol. 15, 142, pl. 38 (1900).
Casuarius lorizæ Rothschild, Verhandl. V. Intern. Kongr. p. 152 (1912).
Casuarius lorizæ Rothschild, Bull. Brit. Ornith. Club, Vol. 29, p. 52 (1912).
30. **Casuarius keysseri** Rothschild. German New Guinea.
Casuarius keysseri Rothschild, Bull. Brit. Ornith. Club, Vol. 29, p. 50 (1912).
31. **Casuarius bennetti bennetti** Gould (Plate 3, Fig. 6). New Britain.
Casuarius bennetti Gould, Proc. Zool. Soc. Lond. 1857, p. 269, pl. 120.
Casuarius bennetti Salvadori, Cat. Birds Brit. Mus. Vol. 27, p. 601 (1895).

Casuarius bennetti Sharpe, Hand-list Birds, Vol. 1, p. 4 (1899).

Casuarius bennetti Rothschild, Trans. Zool. Soc. Lond. Vol. 15, p. 145, pl. 30 (1900).

Casuarius bennetti bennetti Rothschild, Verhandl. V. Intern. Ornith. Kongr. p. 152 (1912).

Casuarius bennetti Rothschild, Bull. Brit. Ornith. Club, Vol. 29, p. 52 (1912).

32. ***Casuarius bennetti maculatus*** Rothschild.

Casuarius bennetti maculatus Rothschild, Trans. Zool. Soc. Lond. Vol. 15, p. 148 (1900).

Casuarius bennetti maculatus Rothschild, Verhandl. V. Intern. Ornith. Kongr. p. 152 (1912).

EXPLANATION OF PLATES

PLATE 1

Fig. 1. *Casuarius casuarius casuarius*.

- 2. — — — (the bill).
- 3. — — — (the head, anterior part).
- 4. — — — (the right foot, inside view).
- 5. — unappendiculatus unappendiculatus (the head).

PLATE 2

Fig. 1. *Casuarius casuarius casuarius* (the head).

- 2. — — johnsonii (the head).
- 3. — — altijugus (the head).
- 4. — — salvadorii (the head).
- 5. — jamrachi (the head).
- 6. — bicarunculatus (the head).

PLATE 3

Fig. 1. *Casuarius unappendiculatus rothschildi* (the head).

- 2. — — occipitalis.
- 3. — doggetti (the head).
- 4. — papuanus papuanus (the head).
- 5. — loriæ (the head).
- 6. — bennetti bennetti.

(The figures of plates 2 and 3 after W. Rothschild's works).

Caen, 10th October 1913.

FAM. CASUARIIDÆ

1. CASUARIUS CASUARIUS CASUARIUS. 2. BILL OF CASUARIUS CASUARIUS CASUARIUS. 3. BILL OF CASUARIUS CASUARIUS CASUARIUS. 4. FOOT OF CASUARIUS CASUARIUS CASUARIUS. 5. HEAD OF CASUARIUS UNAPPENDICULATUS UNAPPENDICULATUS.

FAM. CASUARIIDÆ

1. HEAD OF CASUARIUS CASUARIUS CASUARIUS. 2. HEAD OF CASUARIUS CASUARIUS JOHNSONII. 3. HEAD OF CASUARIUS CASUARIUS ALTIJUGUS. 4. HEAD OF CASUARIUS CASUARIUS SALVADORII. 5. HEAD OF CASUARIUS JAMRACHI. 6. HEAD OF CASUARIUS BICARUNCULATUS.

FAM. CASUARIIDÆ

1. HEAD OF CASUARIUS UNAPPENDICULATUS ROTHSCHILDI. 2. HEAD OF CASUARIUS UNAPPENDICULATUS OCCIPITALIS.
 3. HEAD OF CASUARIUS DOGGETTI. 4. HEAD OF CASUARIUS PAPUANUS PAPUANUS. 5. HEAD OF CASUARIUS LORLE.
 6. HEAD OF CASUARIUS BENNETTI BENNETTI.

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FAM. RHINOCHETIDÆ

FAM. RHINOCHETIDÆ

BY L. BRASIL

THIS Family contains an only Bird, the New Caledonian Kagu, which presents a very special association of characters and is considered as an old form, what it seems to be really. However Kagu is somewhat allied, though not very closely, to Cranes and above all to American Sun-Bittern. Therefore *Rhinochetidae* are included as these last Birds in the Order *Grues*, *Gruiformes* or *Alectorides*.

Characters. — The size is about that of a domestic fowl. The head is large, the neck strong and rather short, the legs are long. The bill is a little longer than the head, strong compressed, the culmen flat on about two third of its way from the base, rounded on the last third and here rather arched. On each side of the maxilla is a wide and deep furrow, long about as the half of the bill, with at the base a very peculiar horned opercule, which conceals the nostril and is said to protect it when the bird rummages the earth for worms. The mandible is devoid of lateral grooves. The eye is very large. Behind the head, feathers are very elongated — the longest measure 10 or 12 cm. —, and form a pendent tuft which is erected in angry, fright or any other excitement. The wings are moderate, broad, and rounded; the primaries are ten in number, the first is the shortest, the fifth the longest; the inner secondaries, which are thirteen in number, exceed the primaries. The tail is rather long, wide, and rounded, with twelve rectrices. The legs are long and slender. The tibiæ are partly bare. The tarsi present in front large and high transverse scutes, smaller scales behind. Toes are four in number; the hallux is rather long and elevated; claws are arched and sharp. Feathers are somewhat desintegrated and they have a large altershaft. In adults, down covers the whole surface. The general coloration is slaty grey, with the wings and tail obscurely barred.

In opposition with the *Gruidae*, but as in the *Eurypygidæ* and *Mesanatidæ*, powder-down patches exist and the present oil gland is nude. Powder-down patches have a very

special disposition : they are profusely scattered over the body. The pterylosis is described by Forbes as follows : On the neck the dorsal tract is double and continues so until its termination about on a level with the anterior end of the scapulæ; the posterior portion of the dorsal tract, which is quite separate from the anterior portions, is only forked to a slight extent anteriorly and widely dilated mesially. The ventral tract is broken up into two and the pectoral branch is likewise quite separated from the main tract, what seems special to *Rhinochetos* and *Mesanas*. The humeral tract is perfectly free from the inferior one. The characters of the pterylosis of *Rhinochetos* seems to be indebted for much to the presence of the scattered powder-down patches.

The musculature has been carefully studied by Beddard. The semitendinosus, its accessory, the femoro-caudal, and the ambiens are all present; the semitendinosus is inserted in common with the semimembranosus; both peroneals are present; the flexor hallucis supplies the hallux alone; the tendon of the tensor patagii brevis divides into three branches, the two inner of which are prolonged some way beyond the tendon of the extensor metacarpi radialis longi, to which they are first of all attached; there is a biceps slip and an accessory biceps, which arises from the humerus just below the insertion of the deltoid, and is inserted near the insertion of the biceps; the expansor secundariorum is present.

The cervical vertebræ are sixteen in number, the two last of which can be provided with movable ribs. Four dorsal vertebræ are ankylosed. Five ribs articulate with the sternum. The sternum is weak, narrow, and posteriorly unnotched; its keel is small. The pelvis is broad. The furcula is weak and U-shaped. The pelvis is broad. The anterior furrow of the metatarsus is broad and very deep. The skull is schizorhinal and incompletely desmognathous; the orbit is very large with the edge prominent and sharp; the interorbital septum is largely fenestrated; there are no basipterygoid processes; a partial bony internasal septum is present; the palatines are abruptly truncated posteriorly; there are small occipital foramina.

Habits and Reproduction. Kagus are solitary birds; they can be found in small flocks only in the sun-rise. They are looking grave and sad, standing often motionless, crookbacked, the neck shortened. They inhabit dark woods and in the fern near the sea-shore, but also, in the interior of their native island, wild ravines, craggy places, and the top of the hills. Sleeping during the day-time, they become active in the evening, then feeding upon snails, insects, frogs, and mainly upon worms, which are cleverly picked from earth. Kagus walk quickly and then stand for a long time motionless; they can run very rapidly, the body carried after the manner of a Rail and often wings expanded. When excited, they execute gesticulations or take attitudes in a way that no other bird is known to do. The flight is heavy and low; the bird rises only when it cannot do otherwise. The voice is loud, piercing and yelp-like; it is heard usually about daybreak when the birds are assembled.

The nest is made on the ground in a hole provided with sprigs and leaves. A single egg is laid; it is elliptical in shape, stony-grey in colour with spots and blotches of dull grey; the surface is slightly glossy and the shell comparatively fine. The nestling is covered with down and has a variegated coloration.

Range. Only one Species confined to New Caledonia.

Bibliography. J. Verreaux et des Murs, Rev. et Mag. de Zool. 2^e Sér. Vol. 12, p. 439 (1860); ibidem, Vol. 14, p. 142 (1862); Parker, Trans. Zool. Soc. Lond. Vol. 6, p. 501 (1869); Murie, Trans. Zool. Soc. Lond. Vol. 7, p. 465 (1872); Forbes, Proc. Zool. Soc. Lond. 1882, p. 270; Beddard, Proc. Zool. Soc. Lond. 1891, p. 9; Sharpe, Cat. Birds Brit. Mus. Vol. 23, p. 246 (1894); Burckhardt, Verh. Nat. Ges. Basel, Vol. 12, p. 412 (1900); Nova Acta Abh. Leop. Carol. Deutsch. Akad. Vol. 77, p. 247 (1901); ibidem, Vol. 79, p. 9 (1901); North, Rec. Austral. Mus. Vol. 4, p. 310 (1902); Campbell, Emu, Vol. 4, p. 166 (1905).

GENUS RHINOCHETOS J. VERREAUX ET DES MURS

Rhinochetos J. Verreaux et des Murs, Rev. et Mag. de Zool. 2^e Sér. Vol. 12, p. 439 (1860).

Type : *Rhinochetos jubatus* J. Verreaux et des Murs.

Characters and Geographical Distribution. The same as those of the Family.

1. **Rhinochetos jubatus** J. Verreaux et des Murs (**Plate, Fig. 1, 2, 3, 4**). New Caledonia.

Rhinochetos jubatus J. Verreaux et des Murs, Rev. et Mag. de Zool. 2^e ser. Vol. 12, p. 440, pl. 21 (1860).

Rhinochetus jubatus Sharpe, Cat. Birds Brit. Mus. Vol. 23, p. 246 (1894).

Rhinochetus jubatus Sharpe, Hand-list Birds, Vol. 1, p. 180 (1890).

EXPLANATION OF PLATE

Fig. 1. *Rhinochetos jubatus*.

— 2.	—	—	(the head).
— 3.	—	—	(the right foot).
— 4.	—	—	(the wing).

Caen, 15th October 1913.

FAM. RHINOCETIDÆ

1. RHINOCETOS JUBATUS. 2. HEAD OF RHINOCETOS JUBATUS. 3. FOOT OF RHINOCETOS JUBATUS. 4. WING OF RHINOCETOS JUBATUS.

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FAM. APTERYGIDÆ

FAM. APTERYGIDÆ

BY L. BRASIL

THE *Apterygida*, or Kiwis, are Birds of the Sub-Class *Paleognathæ*. The system of classification by which Kiwis and Moas constitute in this Sub-Class a single Order *Apteryges* or *Apterygiformes*, with two Sub-Orders, *Apterygines* and *Immanes*, seems to us the most natural and we have adopted it. The Sub-Order *Apterygines* includes only the one Family *Apterygida*.

Characters. About the size of a large domestic fowl, or a little more, Kiwis are the smallest of the living *Ratitæ*; they differ from other such birds, amongst other things, by the presence of a back toe, by the very remarkable position of the nostrils at the tip of the bill, and by the relatively enormous size of the eggs.

The bill is very long, slender, weak, grooved at the sides, a little arched near the tip, with a hard bony cere at the base; the upper mandible, at its extremity, projects over the lower and consequently constitutes alone the tip of the bill. The nostrils are small, sub-linear, placed, as it is said above, near the very end of the long bill, but laterally and a little underneath. The neck is short and strong. The wings, which are in an extremely aborted condition and covered with body feathers, are functionless and invisible exteriorly, but they have rudimentary remiges, apparently thirteen or fourteen in number; the manus bears a claw. The legs are very thick and situated backwardly; the tibiæ are feathered; the metatarsi, which are as long as the middle toe, are clothed with variously sized scutes, those in front of the lowest part are the largest and transverse. The toes are four in number owing to the fore-mentioned hallux, which is small and elevated; the front toes are robust, covered with broad scutes and provided, like the back one, with strong, long and sharp claws. The tail devoid of distinct rectrices is rudimentary and not apparent. The feathers, constituting a soft and loose plumage, are narrow, lanceolate, and composed of long desunited barbs or filaments; they have no aftershaft; many elongated hairs occur on the front of the head and the sides of the face; apteria mesogastræi and trunci laterali are present and well marked. There is a large and peculiar oil gland, which is nude or with two minute feathers.

The small intestine is relatively long and narrow; the large intestine is short; the cæca

are moderate in length and they are dilated in their terminal half. The left liver-lobe is larger than the right; the gall bladder is occasionally wanting; the hepatic and pancreatic ducts open separately in the duodenum. The posterior intermediate and abdominal air-sacs are small and quite exceptionally they are enclosed within the sub-pulmonary chamber. There is only one carotid, the left. Alone amongst the *Ratitae*, *Apterygidae* have retained the following muscles, the serratus metapatagialis, the latissimus dorsi metapatagialis, and the pectoralis abdominalis; on the other hand, only here the latissimus dorsi anterior is wanting; the rhomboideus profundus is also absent; in the leg the most variable muscles are all present. The skull is very elongated in its anterior part and rounded posteriorly; the post-orbital processes are entirely absent; the lacrymal is vestigial; the frontal do not form a sharp edge to the orbit; the vomer is fused with the pterygoid and palatine; the quadrate has a two-headed process; the symphysis of the mandible is very long, about half of the length of the ramus. The sternum, variable in form and proportions, is a small quadrate bone with a wide anterior emargination and rather deep notches posteriorly, caused by the projection of the posterior lateral processes; it is usually quite smooth, but sometimes presents « a low ridge nearly as well marked as the vestigial keel of *Stringops* » (Parker). The clavicles are absent. The wing is small-boned and shows in the structure of the manus various degrees of degeneration; a single digit is present, the index, which has two or three phalanges and is clawed. The pre-acetabular part of the ilium is exceptionally long; posteriorly the ilium and ischium are widely separated; the pubis never fuses with the ischium at its free extremity; the interobturator process is very small and do not meet with the pubis; the pectineal process is large and pointed. The femur is relatively large and more slender than in any other living *Ratitae*. All the phalanges are moderate in length.

The female is nearly similar to the male but larger.

Habits and Reproduction. Kiwis are swift running birds, only active in the night, hidden, during the day-time, in natural cavities or holes burrowed by themselves. They inhabit wooded country and high hills. Their food consists chiefly of earthworms, for seeking which in the ground the bill is remarkably adapted, but insects, molluscs, and berries are also eaten. Kiwis are very pugnacious and make good use of their powerful legs in kicking at any object approaching them closely. The cry is a high shrill whistle or a low hoarse note; sometimes a low cackling or grunting noise is heard. The female alone makes the nesting place; it is usually an excavation among the roots of a tree fern or a hole which she finds ready made in the ground, but sometimes she burrows it with her claws, without any assistance of her mate. The eggs are generally two in number; they are elliptical in form and abnormally big: an egg of Mantell's Kiwi can measure 134 by 73 millim.; the shell is smooth, very thin, pure white, or with a slightly greenish grey tint. The male performs all the duties of incubation and takes entire charge of the young birds till they are able to shift for themselves.

Unfortunately Kiwis are now vanishing birds. They are however protected by law, but the voluntary introduction into New Zealand of polecats, stoats, and weasels, in the hope of suppressing rabbits, has been for them a dreadful thing, which will make more early their whole extermination; shortly, it seems, Kiwis will have to undergo the regretful fate of their compatriots and nearest allies, the quite extinct Moas.

Range. This Family is entirely confined to New Zealand.

Bibliography. Buller, Hist. Birds New Zealand 2nd. Ed. Vol. 2, pp. 308-332 (1888); Parker, Phil. Trans. Vol. 182, pp. 25-134 (1891); Rothschild, Bull. Brith. Ornith. Club, Vol. 1, pp. 59-62 (1893); Salvadori, Cat. Birds Brit. Mus. Vol. 27, pp. 603-612 (1895); Rothschild and Beddard, Novit. Zool. Vol. 6, pp. 361-402 (1899); Sharpe, Hand-list Birds, Vol. 1, p. 7 (1899); Pycraft, Trans. Zool. Soc. Lond. Vol. 15, pp. 149-290 (1900); Buller, Suppl. Birds New Zealand, Vol. 1, pp. 1-30 (1905); Rothschild, Verhandl. V. Intern. Ornith. Kongr. pp. 152-153, 157, 163 (1912).

The *Apterygidae* consist of a single Genus.

GENUS APTERYX SHAW

Apteryx Shaw, Nat. Misc. Vol. 24, pl. 1057-1058 (1813).

Synonym : *Apterynx* Swainson, Nat. Hist. and Class. Birds, Vol. 2, p. 346 (1837).

Type : *Apteryx australis australis* Shaw.

Characters. The same as those of the Family.

Geographical Distribution. New Zealand : North and South Islands, Stewart Island.

KEY TO THE SPECIES AND SUBSPECIES

A. General plumage brown. The feathers of the upper parts longitudinally striped.

a. Size smaller; culmen, less than 170 mm.

a'. Lighter, more greyish. Feathers of the neck softer 1. *A. AUSTRALIS AUSTRALIS*.

b'. Darker, more brown. Feathers of the hind neck harsh 2. *A. AUSTRALIS MANTELLI*.

b. Size larger; culmen, till 200 mm. 3. *A. AUSTRALIS LAWRYI*.

B. General plumage greyish. The feathers transversally barred.

c. Size smaller. Plumage lighter. Light bars narrower.

c'. Smaller. Dark bars of the feathers lighter 4. *A. OWENI OWENI*.

d'. Larger. Dark bars of the feathers heavier, more conspicuous 5. *A. OWENI OCCIDENTALIS*.

d. Size larger. Plumage darker. Light bars wider 6. *A. OWENI HAASTI*.

1. ***Apteryx australis australis*** Shaw (Plate, Fig. 1-3).

South Isl., New Zealand.

Apteryx australis Shaw, Nat. Misc. Vol. 24, pl. 1057-1058 (1813).

Apteryx australis Buller, Hist. B. New Zeal. 2nd. Ed. Vol. 2, p. 322 (1888).

Apteryx australis Salvadori, Cat. Birds Brit. Mus. Vol. 27, p. 604 (1895).

Apteryx australis Sharpe, Hand-list Birds, Vol. 1, p. 7 (1899).

Apteryx australis Rothschild (part.), Novit. Zool. Vol. 6, p. 362 (1899).

Apteryx australis Buller, Suppl. B. New Zeal. Vol. 1, p. 2 (1905).

Apteryx australis australis Rothschild, Verhandl. V. Intern. Ornith. Kongr. p. 152 (1912).

2. ***Apteryx australis mantelli*** Bartlett.

North Isl., New Zealand.

Apteryx mantelli Bartlett, Proc. Zool. Soc. Lond. 1850, p. 275, pl. 30, fig. 3-4, pl. 31, fig. 2.

Apteryx bulleri Sharpe, Proc. Wellington Phil. Soc. 1885, p. 6.

Apteryx bulleri Buller, Hist. B. New Zeal. 2nd. Ed. Vol. 2, p. 308, pl. (1888).

Apteryx mantelli Salvadori, Cat. Birds Brit. Mus. Vol. 27, p. 607 (1895).

Apteryx mantelli Sharpe, Hand-list Birds, Vol. 1, p. 7 (1899).

Apteryx australis mantelli Rothschild, Novit. Zool. Vol. 6, p. 360, pl. 10 (1899).

Apteryx mantelli Buller, Suppl. B. New Zeal. Vol. 1, p. 12 (1905).

Apteryx bulleri Buller, ibidem, p. 17 (1905).

Apteryx australis mantelli Rothschild, Verhandl. V. Intern. Ornith. Kongr. p. 152 (1912).

3. ***Apteryx australis lawryi*** Rothschild.

Stewart Isl., New Zealand.

Apteryx maxima Buller, Trans. New Zeal. Inst. Vol. 23, p. 602 (1891).

Apteryx lawryi Rothschild, Bull. Brit. Ornith. Club, Vol. 1, p. 61 (1893).

- Apteryx lawryi* Salvadori, Cat. Birds Brit. Mus. Vol. 27, p. 606 (1895).
Apteryx lawryi Sharpe, Hand-list Birds, Vol. 1, p. 7 (1899).
Apteryx australis Rothschild (part.), Novit. Zool. Vol. 6, p. 362, pl. 9 and 14 (1899).
Apteryx lawryi Buller, Suppl. B. New Zeal. Vol. 1, p. 1, fig. pp. 9-10 (1905).

4. ***Apteryx oweni oweni*** Gould (Plate, Fig. 4-5).

South Isl., New Zealand.

- Apteryx oweni* Gould, Proc. Zool. Soc. Lond. 1847, p. 94.
Apteryx oweni Buller, Hist. B. New Zeal. 2nd. Ed. Vol. 2, p. 327, pl. (1888).
Apteryx oweni Salvadori, Cat. Birds Brit. Mus. Vol. 27, p. 609 (1895).
Apteryx oweni Sharpe, Hand-list Birds, Vol. 1, p. 7 (1899).
Apteryx oweni Rothschild, Novit. Zool. Vol. 6, p. 383, pl. 11 (1899).
Apteryx oweni Buller, Suppl. B. New Zeal. Vol. 1, p. 19, fig. p. 22 (1905).
Apteryx oweni oweni Rothschild, Verhandl. V. Intern. Ornith. Kongr. p. 152 (1912).

5. ***Apteryx oweni occidentalis*** Rothschild.

North Isl. Mount Hector,
 Tararua Ranges and
 South Isl. (west coast),
 New Zealand.

- Apteryx oweni* Buller (part.), Hist. B. New Zeal. 2nd. Ed. Vol. 2, p. 328 (1888).
Apteryx occidentalis Rothschild, Bull. Brit. Ornith. Club, Vol. 1, p. 61 (1893).
Apteryx occidentalis Salvadori, Cat. Birds Brit. Mus. Vol. 27, p. 610 (1895).
Apteryx occidentalis Sharpe, Hand-list Birds, Vol. 1, p. 7 (1899).
Apteryx oweni occidentalis Rothschild, Novit. Zool. Vol. 6, p. 384, pl. 12 (1899).
Apteryx occidentalis Buller, Suppl. B. New Zeal. Vol. 1, p. 23 (1905).
Apteryx oweni occidentalis Rothschild, Verhandl. V. Intern. Ornith. Kongr. p. 153 (1912).

6. ***Apteryx oweni haasti*** Potts.

South Isl. Southern Alps,
 west coast), New Zealand.

- Apteryx haasti* Potts, Trans. New Zeal. Inst. Vol. 4, p. 204 (1872).
Apteryx haasti Buller, Hist. B. New Zeal. 2nd. Ed. Vol. 2, p. 330 (1888).
Apteryx haasti Salvadori, Cat. Birds Brit. Mus. Vol. 27, p. 611 (1895).
Apteryx haasti Sharpe, Hand-list Birds, Vol. 1, p. 7 (1899).
Apteryx haasti Rothschild, Novit. Zool. Vol. 6, p. 381, pl. 13 (1899).
Apteryx haasti Buller, Suppl. B. New Zeal. Vol. 1, p. 25, pl. 1 (1905).
Apteryx haasti Rothschild, Verhandl. V. Intern. Ornith. Kongr. p. 152 (1912).

EXPLANATION OF PLATE

Fig. 1. *Apteryx australis australis*.

- 2. — — — (the bill).
 — 3. — — — (the extremity of the bill, from above).
 — 4. — — — *oweni oweni* (the head).
 — 5. — — — (the left foot).

Caen, 15th October 1913.

FAM. APTERYGIDÆ

1. APTERYX AUSTRALIS AUSTRALIS. 2. BILL OF APTERYX AUSTRALIS AUSTRALIS. 3. TIP OF THE BILL OF APTERYX AUSTRALIS AUSTRALIS. 4. HEAD OF APTERYX OWENI OWENI. 5. FOOT OF APTERYX OWENI OWENI.

FAM. CHAMÆIDÆ

FAM. CHAMÆIDÆ

BY C. E. HELLMAYR

Chamæidæ Ridgway, Bull. U. S. Nat. Mus. no. 50, Vol. 3, 1904, p. 683-691.

Characters 1). Bill much shorter than head, about equal to middle toe without claw, at base decidedly wider than deep; culmen strongly curved; maxillary tomium slightly concave for terminal half, without subterminal notch; gonys slightly convex, its basal angle directly beneath the anterior end of nasal fossae. In general form, the bill is not unlike that of the parine genus *Egithalos*, being, however, relatively longer and stouter, more compressed towards tip and more acute. Nasal fossae very large, entirely unfeathered; nostrils large, overhung by a broad, somewhat elevated, operculum which, as in *Certhiidae*, does not reach to anterior end of nasal fossae. Rictal bristles well developed; feathers of chin and upper throat terminated by distinct, though rather fine bristles. Wing short and much rounded; sixth and seventh primaries longest, fifth scarcely shorter; first primary about two-thirds of second; third equal in length to secondaries while the second primary is much shorter than the latter. Tail much longer than wing, much graduated; the two middle pairs about equal in length, the third but little shorter, the outermost somewhat more than half as long as median rectrix; rectrices rather narrow, of nearly equal width, tips very much rounded. Tarsus very long (nearly half as long as wing); acrotarsium encroaching but little on outer side of tarsus, divided into eight scutes, of which the third, fourth and fifth, from above, are much the longest; middle toe without claw more than half as long as tarsus, its basal phalanx adherent for half its length to outer toe, less adherent to inner toe; outer toe slightly longer than inner one; hallux about equal in length to inner toe, but much stouter, its claw decidedly shorter than the digit. Wing 54-63; tail 73-90; bill about 10-12 mm.

1) The characters of this family have been taken from Ridgway's great work.

Coloration. Dull brown above, sometimes rather greyish on head; beneath buffy or pale cinnamomeous, obsoletely streaked with greyish on throat and chest; plumage very lax and soft, pileum slightly crested. Sexes alike.

Geographical Distribution. California and Oregon, Western United States.

Observations. Although the characters of the single genus are mainly intermediate between those of the *Paridae* (Tits) and *Troglodytidae* (Wrens) it cannot be referred to either of them, and constitutes a rather isolated type among the *Oscines*. From the investigations of F. A. Lucas 1) and R. W. Shufeldt 2) it would seem that the Wren-Tits, in osteological structure, come nearest to *Psaltiriparus*.

Habits and Nidification. The members of the genus are terrestrial birds, living in shrubberies of hill- and mountain slopes. The male is said to have a very sweet, trilling song. The cup-shaped nest is placed, in low bushes, on or near the ground and contains three to five, uniform pale blue eggs.

Monotypic. One species with four subspecies.

GENUS CHAMÆA GAMBEL

1847. **Chamæa** Gambel, Proc. Acad. Nat. Sc. Philad. Vol. 3, p. 154 (Sp. un. : *Chamæa fasciata* Gambel).

Characters. The same as those of the family.

KEY TO THE SUBSPECIES OF CHAMÆA FASCIATA

1. Darker : the back etc. sepia brown or sooty, the under parts ruddy cinnamon 2.
 — Paler : the back etc. clearer, more greyish brown, the under parts pale buffy-or
 vinaceous cinnamon 3.
2. Darker : the back dark sepia brown or sooty, the under parts deeper vinaceous or
 fawn colour. 3. *C. FASCIATA PHILÆA*.
 — Paler : the back clearer sepia brown, the under parts lighter vinaceous cinnamon. 2. *C. FASCIATA RUFULA*.
3. Darker : the back browner under parts, deeper cinnamomeous. 1. *C. FASCIATA FASCIATA*.
 — Paler : the back more greyish, under parts paler, more buffy. 4. *C. FASCIATA HENSHAWI*.

1. **Chamæa fasciata fasciata** (Gambel).

Parus fasciatus Gambel, Proc. Acad. Nat. Sc. Philad. Vol. 2, p. 265 (1845) (California; type in U. S. Nat. Mus. Wash. stated by Ridgway to belong to the present form; cfr. Ridgw., Birds North & Middle America, Vol. 3, 1904, p. 687).

Chamæa fasciata intermedia Grinnell, Condor, Vol. 2, p. 86 (1900) (Palo Alto, Santa Clara Co., California).

Fig. Journ. Acad. Nat. Sc. Philad. (2 ser.), Vol. 1, 1847, pl. 8, fig. 3.

Hab. Eastern and southern shores of San Francisco Bay, and Lower Sacramento Valley, in the counties Santa Clara, Alameda, Contra Costa, San Joaquin, Sacramento, etc.

1) Proc. U. S. Nat. Mus. Vol. 13, 1890, p. 337-345, pl. 27.

2) Journal. of. Morph. Vol. 3, p. 475-502.

2. **Chamæa fasciata rufula** Ridgway.

Chamæa fasciata rufula Ridgway, Proc. Biol. Soc. Wash. Vol. 16, p. 109 (1903) (Nicasio, Marin Co., California).

Hab. Vicinity of San Francisco Bay, on west slope of Coast range, in Mendocino, Marin, San Francisco, San Mateo and Santa Clara counties, California.

3. **Chamæa fasciata phæa** Osgood.

Chamæa fasciata phæa Osgood, Proc. Biol. Soc. Wash. Vol. 13, p. 42 (1899) (Newport, Yaquina Bay, Oregon).

Hab. Coast district of Oregon (Yaquina Bay) and northern California from mouth of Columbia River to Humboldt Bay.

4. **Chamæa fasciata henshawi** Ridgway.

Chamæa fasciata henshawi Ridgway, Proc. U. S. Nat. Mus. Vol. 5, p. 13 (1882) (Walkers Basin, Kern Co., South California).

Hab. Interior valleys and foothills and southern coast district of California, from eastern slope of the Coast Range in Napa and Lake counties, northward to Shasta County, and southward through Sacramento and Joaquin valleys and western foothills of Sierra Nevada to Kern County, thence southwards through southern coast district to northwestern Lower California.

Munich, 15th October 1913.

24TH PART

PASSERES

GENERA AVIUM

CONDUCTED BY

P. WYTSMAN

WITH CONTRIBUTIONS BY MESSRS. L. BRASIL, A. DUBOIS, E. HARTERT,
C. E. HELLMAYR, Hon. W. ROTHSCHILD, T. SALVADORI, &^a

PASSERES

FAM. HYPOSITTIDÆ

by C. E. HELLMAYR

WITH 1 COLOURED PLATE

1913

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FAM. HYPOSITTIDÆ

FAM. HYPOSITTIDÆ

BY C. E. HELLMAYR

Hyposittidæ. Ridgway, Proc. Biol. Soc. Wash. Vol. 16, p. 125 (1903).

Characters. Bill half as long as head, rather strong, decidedly widened at base, where its width is about equal to its depth, and somewhat compressed terminally; culmen slightly ridged, its apical portion distinctly curved, uncinatè at tip; both maxillary and mandibular tomium with a slight, but distinct subterminal notch; gonys decidedly ascending terminally. Rictal bristles strongly developed, rather stiff, reaching over more than two-thirds of the whole bill. Nostrils basal, large, broadly oval, non-operculate, exposed, posteriorly concealed by the dense antrorse latero-frontal plumules as well as by some elongated, stiff bristles. Wing rather long, much rounded; fourth, fifth and sixth primaries nearly equal and longest; third about equal to seventh, both conspicuously shorter than the three longest primaries; second much shorter than third, about equal to ninth; first primary well-developed, though a little narrower than the following, somewhat longer than half the second; secondaries very broad, the outer ones decidedly longer than the innermost primaries; wing-tip much less than length of tarsus. Tail three-fourths as long as wing, very slightly rounded; rectrices of equal width with rounded tip. Tarsus about as long as middle toe without claw; acrotarsium booted; outer toe nearly as long as middle toe and united to the latter for the whole of its basal and half of its subbasal phalanges; inner toe only about half as long as outer toe and united to middle toe for the whole of its basal half; hallux fully as long as middle toe (without claw); claws much compressed, strongly arched with acute tip. Size small : Wing, 75-78; tail, 58-62 mm.

Coloration. Sexes different. The male is coloured as follows : Narrow frontal edge, lores and chin velvety black; crown, back, upper tail- and upper wing coverts bright greenish blue; cheeks and ear coverts rather paler and duller blue; remiges and rectrices dusky, exteriorly washed and edged with dull greenish blue. Under parts dull blue, slightly shaded

with greenish on sides and flanks; under wing coverts greyish with greenish blue tips; quill-lining distinctly rufescent-buff. The female differs by having the frontal edge, lores and chin whitish, the cheeks, ear coverts and all the lower parts dull smoky brownish, with some bluish shade here and there; the upper plumage, too, is of a more greenish blue. Bill coral-red, extreme tip dusky, feet blackish; iris dark red.

Geographical Distribution. Madagascar. Monotypic (one genus with a single species).

Habits and Nidification. In habits, it is said to resemble our Nuthatches, running up and down the trunks of trees in search of food. Its eggs seem to be unknown.

Observations. The single species constituting this family has been referred by various authors, as also formerly by myself, to the Nuthatches (*Sittidae*). It differs, however, so strikingly from all members of the latter group that there can be no question, I think, about its being much more properly placed in a separate family, as has been proposed by Mr. Ridgway. The differences between the two families may be summarized as follows 1).

- a. *Maxilla uncinat* at tip, with *tomium* distinctly notched subterminally, the *mandibular tomium* also notched near tip; *hallux* (without claw) fully as long as middle toe (without claw); *outer toe* very nearly as long as middle toe and united to the latter for the whole of the basal and half of its subbasal phalanges; *inner toe* only about half as long as *outer*; *tail* three-fourths as long as wing. HYPOSITTIDÆ.
- b. *Maxilla* not uncinat at tip, *mandibular tomium* never, *maxillary tomium* sometimes (*Neositta*) very slightly notched subterminally; *hallux* (without claw) decidedly shorter than middle toe (without claw); *outer toe* decidedly shorter than middle toe and united to the latter for not more than the basal phalanx; *inner toe* three-fourths as long as *outer toe*; *tail* about half as long as wing SITTIDÆ.

GENUS HYPOSITTA A. NEWTON

1863. **Hypherp**es (non Chaudoir 1838, *Coleoptera*!) A. Newton, Proc. Zool. Soc. Lond. 1863, p. 85 (Spec. Typ. : *H. corallirostris*, Newton).

1881. **Hypositta** A. Newton, ibidem, 1881, p. 438 (nom. emend. pro *Hypherp*es).

1. **Hypositta corallirostris** (A. Newton).

*Hypherp*es *corallirostris* A. Newton, Proc. Zool. Soc. Lond. 1863, p. 85, pl. 13 (1863) (Madagascar: descr. et fig. 2).

Fig. Milne Edwards & Grandidier, Hist. Nat. Madagascar, Vol. 14, pl. 121-121 c.

Hab. Madagascar.

1) The principal characters have been so clearly pointed out by Mr. Ridgway that I cannot do better than reproduce (with some slight modifications) what he says about this subject in his great work (Bull. U. S. Nat. Mus. Wash. n° 50. Part 3, 1904, p. 439, footnote c).

EXPLANATION OF PLATE

- Fig. 1. *Hypositta corallirostris*, ♀.
— 2. Head of *H. corallirostris*, ♂.
— 3, 4. Bill and leg of *H. corallirostris*.
— 5, 6. Wing and tail of *H. corallirostris*.
— 7, 8, 9. Head, bill and leg of *Sitta europæa europæa*.
-

Munich, 15th November 1913.

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FAM. HYPOSITTIDÆ

1. HYPOSITTA CORALLIROSTRIS ♀. 2. HEAD OF HYPOSITTA CORALLIROSTRIS ♂. 3. BILL OF HYPOSITTA CORALLIROSTRIS.
4. LEG OF HYPOSITTA CORALLIROSTRIS. 5. 6. WING AND TAIL OF HYPOSITTA CORALLIROSTRIS ♀. 7. 8. HEAD AND
BILL OF SITTA E. EUROPÆA. 9. LEG OF SITTA E. EUROPÆA.

25TH PART

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GENERA AVIUM

CONDUCTED BY

P. WYTSMAN

WITH CONTRIBUTIONS BY MESSRS. L. BRASIL, A. DUBOIS, E. HARTERT,
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FAM. DROMAIIDÆ

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BY L. BRASIL

THE *Dromaiidæ* or Emus, containing only one Genus, *Dromaius*, constitute in the Subclass *Palæognathæ* a Family near to the *Casuariidæ* but quite distinct; the two Families, *Dromaiidæ* and *Casuariidæ*, are often united in a same Order, *Casuarii*, *Casuariiformes*, or *Megistanes*.

Characters. Next to the Ostrich, Emus are the largest of existing birds, *Dromaius novæhollandiæ* standing more than 1 m. 50 high.

The head is relatively small, devoid of helmet; the crown is covered with semi-erect or recurved feathers; the sides of face are more or less bare and show hair-like bristles. The bill is moderate, broad, dorso-ventrally depressed; the culmen is elevated at the base. The nostrils, about the middle of the bill in position, are impervious and placed in a large membranous groove with the opening anteriorly; they are not protected by an opercule. The neck is long, bare on the sides of its upper part, feathered elsewhere, devoid of wattles. The wings are rudimentary, without real quills; the degenerate remiges, seventeen in number, possessing an aftershaft, are similar to the body feathers; an *ala spuria* is wanting. The rectrices are undistinguishable, so that the tail is not apparent. The tibiæ are wholly feathered. The metatarsi are long, more slender, and less powerful than in *Casuarinus*; they are covered posteriorly with a series of rough scales, in front with small reticulate plates, which gradually fuse to form ten large tranverse scutes placed on the distal third. Three front toes are present, the inner being the shortest. There is no hallux. The claws, about equally large, are short and strong. The planta is covered with small reticulate plates. Feathers have an aftershaft extremely large, equal to the main shaft, as in *Casuarinus*, but they are less desintegrated, so that the plumage is less hair-like, more softer. The general colouration is blackish, brown, or ashy-grey.

An uropygium is distinctly traceable in the nestling, much more easily demonstrable in the ripe embryo (Pycraft).

The small intestine is long and relatively narrow; the rectum is short, nearly straight; the cæca are of moderate length. The right lobe of the liver is larger than the left; a spigelian lobe is present; there is a well-developed gall bladder; the hepatic and pancreatic ducts open separately into the duodenum. The trachea is peculiar in that its front wall is pierced by a long, vertical, slit-like median aperture, caused by the deficiency of certain of the tracheal rings in this region; the lining membrane of the tube projects from this opening and forms a large dilatable sac, which can be filled with air at will; this remarkable structure is, no doubt, an organ of sound, which probably produces the peculiar drumming of the bird. There are two carotids. Accordingly to the degenerate condition of the fore limb, many muscles have disappeared: the pectoralis propatagialis, biceps propatagialis, deltoïdes propatagialis, deltoïdes minor, scapulo-humeralis anterior, serratus metapatagialis, latissimus dorsali metapatagialis, pectoralis abdominalis; traces of the expansor secundariorum are said to exist; the pectoralis major is very reduced; the latissimus dorsi anterior is present; the rhomboïdeus profundus and superficialis arise from ribs, the latter from three, the former from only one; the biceps arises from the whole of the coracoid and from just an adjacent bit of the sternum; the ambiens and the femorocaudal are wanting; all the gluteals are present; the accessory femorocaudal is very large; a strongly developed dermo-dorsalis is present. The vertebræ are fifty-four in number, of which seventeen or eighteen are cervical, nine or ten post-sacral; the atlas is notched, very nearly perforated; the sternum is entire and it is rather pointed at its extremity; rudimentary clavicles exist; the pre-coracoids are vestigial; the wing is so reduced that it is scarcely longer than the skull; there is no distinguishable carpal region; the metacarpals and phalanges have all fused into one indistinguishable rod of bone; the pubes and ischia are united posteriorly with the ilium, but only by cartilage; the pectineal process is well developed; the interobturator process is present, and shuts off an anterior portion of the obturator foramen; the femur is highly pneumatic, and bears a large pneumatic foramen between its head and the great trochanter; the vomer is expanded into a broad flattened plate between the maxillo-palatines, and it is separated from the parasphenoidal rostrum; the beak is dorso-ventrally depressed; the palatines are fenestrated posteriorly, and they are not anchylosed with pterygoids; the horizontal plate of the mesethmoid appears on the surface of the skull between nasals, but it is never inflated to form a casque; the lachrymals fuse with nasals and frontals; the supra-orbital processes are long.

The anatomical characters given above are borrowed for a large part from Beddard and from Pycraft.

Habits and Reproduction. Emus inhabit large plains or open forest districts. They are monogamous, but they unite in small companies after breeding. They run stongly and rapidly, and rest on the whole metatarsus. They love bathing, and can get through water very quickly, being capable of crossing even a broad river. Their food consists of all sorts of vegetable matters, fruits, roots, herbage, etc., but they seem to prefer fruits. They utter at times a hissing or grunting sound, and, in the breeding season, the peculiar drumming is produced by both sexes when the birds are near the nest; the male's voice is sharper and more distinct. The nest is « usually a flat bed or platform composed of grass or other herbage plucked by the bird round about the site, and trampled down: sometimes bark, pieces of sticks, and leaves

of trees are used, intermingled with a few of the bird's own feathers » (Campbell); the shape is generally oval, about 1 m. 20 by 0 m. 75 in size, and about 5 cm. in thickness; sometimes no nest is formed. The eggs, which are small for the size of the bird, are elliptical in shape; the surface is rough, with granulations of dark green upon a shell of more or less light metallic green. The clutch varies from seven to eighteen eggs, but it is possible that when the number of eggs is larger than eleven or twelve, the nest was used by two females at least. The male performs a very large part of the duties of incubation, and, with the female, attends upon the chicks. The young bird in down shows broad longitudinal dark streaks on a light ground.

The Emu of Australia is the only one that still exists. Those that lived in the neighbouring islands have now all disappeared, and very little is known about them. One, in particular, the dwarf Emu of King Island, is only known by what the French traveller Péron, who observed it in the beginning of the nineteenth century, says of it, and also by a few bones coming from a recent sandy formation. With our actual knowledge, no special character distinguishes clearly this bird from the dwarf Emu of Kangaroo Island, *Dromaius peroni*, and if we may think that it belongs at least to a distinct race localised at King Island, the insufficiency of our documentation about it does not allow us to be absolutely positive. However, the King Island Emu is generally designated under the name of *Dromaius minor*, which name Spencer used in describing the bones mentioned above. It is also under the name of *Dromaius minor* that the King Island Emu figures below, but subject to the above remarks.

Range. Australia; formerly adjacent islands, Tasmania, Kangaroo Island, King Island.

Bibliography. Salvadori, Cat. Birds Brit. Mus. Vol. 27, pp. 585-589 (1895); Chalmers Mitchell, Proc. Zool. Soc. Lond. 1896, p. 140; Beddard, Structure and Classification of Birds, pp. 493-528 (1898); Sharpe, Hand-list Birds, Vol. 1, pp. 2-3 (1899); Milne-Edwards & Oustalet, Bull. Mus. Hist. Nat. Vol. 5, pp. 206-214 (1899); Pycraft, Trans. Zool. Soc. Lond. Vol. 15, pp. 149-290 (1900); Chalmers Mitchell, Trans. Linn. Soc. Lond. Vol. 8, p. 182 (1901); Mathews, Birds Australia, Vol. 1, pp. 1-27 (1910); Novit. Zool. Vol. 18, pp. 175-176 (1912); Austr. Avian Rec. Vol. 1, p. 107 (1912); Rothschild, Verhandl. V. Intern. Ornith. Kongr. pp. 151 & 160 (1912); Dubois, Bull. Soc. Zool. France, Vol. 37, pp. 308-310 (1913); Brasil, Bull. Soc. Linn. Norm. (6), Vol. 6, pp. 76-97 (1914).

The *Dromaiidæ* consist of a single Genus.

GENUS DROMAIUS VIEILLOT

Dromaius Vieillot, Analyse, p. 70 (1816).

(Also spelt, *Dromiceius*, *Dromæus*, *Dromiceus*, *Dromeicus*.)

Synonyms: *Tachea* Fleming, Philos. of Zool. Vol. 2, p. 257 (1822).

? *Chelarga* Billberg, Syn. Faunæ Scand. Vol. 1, Pars 2, tab. A (1828).

Peronista Mathews, Austr. Avian Rec. Vol. 1, p. 107 (1912).

Type: *Dromaius novæhollandiæ novæhollandiæ* (Latham).

Characters. The same as those of the Family.

Geographical Distribution. The same as the range of the Family.

KEY TO THE SPECIES AND SUBSPECIES

A. *Tarsus more than 30 cm. in length.*

- a. *Feathers of fore-neck black in contrast to the under surface.*
 - a'. *Feathers of the upper-surface not wholly blackish.* 1. *D. NOVÆHOLLANDIÆ NOVÆHOLLANDIÆ.*
 - a''. *Feathers of the upper-surface brown and tipped with black.* 2. *D. NOVÆHOLLANDIÆ WOODWARDI.*
 - b'. *Feathers of the upper-surface wholly blackish.* 3. *D. NOVÆHOLLANDIÆ ROTHSCHILDI.*
- b. *Feathers of the fore-neck whitish like the remainder of the under-surface.* 4. *D. NOVÆHOLLANDIÆ DIEMENENSIS.*

B. *Tarsus less than 30 cm. in length.*

- c. *Pelvic limb slenderer?* 5. *D. PERONI.*
- d. *Pelvic limb stouter?* 6. *D. MINOR.*

1. ***Dromaius novæhollandiæ novæhollandiæ* (Latham) (Plate, Fig. 1-4).** E. Australia

- Casuarus novæ-hollandiæ* Latham, Ind. Orn. Vol. 2, p. 665 (1790).
Dromiceus novæ-hollandiæ Vieillot, Anal. p. 54 (1816).
Dromaius ater Vieillot (pars), Nouv. Dict. Hist. Nat. Vol. 10, p. 212 (1817).
Dromæus irroratus Bartlett, Proc. Zool. Soc. Lond. 1859, p. 205.
Dromæus novæ-hollandiæ Salvadori, Cat. Birds Brit. Mus. Vol. 27, p. 586 (1895).
Dromæus irroratus Salvadori, ibidem, p. 589 (1895).
Dromæus novæ-hollandiæ Sharpe, Hand-list Birds, Vol. 1, p. 2 (1899).
Dromæus irroratus Sharpe, ibidem, p. 3 (1899).
Dromaius novæ-hollandiæ novæ-hollandiæ Mathews, Birds Austral. Vol. 1, p. 3, pl. 1 (1910).
Dromiceus novæhollandiæ novæhollandiæ Mathews, Novit. Zool. Vol. 18, p. 175 (1912).
Dromaius novæhollandiæ novæhollandiæ Rothschild, Verhandl. V. Ornith. Kongr. p. 151 (1912).
Dromiceus novæ-hollandiæ Dubois, Bull. Soc. Zool. France, Vol. 37, p. 309 (1913).

2. ***Dromaius novæhollandiæ woodwardi* Mathews.**

N. W. Australia.

- Dromiceus novæhollandiæ woodwardi* Mathews, Novit. Zool. Vol. 18, p. 175 (1912).
Dromiceus novæ-hollandiæ var. *woodwardi* Dubois, Bull. Soc. Zool. France, Vol. 37, p. 309 (1913).

3. ***Dromaius novæhollandiæ rothschildi* Mathews.**

S. W. Australia.

- Dromiceus novæhollandiæ rothschildi* Mathews, Novit. Zool. Vol. 18, p. 175 (1912).
Dromiceus novæ-hollandiæ var. *rothschildi* Dubois, Bull. Soc. Zool. France, Vol. 37, p. 310 (1913).

4. ***Dromaius novæhollandiæ diemenensis* Le Souëf.**

Tasmania (Extinct).

- Dromæus diemenensis* Le Souëf, Cat. Austral. B. Eggs and Nests, p. 23 (1904).
Dromæus diemenensis Le Souëf, Bull. Brit. Orn. Club, Vol. 21, p. 13 (1907).
Dromaius novæ-hollandiæ diemenensis Mathews, Birds Austral. Vol. 1, p. 14, pl. 2 (1910).
Dromaius novæhollandiæ diemenensis Rothschild, Verhandl. V. Intern. Ornith. Kongr. p. 151 (1912).
Dromiceus novæ-hollandiæ var. *diemenensis* Dubois, Bull. Soc. Zool. France, Vol. 37, p. 310 (1913).

5. ***Dromaius peroni* Rothschild.**

Kangaroo Isl. (Extinct).

- Casuarus novæ hollandiæ* Péron, Voy. Découv. Terres Austral. Vol. 2, p. 10, pl. 36 (1816).
Dromaius ater Vieillot (pars), Nouv. Dict. Hist. Nat. Vol. 10, p. 212 (1817).
Dromaius ater Vieillot, Gal. des Ois. pl. 226 (1825).
Dromaius parvulus Gould, in Broderip's Penny Cyclop. Vol. 23, p. 145 (1842).
Dromaius ater Milne-Edwards & Oustalet, Vol. comm. Centen. Mus. Hist. Nat. Paris, p. 246, pl. 5 (1863).
Dromæus ater Salvadori, Cat. Birds Brit. Mus. Vol. 27, p. 588 (1896).

- Dromæus ater* Sharpe, Hand-list Birds, Vol. 1, p. 3 (1899).
Dromaius peroni Rothschild, Extinct Birds, p. 235, pl. 40 (1907).
Dromaius parvulus Mathews, Birds Austral. Vol. 1, p. 19, pl. 3 (1910).
Dromaius minor Mathews (pars), ibidem, p. 23, pl. 4 (1910).
Dromiceius spenceri Mathews, Novit. Zool. Vol. 18, p. 176, footnote (1912).
Dromaius parvulus Rothschild, Verhandl. V. Intern. Ornith. Kongr. p. 151 (1912).
Peronista peroni Mathews, Austr. Avian. Rec. Vol. 1, p. 107 (1912).
Dromiceius peroni Dubois, Bull. Soc. Zool. France, Vol. 37, p. 310 (1913).
Dromiceius minor Dubois (pars), ibidem, p. 310 (1913).

6. *Dromaius minor* Spencer.

King Isl. (Extinct).

- Dromæus minor* Spencer, Vict. Nat. Vol. 23, p. 140 (1906).
Dromæus bassi Legge, Emu 6, p. 119 (1907).
Dromaius minor Rothschild, Extinct Birds, p. 237 (1907).
Dromaius minor Mathews (pars), Birds Austral. Vol. 1, p. 23 (1910).
Dromaius minor Rothschild, Verhandl. V. Intern. Ornith. Kongr. p. 151 (1912).
Dromiceius minor Dubois (pars), Bull. Soc. Zool. France, Vol. 37, p. 310 (1913).

EXPLANATION OF PLATE

Fig. 1. *Dromaius novæhollandiæ novæhollandiæ*.

— 2.	—	—	—	(the head).
— 3.	—	—	—	(the bill).
— 4.	—	—	—	(the foot).

Caen, 19th January 1914.

FAM. DROMAIIDÆ

1. DROMAIUS NOVÆHOLLANDIÆ NOVÆHOLLANDIÆ. 2. HEAD OF DROMAIUS NOVÆHOLLANDIÆ NOVÆHOLLANDIÆ.
3. BILL OF DROMAIUS NOVÆHOLLANDIÆ NOVÆHOLLANDIÆ. 4. FOOT OF DROMAIUS NOVÆHOLLANDIÆ NOVÆHOLLANDIÆ.

FAM. MESITIDÆ

FAM. MESITIDÆ

BY L. BRÁSIL

THE Family *Mesitidæ* consists of a single Genus *Mesites* Geoffroy Saint-Hilaire (= *Mesanas* Reichenbach), which is confined to Madagascar. This Genus was originally referred by Isidore Geoffroy Saint-Hilaire (1838) to the neighbourhood of the Pigeons, then placed near the Mound-builders by Gray (1841), Reichenbach (1851), and Bonaparte (1854). Afterwards, at J. Verreaux's suggestion, it seems, the Genus has been classed by Gray (1869), Sundevall (1872), and Hartlaub (1877) in the Passerine birds. A. Milne-Edwards (1878), judging from his own dissection of *Mesites variegata*, the single known species, put the bird close to the Rails and Herons. Gadow (1893), considering *Mesites* as a link between the *Gruiformes*, the *Tinamiformes*, and the *Galliformes*, has referred it to this last Order. On the other side, Forbes (1882), after Bartlett (1877), has pointed out the affinities of *Mesites* with *Eurypyga* and *Rhinoceros*; Sharpe (1891, 1899), acknowledging the truth of this observation, has placed the three birds in the Order *Gruiformes* or *Grues*, where I put them also.

Characters. *Mesites variegata* is a bird of a moderate size, being large about as a Water Rail.

The bill is slender, compressed, moderate in length, shorter than the head, the culmen rounded and slightly incurved; the nostrils are long, linear and concave upturned slits, extending for more than half the length of the bill, and covered with a well-marked membranous valvular operculum. The wings are short and obtuse; the primaries are ten in number, the first of which is rather long, the next three are on increasing, the next three are equal; there are six secondaries. The tail is long, strong, and rounded; there are sixteen upper tail-coverts, fourteen rectrices, which are longer than the upper tail-coverts, and fourteen under tail-coverts about one quarter shorter. The legs are rather long, slender, weak; the tibiae are

naked on their inferior part; the metatarsi are scutellated; the toes are slender; the hallux is inserted on the same level than the front toes, the inner of which is shorter than the outer; at the base, on a very small extent, the outer and middle toes are united by a skin expansion. The feathers have no aftershaft; their rhachis is slender and weak, the barbs are without strong adherence, so that the plumage is very soft to the touch.

The pterylosis has been fully described by Forbes and summed up as it follows by Beddard: «There are four apteria on the neck, since both dorsal and ventral tracts divide early. The dorsal tracts converge inter-scapularly, and then become much feebler, and are continued on to the Y-shaped posterior part of the tract. The ventral tracts cease altogether at the commencement of the pectoral region, but recommence behind the powder-downs. The outer branch is present, but is quite inconnected with the main stem.» There are five pairs of powder-down patches: two pairs are dorsal, one in the interscapular region, the other on the rump; two pairs are ventral, one on the breast, the other on the posterior ventral region; the patches of the fifth pair are lateral, being axillary in situation. The oil gland is present and apparently nude.

The tongue is long, slender, bitid at its extremity. There are two carotids. The sternum is weak and narrow; the keel is small and has its anterior angle about on the middle of the breast-bone; anterior and posterior lateral processes are present and well-developed. The clavicles are wanting. According to the terrestrial habits and to the high run-power of the bird, the wing bones are reduced, but the pelvis is very wide and the legs are strong boned; the skull is schizognathous with weak maxillo-palatines. In the hind limb musculature, the femorocaudal and its accessory, the semitendinosus and its accessory, the ambiens, are all present.

The female has a more uniformly coloured plumage than the male; she is more rufous and originally she has been described as a distinct species, *Mesites unicolor*.

Habits and Reproduction. *Mesites* is a terrestrial bird inhabiting only some wooded eastern districts of the mountains of Madagascar. It does not fly, but runs quickly. When the bird is walking, it stops frequently looking on all sides, then runs again. The cry is a feeble deaf note, uttered specially in running. Insects, chiefly ants, constitute the main part of the feeding. The nest is upon the ground; it is made of small branches, sprigs of rush, or *Pandanus* leaves.

Range. The *Mesitidae* are confined to Madagascar.

Bibliography. Milne-Edwards et Grandidier, Hist. Nat. Madagascar, Ois. Vol. 2, p. 601 (1885); Sharpe, Cat. Birds Brit. Mus. Vol. 23, p. 244 (1894); Beddard, Structure and Classification of Birds, p. 379 (1898); Sharpe, Hand-list Birds, Vol. 1, p. 180 (1899).

The *Mesitidae* consist of a single Genus *Mesites*. Only one Species is known, *M. variegata*.

GENUS MESITES GEOFFROY SAINT-HILAIRE

Mesites Geoffroy Saint-Hilaire, Comptes Rendus Acad. Sc. Paris, Vol. 6, p. 440 (1838).

Synonym: *Mesanas* Reichenbach, Naturgesch. Tauben, p. 6 (1862).

Mesitornis attributed by Gray (Hand-list, Vol. 1, p. 267, 1869) to Bonaparte has never been introduced by this ornithologist for replacing *Mesites* (see Comptes Rendus Acad. Sc. Paris, Vol. 41, pp. 650-651, 1855).

Characters and Geographical Distribution. The same as those of the Family.

1. **Mesites variegata** Geoffroy Saint-Hilaire (**Plate, Fig. 1-7**).

Madagascar.

Mesites variegata Geoffroy Saint-Hilaire, Comptes Rendus Acad. Sc. Paris, Vol. 6,
p. 449 (1838).

Mesites unicolor Des Murs, Rev. Zool. Vol. 8, p. 176 (1845).

Mesonas variegata Reichenbach, Naturgesch. Tauben, p. 6 (1862).

Mesonas unicolor Reichenbach, Naturgesch. Tauben, p. 7 (1862).

Mesites variegata Sharpe, Cat. Birds Brit. Mus. Vol. 23, p. 244 (1894).

Mesonas variegata Sharpe, Hand-list Birds, Vol. 1, p. 180 (1899).

Mesites variegata Reichenow, Die Vögel, Vol. 1, p. 222 (1913).

EXPLANATION OF PLATE

Fig. 1. *Mesites variegata* ♂.

— 2.	—	—	(the head, natural size).
— 3.	—	—	♀.
— 4.	—	—	(the wing).
— 5.	—	—	(the tail).
— 6.	—	—	(the left foot).
— 7.	—	—	(the bill, from above).

(From Milne-Edwards & Grandidier's *Histoire Naturelle de Madagascar*).

(On the Plate, for *Mesonatidæ*, *Mesonas*, read *Mesitidæ*, *Mesites*).

Caen, 16th June 1914.

FAM. MESÇENATIDÆ

1. MESÇENAS VARIEGATA ♂. 2. HEAD OF MESÇENAS VARIEGATA. 3. MESÇENAS VARIEGATA ♀ 4. WING OF MESÇENAS VARIEGATA. 5. TAIL OF MESÇENAS VARIEGATA. 6. FOOT OF MESÇENAS VARIEGATA. 7. BILL OF MESÇENAS VARIEGATA.

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