



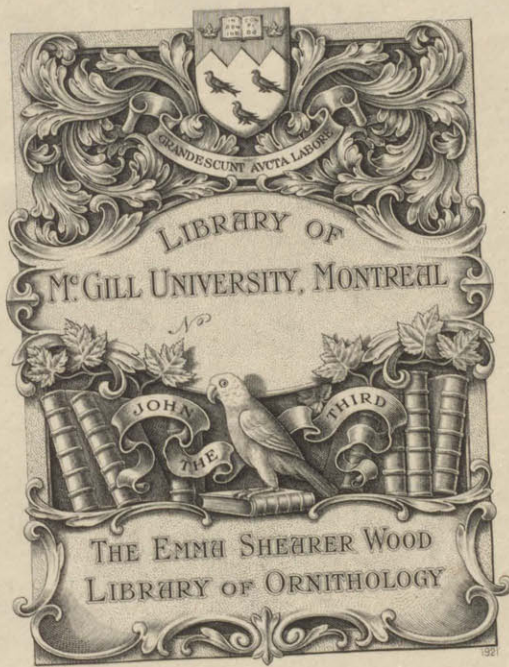
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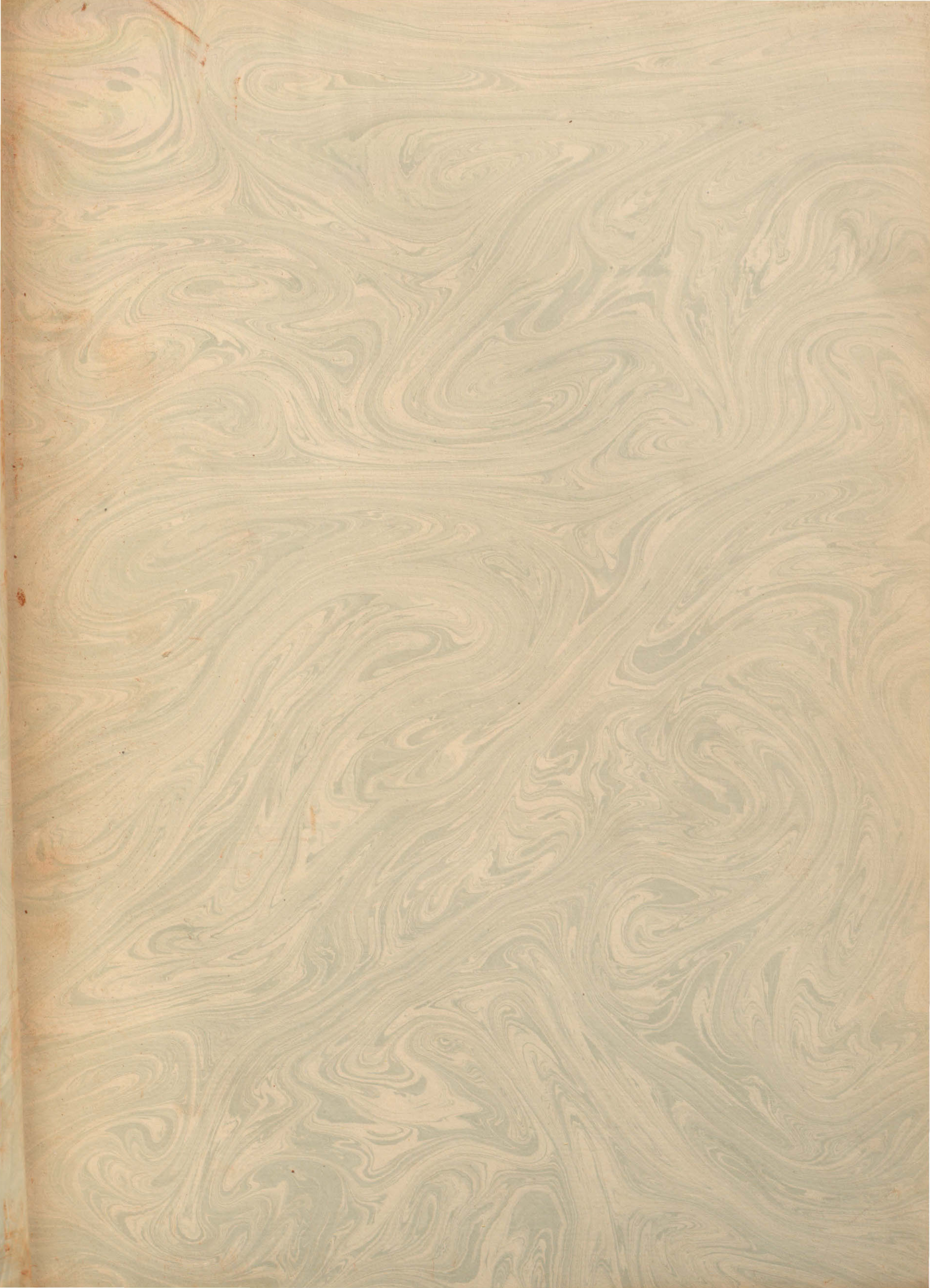
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ACC. No. 174479





THE BIRDS OF AUSTRALIA

Aus. Apr. 8/24. Will be glad to come.

STATION:- SHAWFORD.
TELEGRAMS:- FAIR OAK.

FOULIS COURT,
FAIR OAK,
HANTS.

14/3/25

Dear Miss Raymond

Please thank Mr
Casey Wood for his very
agreeable letter, which is
full of interest.

Also please tell him when
next in England to let
me know as I am very
anxious for him to visit
my country home in

THE
BIRDS
OF
AUSTRALIA

BY
GREGORY M. MATHEWS
F.R.S.E.

MEMBER OF THE AUSTRALIAN ORNITHOLOGISTS' UNION
AND THE BRITISH ORNITHOLOGISTS' UNION
CORRESPONDING FELLOW OF THE AMERICAN ORNITHOLOGISTS' UNION

WITH HAND-COLOURED PLATES

VOLUME I.

WITHERBY & CO.
326 HIGH HOLBORN LONDON
1910-1911

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PREFACE.

ON the completion of this first volume little needs to be said, but as certain reviewers have pointed out supposed errors of omission and commission, I take this opportunity of explanation.

My nomenclatural views I have fully detailed in the *Novitates Zoolo-gicæ*, Vol. XVII., pp. 492-503, 1910, and Vol. XVIII., pp. 1-22, 1911, and more especially for the benefit of Australian readers, in the *Emu*, Vol. X., pp. 317-326, and Vol. XI., pp. 52-58, 1911, and nothing further needs to be added.

In some cases the meagre accounts of the life-history of species I have dealt with has been commented upon, but what I have written is all that is on record that can be trusted. My book therefore shows how little is known regarding the species already treated, and how much has yet to be learned. When searching the literature this has been especially impressed upon me, as I have found that many accounts printed in Australian books are made up of items relative to extra-Australian forms.

The discrepancy between the names on the Plates and those used in the text has been also a source of remark. The explanation is that the Plates have to be prepared a long time in advance, and it is necessary that names be attached to the Plates. Some kind of consistent naming had to be attempted, and the names were therefore printed in accordance with the nomenclature accepted in my *Handlist*. But that nomenclature has proved inaccurate, as pointed out in the articles above quoted, and I have been engaged in correcting it ever since my *Handlist* was completed. I have now finished my preliminary examination of the nomenclature of Australian birds, and henceforth the Plates will be named according to my corrections. But already the Plates of Volume II., III. and part of IV. are finished, and these for the most part bear the names used in my *Handlist*. Though anxious that the names on the Plates and text should correspond, I cannot promise this throughout, as I purpose to give the result of my latest studies in the letterpress, whatever name I may have used on the Plate.

THE BIRDS OF AUSTRALIA.

All these alterations are due to the fact that the science of ornithology is just now passing through a revolutionary period, and until the necessary changes are made this state of uncertainty must persist. That the new ornithology is more scientific cannot be denied; and the new method of portraying facts is more conducive to the advancement of knowledge, which is my sole aim.

The most gratifying feature in connection with my work is the declared intention of the Royal Australasian Ornithologists' Union (voiced by Mr. Milligan, *Emu*, Vol. XI., p. 136, 1911) "to give loyal adherence to the system presently adopted by the national authority on ornithology within the British Dominions—namely, the British Museum."

This action at once decides the acceptance of that adopted by me throughout this volume, as though at the time I made the step the British Museum ornithologists were not agreed as to their future action, the last stumbling-block has now been removed, and ornithologists throughout the world now follow the same rules that have been rigidly observed by me in selecting the nomenclature to be conserved.

I can also add, on Mr. W. R. Ogilvie-Grant's authority, that the British Museum authorities have decided to discard the many useless generic names included by the late Bowdler Sharpe in the *Handlist of Birds*.

My main object, however, in writing this Preface, is to tender thanks to all those who have so generously and materially aided me during the preparation of this work.

Special thanks are due firstly to Mr. Bernard H. Woodward, Curator of the Perth Museum, Western Australia, who forwarded me for examination the whole of the collection of bird-skins in that Museum. The value of this action can be understood from mention of the fact that the collection numbered over 5,000 skins.

Secondly, I wish to sincerely thank my friends the Hon. Walter Rothschild and Dr. Ernst Hartert, for allowing me the free use of the valuable material in the Zoological Museum, Tring, and also for aid in determination. It is largely owing to the generosity of the Hon. Walter Rothschild, through gifts of the rarer bird-skins, especially *Ptilinopus alligator*, that I have been able to figure all the birds (save the extinct Emus and the unique *Turnix olivii*) from my collection. Dr. Hartert has also found time to read the proof-sheets, in spite of his heavy museum duties and the production of his own epoch-marking work, "Die Vögel der paläarktischen Fauna."

I have also to thank the authorities of the British Museum for every assistance given me at that institution during the last five years, and

PREFACE.

especially to the members of the staff of the "Bird Room" for their ever-ready aid at all times; and also to Mr. B. B. Woodward, Librarian, and Mr. England, in charge of the books in the Zoological Department, who were always at my service in my search for rare references, so that I have personally verified every reference (save one) given in my first volume.

I now particularly wish to draw attention to those who have helped me with gifts of specimens, thereby allowing me to deal in the most effective manner with the Australian avifauna, viz. by criticism and comparison at my ease with specimens in my collection.

From the magnitude of their donations some friends desire special mention, as Mr. H. C. Robinson, who handed me the collection made by Olive at Cooktown and Bellenden Ker, Queensland, consisting of over 400 skins; to Mr. R. H. W. Leach for a large number of Tasmanian specimens; to Mr. Frank E. Howe, whose donation of about 300 Victorian skins, contained some very rare specimens; to Dr. J. B. Cleland, whose gift of 400 skins collected in Western Australia and Eastern Australia, enabled me to make comparisons between the eastern and western representatives of many birds; and to Mr. L. Chandler for a gift of 130 beautifully prepared Victorian skins, which were remarkable for the splendid series of immature individuals amongst them, in some cases showing all changes from nestling to adult.

I have endeavoured to show my appreciation of such material aid by perpetuating the names of the donors in connection with some species of Australian bird, thereby fixing the interest they have taken in Australian Ornithology. Others whose donations have been less in number I wish to thank just as sincerely as those already mentioned, as it is by the help of the many, however small the individual contribution may be, that a work like the present is made possible. Such are Mr. F. L. Berney, Mr. Tom Carter, Miss A. Fletcher, Mr. Robert Hall, Professor A. Dendy, Mr. Frank Littler, Dr. W. MacGillivray, Mr. D. Seth-Smith, Mr. A. W. Swindells, Captain S. A. White, Mr. H. L. White, Mr. J. Wilkinson, and Mr. F. E. Wilson.

Dr. A. Morgan, Captain S. A. White and Miss A. Fletcher have also forwarded me nests, for which thanks are due.

Mr. Edwin Ashby forwarded me his entire collection of birds to England, and I have benefited much by valuable exchanges with him.

Last (but decidedly not least) I have to thank Mr. A. J. Campbell, author of the standard work on "Nests and Eggs of Australian Birds," for sending me on loan his entire collection of bird-skins, including many

THE BIRDS OF AUSTRALIA.

of his own types. This collection was the first to arrive in England, and I cannot express too fully my appreciation of his action.

I have to ask all my friends who have supplied field-notes to continue to do so, and from all my readers who have not yet contributed I would beg assistance. I have in every case acknowledged the source of every note throughout my work.

To my publishers, Messrs. Witherby & Co., I am much obliged for the care they have always shown in turning out the work in the very attractive way it appears.

I would ask all who are interested in the Ornithology of Australia to differentiate between "species" and "subspecies"; then, freed from the shackles of sentiment and binomials, we will have a new ornithology for Australia as scientific as that of any other country.

To those who admit that there are "subspecies," trinomial nomenclature is the only usage. To those who do not, let them only name "species" and leave the naming of "subspecies" to others. To name "subspecies" binomially is of course unscientific.

In spite of the fierce opposition to trinomials, the younger generation of workers in Australia already shows signs of being up to date.

On page 274, line 13, it was stated in error that the bird was "figured," but no Plate has been prepared of *Aptenodytes patagonica halli*.

G. M. M.

CHRISTMAS, 1911.

ERRATA.

| PAGE | | should read |
|----------------------------------|-----------------------------|----------------------------|
| 1—Footnote, one line from bottom | Oberhohlser | Oberholser |
| 3—Line 21 | " | " |
| 19—Line 18 | " | " |
| 18—Footnote, last line | " | " |
| 91—Line 7 | <i>D. novæ-hollandiæ</i> | <i>D. novæ-hollandiæ.</i> |
| 111—Third line from bottom | <i>pyrrothorax</i> | <i>pyrrothorax</i> |
| 124—Line 21 | <i>porphyrostictus</i> | <i>porphyrostictus</i> |
| 182—Line 30 | <i>Alsocomus (alscomus)</i> | <i>Columba (alsocomus)</i> |
| 196—Line 7 | Riviera | Riverina |
| 216—Line 21 | <i>E. pectoralis</i> | <i>R. pectoralis</i> |
| 247—Line 7 | Ogilvie-Grant | Ogilvie-Grant |
| | <i>Gallinule alba</i> | <i>Gallinula alba</i> |

CLASS—AVES.

SUB-CLASS I.—PALÆOGNATHÆ.

[PYCRAFT, *Trans. Zool. Soc.*, XV., p. 149 (1900).]

ORDER I.—CASUARIIFORMES.

FAMILY—DROMÆIDÆ.

GENUS—DROMAIUS.

DROMAIUS* Vieillot, *Analyse*, p. 70 (1816) *D. novæ-hollandiæ*.

Dromiceius (misprint) Vieillot, *Analyse*, p. 54 (1816) .. *D. novæ-hollandiæ*.

Dromaius, *id.*, *l.c.*, p. 70 (1816).

(Also spelt, *Dromæus*, *Dromiceus*, *Dromeicus*.)

Tachea Fleming, *Philos. of Zool.*, ii., p. 257 (1822) .. *D. novæ-hollandiæ*.

FEATHERS with shaft and after-shaft of equal length, as in *Casuarius*, but much softer, less hair-like and less disintegrated. Wings rudimentary, without real "quills," but with soft feathers like those of the body; rectrices not distinguishable. Head and neck feathered. No helmet on head. Metatarsus slenderer, less powerful than in *Casuarius*. Toes three in number, with about equally large short strong claws.

Colour of adult and young brown. Nestlings striped on the upper-side.

[For anatomical description see Pycraft, *Trans. Zool. Soc.*, XV., p. 267 (1900).]

DISTRIBUTION. Australia: formerly also adjacent islands.

* In *Analyse*, p. 54, Vieillot established the genus *Dromiceius* for the reception of the Australian Emu, *Casuarius novæ-hollandiæ* Latham. This was evidently a misprint, as in the same work, on p. 70, he writes *Dromaius* and gives the derivation of that name. As he himself also adopted this latter name in his future writings, I have thought it better to adhere to it, and not the former, as suggested by Mr. Oberholser in the *Smithsonian Quarterly*, Vol. 48, Pt. I., p. 60 (1905).

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Key to the Species.

- A. Tarsus more than 12 inches in length.
- a'. Feathers of fore-neck black in contrast to the under-surface *D. n. novæ-hollandiæ*, p. 3.
 - b'. Feathers of fore-neck white like remainder of the under-surface *D. n. diemenensis*, p. 14.
- B. Tarsus less than 12 inches in length.
- c'. Feathers of fore-neck long and blackish in colour *D. parvulus*, p. 19.
 - d'. Feathers of fore-neck long and whitish in colour *D. minor*, p. 23.



J.G. Keulemans, del.

Witherby & Co

$\frac{1}{6}$
DROMÆUS NOVÆ - HOLLANDIÆ .
(EMU).

DROMAIUS NOVÆ-HOLLANDIÆ NOVÆ-HOLLANDIÆ.

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(PLATE 1.)

CASUARIUS NOVÆ-HOLLANDIÆ Latham, Ind. Orn., II., p. 665 (1790), Sydney, New South Wales.

Emu Tench, Narr. Exp. Bot. Bay, p. 123 (1789); Collins, Acc. Engl. Col. N.S.W., II., p. 306 (1802).

New Holland Cassowary Phillip, Voy. Bot. Bay, p. 271 (1789); White, Journ. Voy. N.S.W., p. 129 (1790); Latham, Suppl. II., Gen. Syn. B., p. 290 (1801); *id.*, Gen. Hist. B., VIII., p. 383 (1823).

Casuarius novæ-hollandiæ Latham, Ind. Orn., II., p. 665 (1790); Péron, Voy. découv. aux Terres Austr., I., p. 467 (1807); Knox, Edinb. Phil. Journ., pt. 19, p. 132 (1824); Griffiths, An. Kingd. Cuvier, VIII., p. 298 and Pl. facing p. 443 (Chick) (1829).

Casuarius australis Shaw, Nat. Misc., III., Pl. 99 (1792).

Cassowary Tench, Compl. Acc. Settl. Port Jackson, p. 174 (1793).

Struthio novæ-hollandiæ Meyer, Syst.-Summar. Uebers. d. neust. zool. Entd. in Neuholl. u. Afrika, p. 59 (1793).

Dromiceius novæ-hollandiæ Vieillot, Analyse, p. 54 (1816); Stephens, in Shaw's Gen. Zool., XI., pt. 2, p. 439 (1819); Oberhohler, Smiths. Quart., III., pt. 1, p. 60 (1905).

Dromaius ater (part.) Vieillot, Nouv. Dict. d'Hist. Nat., X., p. 212 (1817); *id.*, Gal. des Ois., p. 79 (1825).

Dromæus novæ-hollandiæ Ranzani, El. di Zool., Vol. I., p. 99 (1823); Sclater, Trans. Z.S., IV., p. 360, Pl. 75 (1862); *id.*, P.Z.S., p. 315 (1880); Haswell, P.L.S., N.S.W., (2), II., p. 577 (1887); Salvadori, Cat. B. Brit. Mus., XXVII., p. 586 (1895); Campbell, Nests and Eggs Austr. B., p. 1058 (1901); Oates, Cat. Birds' Eggs Brit. Mus., I., p. 4 (1901); Hartert, Nov. Zool., p. 194 (1905); Hall, Key B. Austr., p. 109 (1906); Mathews, Handl. B. Austral., p. 5 (1908); M'Lennan, Emu, VIII., p. 42 (1908); Ogilvie-Grant, Ibis, p. 191 (1910).

Tachea novæ-hollandiæ Fleming, Phil. of Zool. II., p. 257 (1822).

Rhea novæ-hollandiæ Field, Geogr. Memm. on N.S.W., p. 503 (1825); Freycinet, Voy. l'Uranie et la Phys. (Hist.), p. 698 (1839); Ogle, Colony of W, Austr., p. 254 (1839).

Dromiceus emu Stephens in Shaw's Gen. Zool., XIV., Pl. 39 (1826).

Rhea australis Mudie, Picture of Austr., p. 184 (1829).

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Dromiceus australis Swainson, Class. B., II., p. 346 (1837).

Dromaius novæ-hollandiæ, G. R. Gray, List. Gen. B., p. 63 (1840); Gould, B. Austr., VI., Pl. 1 (1848); G. R. Gray, Gen. B., III., p. 528 (1849); Sturt, Exped. Centr. Austr., II., App., p. 47 (1849); Bennett, Gath. Natur. Austr., p. 216 (1860); Gould, Handb. B. Austr., II., p. 200 (1865); Ramsay, P.Z.S., p. 119 (1876); Masters, P.L.S., N.S.W., II., p. 275 (1878); Ramsay, Tab. List. Austr. B., p. 19 (1888); North Austr. Mus. Cat., No. 12, p. 292 (1889); *id.*, P.L.S., N.S.W. (2), IV., p. 1029 (1890); *id.*, Rep. Horn Sc. Exp. Centr. Austr., p. 103 (1896); Campbell, Proc. Roy. Phys. Soc., p. 215 (1896).

Dromaius emu Homeyer J. f. O., p. 365 (1859).

Dromæus irroratus Bartlett, P.Z.S., p. 205 (1859); *id.*, P.Z.S., p. 205 (1860); Sclater, P.Z.S., p. 211, p. 248 (1860); *id.*, Trans. Zool. Soc., IV., p. 360, Pl. 76 (1862); Salvadori, Cat. B. Brit. Mus., XXVII., p. 589 (1895); Campbell, Nests and Eggs Austr. B., p. 1066 (1901); Hall, Key B. Austr., 2nd ed., p. 109 (1906).

Dromaius irroratus Gould Handb. B. Austr., II., p. 204 (1865); Ramsay, Tab. List. Austr. B., p. 19 (1888); North, Austr. Mus. Cat., No. 12, p. 294 (1889); Campbell, Proc. Roy. Phys. Soc., p. 226 (1896); *id.*, Vict. Nat., IV., p. 185 (1888).

DISTRIBUTION. Australia generally, except the extreme north-east.

Adult. General colour above blackish, the feathers being brown or ashy-brown, the shafts and the ends of the feathers black, giving the general tone to the upper-surface; sides of the body lighter than the back; the feathers of the lower back and rump very long and spine-like, black in the centre and rufescent on the margins; sides of body grey, with black shaft-lines and ends to the feathers, imparting a spotted appearance; crown of head with long hairy crest-plumes, black, like the upper hind-neck; lower hind-neck light ashy-brown, with black shaft-lines and tips to the feathers; lores, eyelid, sides of face and sides of neck bare and of a bluish-white colour, with a few hair-like bristles; ear-coverts hidden with black bristly plumes, which also conceal the cheeks, but in a less degree; throat smoky-grey, the chin bare. The feathers of the neck for about half-way down from the head are short and hair-like, joining the other feathers abruptly. This gives the bird the appearance of having a ruff. This ruff is whitish in very old birds. Iris hazel; legs brownish-black; bill blackish (life). Total length about 183 cm.; bill from gape, 115 mm.; tarsus, 355; middle toe and claw, 200.

Immature (about half grown). General colour above greyish-brown, all the feathers having whitish hair-like ends; the feathers on the lower hind-neck and down the middle of the back are blackish, and impart a more or less streaked appearance; on the lower back, rump and tail the feathers are much more disintegrated, and are brown and white in colour; the head and neck all round (including the lower fore-neck) are covered with short black feathers, more thickly on the crown of the head and more sparsely on the neck; a longitudinal line of white feathers on the middle of the chin and throat and a few intermingled on the forehead and sides of head; the remainder of the under-surface silvery-grey, all the feathers more or less intermixed with brown. Total length about 92 cm.; culmen, 53 mm.; tarsus, 228; middle toe and claw, 95.

Chick. Covered with down of a sooty-black colour, and with longitudinal lines of white running from the hinder part of the crown to the end of the body and down the thighs, giving a broadly striped appearance, with whitish hair-like tips; head similar in colour, but the dark portion blacker, with intensely black hair-like tips, the white interspaces tending rather to cross-bars; sides of face, throat, and fore-neck similar, but the white increasing in proportion to the black in longitudinal

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lines towards the abdomen, which is entirely white or whitish. Total length about 30.5 cm.; culmen, 23 mm.; tarsus, 58; middle toe and claw, 35.

Albino. "Mr. A. C. Le Souëf* of the Zoological Gardens, Sydney, draws attention to a letter he has discovered, dated Warialda, N.S.W., December 3rd, 1887, in which a white Emu is offered for sale to the Society. It was about two and a half months old and stood 3 feet high. No record is given of its purchase."

Nest. "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. Shape generally oval, about 4 feet by 2½ feet in size, and about 2 inches in thickness. Situation in open country, usually near the base of a tree or stump; at other times in rank herbage or in a dry bed of a polygonum swamp. Sometimes no nest is formed. The nest or bed is constructed or augmented as the laying and incubation proceeds" (Campbell).

Eggs. "Clutch, usual average nine, but varies from seven to eighteen; elliptical in shape, a few exceptions being more swollen about the centre. The appearance of a collection of freshly-gathered unblown specimens is very beautiful; the surfaces are rough (not unlike shagreen), with granulations of dark green upon a shell of light metallic or verdigris-green. In some clutches the granulations are so closely placed and flattened or squeezed down as to hide completely the interstices of light green. In some instances the eggs are of a more uniform dark green. The granulations are slightly lustrous, but as incubation proceeds becomes much darker and polished, while the interstices become bluer or dingy in shade. Dimensions in inches of a normal clutch 5.62 to 5.06 by 3.68 to 3.31" (Campbell).

Incubation-period. Dr. Oustalet (*Nouv. Arch. Mus. Paris* (3), VIII., p. 262) says that in Paris the male incubated an egg for seventy days. The young one died at birth.

Dr. Sclater (*P.Z.S.*, p. 205 (1859)) gives the length of incubation as fifty-six days in an incubator.

Mr. A. J. North (*Proc. Linn. Soc., N.S.W.* (2), IV., p. 1029 (1890)) mentions one egg being incubated by two hens in forty-nine days.

Mr. A. J. Campbell (*Proc. Roy. Phys. Soc.*, p. 221 (1896)) says:—"Hatching was completed at the expiration of eight weeks from the time the bird commenced to sit, but it would depend whether the bird sat very closely or not if the hatching would be completed one or two days before or after the expiration of eight weeks."

Mr. H. Holroyd (*Emu*, I., p. 144 (1902)) says the female sat for nine weeks; (*Emu*, II., p. 182 (1903)) that the egg was hatched "after fifty-six days of sitting by the male bird."

Mr. C. H. M'Lennan (*Emu*, VIII., p. 42) writes:—"From the time the last egg is laid until the first downy chick is hatched varies from fifty-four to fifty-seven days."

I consider eight weeks the usual length of incubation; breeding months April to November.

THIS characteristic Australian species, once so common all over the continent, was first recorded by the early settlers under Governor Phillip. Tench†—whose book, I think, was published before that of Phillip—gives the first mention of it in print. He writes of the double feathers from one shaft‡ as having been omitted by Goldsmith in his account of the Emu of South America [Rhea]. He also dissected the bird (which he says was shot with a single

* *Emu*, VI., p. 128 (1907).

† *Narrative of the Expedition to Botany Bay*, p. 123 (1789).

‡ The shaft and after-shaft of the feathers of the Emu are approximately of the same length.

§ In this genus there is no after-shaft.

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ball by a convict, employed for the purpose of shooting animals for the Governor), and gives the anatomical singularities. This bird measured 7 feet 2 inches from the end of the toe to the tip of the beak, and weighed 74 lbs., and is the same bird as that mentioned by Phillip and White in their books.

The same author mentions* seeing an old bird and ten young; three others were captured alive and given to the Governor, but died after a few days; these young were beautifully striped. This author was the first to describe the nest and egg of this species. The first egg was picked up in the "desart place"; he accurately describes it, giving measurements and weight. A nest found later on contained twelve eggs. The heaviest bird known to him weighed 94 lbs.

The first coloured plate of the Emu is given in Phillip's book.† The bird was shot two miles from the settlement; and a sketch of it was made by Lieutenant Watts, whose name appears on the plate as the draughtsman, with that of Peter Mazell as the engraver, of the figure.‡

Dr. John White§ (Surgeon-General to the settlement) also gives a coloured figure of this bird, and in the "Advertisement" to his book, Dr. White states that the specimens figured in his work were in the Leverian Museum, but the Emu seems not to have been included in the catalogue.

The skin referred to by the above three authors was sent in spirits to England, and given to Sir Joseph Banks by Lord Sydney. It was then mounted, and Sir Joseph afterwards deposited it in the collection of natural history specimens of Mr. John Hunter in Leicester Square. It afterwards became the property of the Royal College of Surgeons, and has long since been destroyed. The late Bowdler Sharpe told me that when the authorities of the Royal College of Surgeons handed over all their collection of mounted birds to the British Museum, they made a search for the Emu, but could discover no trace of it. This bird was shot in February, 1788, as mentioned by White, who says, "The colour of the plumage consists of a mixture of dirty brown and grey; on the belly it was somewhat whiter. . . . upon the upper part of the head the feathers, with which it is but thinly covered, are very small, looking more like hair than feathers, and having the neck pretty well clothed with them, except the chin and throat, which are so thinly covered that the skin, which is there of a purplish colour, may be seen clearly." White's figure, founded on Lieutenant Watts' drawing has been considerably modified, probably

* *A Complete Account of the Settlement at Port Jackson*, p. 174 (1793).

† *The Voyage of Governor Phillip to Botany Bay*, 1889.

‡ Mazell was a well-known artist and engraver, and was largely employed by Benjamin White, the publisher of the principal Natural History works of the time.

§ *Journal of a Voyage to New South Wales*, p. 129 (1790).

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by Nodder, from the one published in Phillip's book, as the figure in the *Naturalists' Miscellany** is very similar to that given in White's *Journal*.

Latham's description of the "New Holland Cassowary" is apparently founded on the description given by Phillip, and in his account of the genus *Casuarius*† he gives it the name of *C. novæ-hollandiæ*. Later‡ he refers to the above account as *Struthio novæ-hollandiæ*, but he never employed this name before. He must also later on have examined the original specimen of the Emu sent to England by Governor Phillip, as he says that a fine specimen of this bird is in the collection of the late Mr. John Hunter.

Collins§ says that three Emus were sent on board the "Buffalo," which sailed from New South Wales on October 21st, 1800, and arrived at Spithead on May 24th, 1801. These birds, which were the first sent alive to England, were given by Lieutenant William Kent to Sir Joseph Banks, and were liberated in the Earl of Exeter's park at Burleigh.

From the account given by Leichhardt|| it would appear that his expedition would have been unable to reach Port Essington had it not been for the supply of Emu meat. The Emus, he says, used to come up in their inquisitive way, and on November 24th, 1844, the black boy struck at one with his tomahawk, another was shot with dust-shot later on. By suspending the skins on sticks before a gentle fire Leichhardt extracted an oil, which he describes as of a light yellowish colour, tasteless, and almost free from scent. When he was tired he rubbed himself with this oil and found it most beneficial. The stomach of one bird killed on this expedition was full of the leaves of a small plant resembling chickweed, which grew round the water-holes; they were also seen eating nonda fruit, and north of the Van Diemen's River, when the nonda tree disappeared, the birds fed on the fruit of the severn-tree,¶ which is so excessively bitter as to impart its quality to the meat, and even to the very marrow.

Sturt** says that Emus "travel many miles during a single night, to water, as was proved by a pack of thirteen coming down to the Depôt creek to drink, that we had seen the evening before more than twelve miles to the north."

Mr. Dudley Le Souëf sends me the following note:—"The Emus vary considerably in size and length of leg, and in colour. When the young lose their down towards the end of the first year, the succeeding feathers are fine and silky, and are frequently more or less barred, which produces a spotted appearance. Even in the same clutch some birds will have their feathers barred

* Published by Shaw and Nodder (April, 1792).

† *Ind. Orn.*, II., p. 665 (1790).

‡ Supplement II. to the *General Synopsis of Birds*, p. 290 (1801).

§ *An Account of the English Colony in New South Wales*, Vol. II., p. 306 (1802).

|| *Journal of an Overland Expedition to Port Essington* (1847).

¶ I have noticed the Emus eating this in Queensland.

** *Expedition to Central Australia*, Vol. II., p. 47 (1849).

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to a greater or less degree; others may have no markings. At the end of the second year these fine feathers will be replaced by the coarse feathers of the adult plumage, which do not show any bars. In the third year the clutch will be practically alike. In the adult birds many will be noticed darker than others, but it is mostly due to age and moulting. The older birds are frequently of a lighter hue, and have the head and upper portion of the neck nearly bare of the hair-like feathers. The upper fringe of the longer feathers on the neck is very light, looking almost white. In the young birds the neck and head are fairly well covered with the black bristly feathers. When the dark tips of the new feathers appear through the older ones (which are lighter), the bird has a patchy appearance.*

“When the male is sitting, he picks at all the grass and leaves within reach, and places them under him. The male usually sits during the day and the female at night. If any accident happens to the female, the male will hatch out and rear the young.

“Old addled eggs found in the nests are sometimes nearly white.”

Mr. A. H. E. Mattingley says:—“The eggs of the Emu range in colour from white; purplish-brown; purple; lavender purple; yellowish-purple to dark green.

“The Emu can get through water very quickly—I have often seen them running through Murray River swamps with young following them. They nest on the ridges of these swamps, and feed upon a soft nutritious waterweed known as cats'-tails (*Myriophyllum*). I have also seen them swimming (when hard pressed) across streams in the Riverina and North Queensland.”

Mr. James I. Scrymgeour, “Callandoon,” writes:—“Emus were plentiful when Messrs. Ross and Scrymgeour took possession of ‘Callandoon.’ The contractors were paid 6d. per egg and 1s. 6d. per head for the birds, and during three months destroyed sixteen hundred eggs and nine hundred birds. This was necessary, as the birds spread the prickly pear. I have seen three hundred and sixty-seven pear-seeds taken from the inside of a single bird, and most of the digested food was coloured red with the pear-juice. They prefer this food, when they can get it, to any other.

“I have noticed broods of twelve, fifteen, eighteen and two of twenty-two each.

“They must live to a great age, as I have seen some killed here quite green on the legs, and notched and hard like knotted wood.

“Bushmen here shoot them by lying down within sight of a mob and waving their hat on a stick, when the bird will come right up within a few feet. After a shot others, as curious as the first, will continue to come up, and I have seen as many as fifteen shot like this.

* This I notice in a skin in my collection from Tucka Tucka, given me by Mr. H. L. White of Seone.

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“The birds, when in good condition, have layers of fat of from 3 to 5 inches thick on the breast and back. As much as two and a half gallons of oil, when rendered, being obtained from a single bird. This oil is very penetrating, and is of considerable commercial value.”

Mr. P. T. Sandland, writing to me from South Australia, says:—“The Emus were plentiful years ago, but they were almost wiped out by the drought of 1895. I have seen a brood of ten young with the parent bird. Numbers die yearly by getting caught in the fences when attempting to get over them. They often tear holes in the rabbit-proof fences, when blundering over them, and for this reason are slaughtered wholesale by certain pastoralists.”

As the male usually does most of the incubating, the following notes relating to the sitting of the female may be of interest:—

“This season (1901) the female Emu made a nest in a secluded corner [of a small paddock] amongst the gum-trees, and deposited there five eggs, upon which she sat contentedly for nine weeks . . . and in due season marched off with three young birds. They all keep by themselves aloof from the other birds.

“On my old wild run in Port Lincoln they were very plentiful at certain seasons; but a few times that I actually saw the bird run off the nest it was a female. In this case, the gardener says that the female bird kept to the nest all through the sitting, and walked off with the young ones, and they kept entirely together for some weeks, until the other big birds, male and female, gradually joined them; and one day he pointed out to me the Emu with her brood, and it was a female bird.”*

When Mr. J. P. Rogers was in England he told me that when he was camped on the rabbit-proof fence, about one hundred miles east of Perth, he noticed what he considered a migratory movement amongst the Emus. They went from east to west, and, afterwards, on the approach of the dry season, came back again. On coming to the fence they would wander up and down looking for an opening, and hundreds of them perished for want of water.

Mr. Tom Carter, writing from Western Australia, says:—“These birds are still abundant through North-West Australia, although in severe droughts their numbers decrease very much for a while. The great extent of wire fences now in existence on all the sheep-runs must be the cause of many dying, as when temporary pools of water outside the paddocks dry up, the birds are prevented from reaching other supplies, although when frightened they will easily clear a fence of three feet or more in height. Great numbers of Emus, too, when undisturbed, will attempt to cross a fence by putting one leg through the wires and the other over the top. As the bird's body goes over the fence, the wires cross, and escape is almost hopeless. In the drought which prevailed

* Henry Holroyd, Tarlee, S.A., *Emu*, I., p. 144 (1902).

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from the end of 1894 until 1896 immense numbers of birds must have perished. In the corner of one paddock I counted seventy-five dead in the space of about 200 yards square. Mobs of them wandered miserably along the beach, at Point Cloates, eventually drinking the sea-water and dying. The natives, on seeing a mob approaching, would conceal themselves just off the beach, in an extended line, and when the poor birds were opposite the centre of them, the blacks would rush out and drive them into the sea. At one well a pair or more of these birds for a long time regularly came to drink at the troughs when the sheep were there, the water being drawn by hand. I observed them myself on several occasions. They squatted down to drink, which is not their usual custom.

“ They feed largely on the wild figs which grow abundantly on the rugged ranges, the fruit of the quondong, and many berries and fruits. The stones of the quondong are voided unchanged. Several pebbles or stones, up to the size of a walnut, are usually found in the gizzard, and occasionally lumps of charcoal. The loud ‘pumping’ or booming noise is usually uttered by the male bird as he approaches water, and I have often heard it at night.

“ In normal seasons (not dry) the breeding season in the North-West begins about the middle of May, when I have seen most eggs. On March 28th, 1887, I shot a female with eggs considerably enlarged in the ovary, and first saw eggs in the nest May 25th. In 1888, first eggs were seen on May 28th and in December I saw ten young not a fortnight old. On November 21st, 1901, I saw an Emu at Point Cloates with four young the size of large fowls.

“ I consider the rusty-red Emus not fully adult and not in good condition ; while those that look black at a distance are invariably fat.”

The Emu is recorded as an inhabitant of the whole of the continent by Australian ornithologists, but the species of Western Australia has been generally supposed to be distinct, and was known as *D. irroratus*. The type (a flat skin) described by Bartlett is in the British Museum, and I have examined it in company with the late Bowdler Sharpe and Mr. Dudley Le Souëf. It is cross-barred in a very distinct manner. Mr. Le Souëf at once pronounced this skin to be that of a young bird, basing this conclusion on his experiences detailed in the *Emu*. Further material received from Mr. H. L. White of Scone, N.S.W., has proved the truth of Mr. Le Souëf's convictions ; four skins of immature birds from Tucka Tucka being barred and resembling the typical skin of *D. irroratus*. I have also seen a living bird in the Zoological Gardens, London, which was moulting, and was partly striped and partly barred, indicating a change from the plumage of the so-called *D. irroratus* to the full plumage of *D. novæ-hollandiæ*.

The history of *D. irroratus* is as follows :—A flat skin was described by the late A. D. Bartlett at a meeting of the Zoological Society on the 24th of May,

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1859. The specimen had been received by him, along with some others, from the interior of South Australia.

Mr. Bartlett, who was a minute observer of birds, pointed out that he had examined three specimens of this Emu, two of which were adult, and the third immature, the latter about two-thirds grown. This young bird was said by him to show the transverse bars (the character on which the species was founded) as distinctly as the old birds.

Gould never figured *D. irroratus* as a distinct species, but states that he has seen both adult and young examples, and had no doubt that it was distinct from the ordinary *D. novæ-hollandiæ*. He was, moreover, almost equally certain that it was confined to the Western division of Australia.

The young and old birds spoken of by Gould were no doubt the specimens in the possession of his old friend Bartlett. At the same time it was doubtless Gould's statement of his convictions that *D. irroratus* was the Western Australian bird that has led so many naturalists to follow his record, although Bartlett expressly stated that the original specimen came from the interior of South Australia.

Dr. Sclater likewise had no doubt as to the distinctness of *D. irroratus*, and in his memoir on Struthious birds* he states that two young birds had been received at the Gardens from Swan River, and that they were darker than the Common Emu in the same state of plumage. He also mentions a specimen in the Gardens of the Amsterdam Zoological Society, which had been received from Albany in Western Australia, and he points out the differences in plumage between the eastern and western forms of Emu, especially as regards the more slender size of *D. irroratus*, which had longer and thinner tarsi with longer and much more slender toes, and smaller tarsal scutes; the iris was pale hazel in *D. irroratus*, instead of reddish-brown, as in *D. novæ-hollandiæ*.

Since Mr. Dudley Le Souëf has proved that the Spotted Emu is the young of the common species, the range of the former becomes merged in that of the latter. I give below in full the account of the life-history of this species, written by Mr. M'Lennan,† a very observant field-naturalist:—

“I have reason to think that in selecting its nesting-place the Emu has some strange foreknowledge of the weather—call it instinctive or what you please—because I have noticed that in seasons which have turned out very wet the bird frequently builds its nest on high ground, and, as the nesting season begins often as early as the month of June, and extends to November, the nest site has to be selected before the winter and spring rains have fairly set in. The nest is generally placed amongst low scrub upon a slope facing the rising sun; but in seasons which afterwards turned out to be exceptionally dry

* *Transactions of the Zoological Society*, Vol. IV. (1862).

† C. H. M'Lennan, *Emu*, VIII., p. 42 (1908)

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I have found the nest on low ground, even in depressions. The lignum swamps are another favourite nesting place, and there, of course, the bird usually selects one of the hummock islands. Building the nest is not a matter of much importance. The eggs are as often as not laid upon the bare ground, surrounded with a ring of twigs, leaves, and other loose litter, in the outline of the Emu's body. There is generally a slight depression where the bird has scratched away the loose earth, but occasionally the eggs are found lying upon a bed of dry leaves. The female lays in the early morning, an egg every second day, and I notice two distinct types of egg both in shape and colour. One of them is pale green, and round in shape, in contrast with the other, which is more of an oval or pear shape, the shell a deep, dark shade of green, and much thinner than in the other type. From the time the last egg is laid until the first downy chick is hatched varies from fifty-four to fifty-seven days, and that is the period when the habits of the birds form the most interesting study. As far as my personal observations go, a full clutch varies from seven to eleven eggs. The greatest number I found in one nest was seventeen, but in this instance I think that two birds laid in one nest. There is a good deal of controversy upon this point, and it is a matter on which few naturalists are able to get direct evidence, but on two or three occasions I have satisfied myself that a pair of females used the same nest, and have studied the tracks of the birds closely in order to make sure of it. My opinion is that in every case where an exceptional number of eggs were found in one nest, it was used by more than one female. . . . The Emu's habit of drumming near the nest is one of the best aids in finding it. The female generally drums in the evening, and by drawing a straight line on the ground in the direction of the drumming you have a pointer in searching for the nest the next day. In the laying season the female generally booms early in the evening, about twelve resonant notes in succession, with a short interval between each. The drumming of the female is loud and rather harsh towards the end of the call, the note of the male sharper and more distinct. Few birds of the bush take a larger share in the hatching and rearing of the family than the male Emu. He is the first to sit as soon as the clutch is complete, and rarely goes far from the nest site from the time the first egg is laid until the young are hatched, while the female during the day, when she is off duty, wanders over a considerable range of country. She generally returns to the nest towards evening, and relieves the male bird for an hour or two each night, commencing about the second week and continuing from fourteen to twenty nights. Afterwards the male has complete charge, and though in the early stages of incubation he only sits from two to four hours each day, at a later period he seems loth to leave the nest even when alarmed. At first, when any suspicious sound excites the vigilant male, he leaves the eggs at once, and makes away stealthily

EMU.

through the scrub. At the end of a few weeks, however, even with an intruder close by, he crouches low upon the nest with his head and neck flat upon the ground, and his sombre plumage is then so closely in harmony with his surroundings that he is not easily detected—a surprising circumstance with a bird so large as the Emu. The female may generally be seen making a straight line for the nest in the evening, and wandering off from it again at dawn. Nearing the nest the course of both birds is always erratic; they circle about it for a time, approaching from all points of the compass. However the trails may vary, they all unite at one point, and thence for about fifty yards there is a straight line for the nest, which from much trampling finally becomes as clearly defined as a beaten 'pad.' Even when the female lets him off duty for a few hours at night the male is never far distant, and on the first sign or sound of alarm the faithful sentinel makes straight for the nest, his feathers ruffled up in fury until he looks quite a formidable adversary. If the intruder be a tame dog or a dingo the bird goes straight at him, pecking and kicking, and soon drives him off. . . . After the young are hatched the female still takes the lesser share of the trouble. For two or three weeks both parents are in charge of the brood. When they are wandering in search of food or water the male is invariably the advance guard, while the hen brings up the rear, but when the mother finally leaves the family as they gain strength, the 'old man' changes his tactics and always follows the young."

Of the birds described, the adult, which is the bird figured, is from Eastern Australia; the others being from Western Australia.

The attitude of the adult in the plate is taken from a photo from life kindly lent to me by the Hon. Walter Rothschild.

DROMAIUS NOVÆ-HOLLANDIÆ DIEMENENSIS.

TASMANIAN EMU.

(PLATE 2.)

DROMÆUS DIEMENENSIS Le Souëf, Bull. B.O.C., XXI., p. 13 (1907), Tasmania.

Emu Jeffreys, Van Dieman's Land, p. 99 (1820); Widowson, Present State of Van Diemen's Land, p. 181 (1829); Backhouse, Narr. Visit Austr. Col., p. 212 (1843); Gunn, in West's Hist. of Tasmania, I., p. 330 (1852); Campbell, Nests and Eggs Austr. B., p. 1069 (1901).

Dromæus novae hollandiae (not Latham) Hartert, Kat. Vogelsamml. Mus. Frankfurt, p. 249, No. 3610 (1891).

Dromæus diemenensis Le Souëf, Cat. Austr. B. Eggs and Nests, p. 23 (1904); *id.*, Bull. B.O.C., XXI., p. 13 (1907); Mathews, Handl. B. Austral., p. 5 (1908).

DISTRIBUTION. Formerly Tasmania; now extinct.

Adult female. The general colour above is ashy-grey; the feathers of the back are linear in shape and tipped with black or reddish-brown, which gives a streaked appearance to the upper side; the sides of the body and feathers of the wings are grey; the feathers of the lower back, rump, and tail are more elongated and disintegrated, being of a pale brown intermixed with a dark shade of the same colour; the head and neck are covered with short, down-like plumes, which are black on the crown and hind-neck, somewhat paler on the sides of face, and ashy-grey or whitish with minute black, hair-like points on the throat and fore-neck; the under-surface of the body is grey, paler than that of the upper-surface, the feathers being shorter on the breast and abdomen, but becoming longer on the under tail-coverts, which are darker in colour, stiffer in texture and more disintegrated, like those of the tail. Total length, about 167 cm.; culmen, 95 mm.; tarsus, 355; middle toe and claw, 145.

A second example of this species in the British Museum is similar in colour of plumage, but not quite so dark on the sides of face and ear-coverts. It also shows some slight variations in the measurements. Culmen, 97 mm.; tarsus, 325; middle toe and claw, 153.

Nest. Probably the same as that of *D. novae-hollandiae*.

Eggs. An egg in the collection of the British Museum, presented by Dr. Milligen, from Tasmania, appears to be somewhat smaller than those of *D. novae-hollandiae* and more finely granulated. The colour is deep dark green, and the measurements are 5 inches by 3.1 inches. A second egg from Tasmania in the same collection, presented by Mr. R. J. Mercer, is larger, paler in colour, and more coarsely granulated. The measurements are 5.2 inches by 3.45 inches.



J.G. Keulemans. del.

$\frac{1}{6}$
DROMÆUS DIEMENENSIS.
(TASMANIAN EMU).

Witherby & C^o

TASMANIAN EMU.

THE extinction of the Tasmanian Emu, and the rarity of specimens in museums, explains the want of evidence as to the differences existing between it and the Common Emu (*Dromaius novæ-hollandiæ*) of the continent of Australia. Most authors have considered them identical.

The late Ronald Gunn wrote in 1852:—"Tame Emus are common in the Colony [Tasmania], but the original stock of most of those now domesticated was introduced from Port Phillip."*

From Mr. Le Souëf's notes† I gather the following. On the authority of Mr. Stephens he says that "in the early 'fifties' Mr. James Cox, of Clarendon, imported one or more from Victoria, and others were introduced somewhat earlier.

"A specimen lived for some years in the City Park, Launceston. Mr. Wm. M'Gowan, the Superintendent for Public Reserves in that city, informs me that the bird was received there about thirty years ago, and that it lived for about ten years in confinement, but that the person who buried it on its death has since died, therefore its burial place is unfortunately not known. Mr. M'Gowan, speaking from memory, considers it was quite as large as the mainland species. This bird was supposed to be the last of the Tasmanian Emus, but as apparently nothing authentic is known as to where it really came from, it may very probably have been imported from Australia, as there are records of Emus having been sent across to Tasmania over fifty years ago from Victoria.

"Emus were originally plentiful in Tasmania, as they are often mentioned by early settlers. For instance, the late Rev. R. Knockwood mentions an Emu and six young ones in his diary in 1803,‡ and Mr. T. Stephens, of Adelaide Street, Hobart, has kindly sent me the following notes regarding them. Mr. John Meredith, of Cambria, East Coast, says:—"I remember perfectly Emus being caught in this neighbourhood prior to 1830, and for a few years subsequently, also between this place and Avoca. I saw a pair at Circular Head on 'Black Thursday' (1851). They were full grown, and had with them half a dozen young ones. The old birds had been caught when young near Circular Head, and reared and tamed.

"Mr. Ransom, of Killymoon, in the Fingal district, remembers hunting Emus with Kangaroo dogs about 1840, when he was a young man of 18. He remembers Captain Hepburn, of Roy's Hill, finding an Emu's nest with eight or nine eggs. A little later these were hatched under a Turkey hen. From these were bred others, and a pair of them was given to the late Baron

* Gunn, in *West's History of Tasmania*, I., p. 330 (1852).

† *Emu*, III., p. 229 (1904).

‡ This diary is quoted by Mr. A. Morton (*Emu*, III., p. 158) to the effect that "The Rev. Robert Knopwood recorded that his dog killed one large Emu and that six young ones were got."

THE BIRDS OF AUSTRALIA.

von Steiglitz, of Killymoon, one of which survived until 1873, when it was drowned in trying to cross a flooded river. With its death, the Tasmanian Emu, Mr. Ransom believes, became extinct."

Mr. Le Souëf has also observed a difference in the size of the eggs of the Tasmanian Emu. "Two eggs are known to be in existence. Both are considerably smaller than those of the mainland variety, one measuring 4.85 by 3.40 inches, and the other 4.80 by 3.50 inches, whereas the size of a typical egg of the mainland Emu is 5.56 by 3.63 inches, which would seem to point to the insular bird itself being also smaller, but two eggs are barely sufficient to prove the point."

Colonel W. V. Legge says* that "during the 'forties' the Tasmanian Emu used to inhabit, and bred regularly in, a locality known as Kearney's Bogs. This upland moor was part of the Rockfort Estate, owned then by the writer's father-in-law, Major W. Gray, 94th Regiment. It is situated about twelve miles to the south of Avoca, in a portion of the East Coast Ranges, which flank the valley of the St. Paul's river. One of the shepherds of the estate, H. Wyburn, was resident at the bogs, and used not infrequently to bring eggs to the house, and about the year 1845 succeeded in capturing two young birds, which were conveyed to Rockfort and reared in the goose-yard. They lived about the homestead for several years, and were tame and mischievous, coming to the open 'French' windows of the dining-room to be fed, thrusting their heads into the room at times. Mrs. Legge, who was then a young girl, has vivid recollections of these Emus, and avers that they were large birds very similar to the Emu of the continent. Some years afterwards a pair of Tasmanian Emus, which I am of opinion were also brought from Kearney's Bogs, were kept at the Tullochgorum Estate, not far from Avoca, and the appearance of these birds, as they ran along the fence of their enclosure, near the road, is firmly impressed on my recollection as a boy. They were slightly smaller than the average example of *D. novæ-hollandiæ*, but must, from the accounts given of *D. ater* of Kangaroo Island, have been larger than that bird and much in excess of the species whose osseous remains have been lately found in King Island."

Colonel Vincent Legge† also said "he recollected two Emus being kept at an estate nine miles from Fingal, but did not know what became of them. They seemed much shorter birds than the fine ones found elsewhere."

Mr. Le Souëf‡ describes an egg in his possession thus:—"This unique specimen was collected about forty years ago in the eastern district of the island, and if it is a fair type of their size, these birds must have been slightly smaller

* *Emu*, VI., p. 117 (1907).

† *Op. cit.*, III., p. 158 (1907).

‡ *Op. cit.*, III., p. 114 (1903).

TASMANIAN EMU.

than the Australian race, and it would be interesting to know the dimensions of any other authentic eggs that may still be in existence (excepting the one in Mr. J. W. Mellor's collection, mentioned in Mr. Campbell's *Nests and Eggs*, p. 1069). The granulations on a lighter ground appear finer than those on eggs from the mainland, and the egg is very dark green in colour; it measures 4.85 by 3.40 inches."

In 1904 Mr. Le Souëf came to the conclusion that the Tasmanian Emu was really distinct from the typical *D. novæ-hollandiæ*, and he founded the name of *Dromæus diemenensis* on the egg in his collection.* This would not in itself have been considered sufficient grounds for establishing a species, as there were no characters given of the bird, but during his visit to London in 1907 Mr. Le Souëf visited the Natural History Museum, wherein exist two skins of the Tasmanian Emu, presented by the late Ronald Gunn in 1838.†

These two specimens were fortunately never mounted. Count Salvadori‡ has united the Tasmanian Emu with the Australian species, but on examining the series of skins in the museum, Mr. Le Souëf at once found that the Tasmanian birds had white throats, without any sign of black, as in *D. novæ-hollandiæ*, and he was therefore able to show that his name of *D. diemenensis* was justified, and the species must henceforth be known by the name which he proposed in 1904, and confirmed in the *Bulletin of the British Ornithologists' Club* (XXI., p. 13, 1907).

The Rev. T. J. Ewing§ considered the Tasmanian bird identical with the mainland one.

As Ronald Gunn's specimens were presented as early as 1838 it may be taken for granted that they represent the Emu indigenous to Tasmania.

Lieutenant Ch. Jeffreys, in an account of the hunting and slaughter of these birds, says:—"Early in the morning their sport commences, and it is not unusual for the dogs to start flocks of birds and kangaroos consisting of seventy or eighty of each of the kinds above mentioned."||

Again Widowson writes:—"The birds that may be termed game are [not] very numerous, with the exception of the Emu, or native ostrich . . . they leave the mountains to feed in the plains, and are sometimes caught by the Kangaroo dogs."¶

Backhouse gives the following information regarding their former abundance:—On July 21st, 1834, "we visited Hugh and Mary Germain, in their

* *Cat. Austr. B. Eggs and Nests*, p. 23 (1904).

† That the late R. Gunn was interested in this bird is proved by his remarks and by his taking the trouble to preserve and send to England two such large skins.

‡ *Catalogue of Birds Brit. Mus.*, Vol. XXVII., p. 588 (1895).

§ *Catalogue of the Birds of Tasmania, Tasm. Journ.*, Part I., p. 57 (1841).

|| *Van Diemen's Land*, p. 100 (1820).

¶ *Widowson, Present State of Van Diemen's Land*, p. 181 (1829).

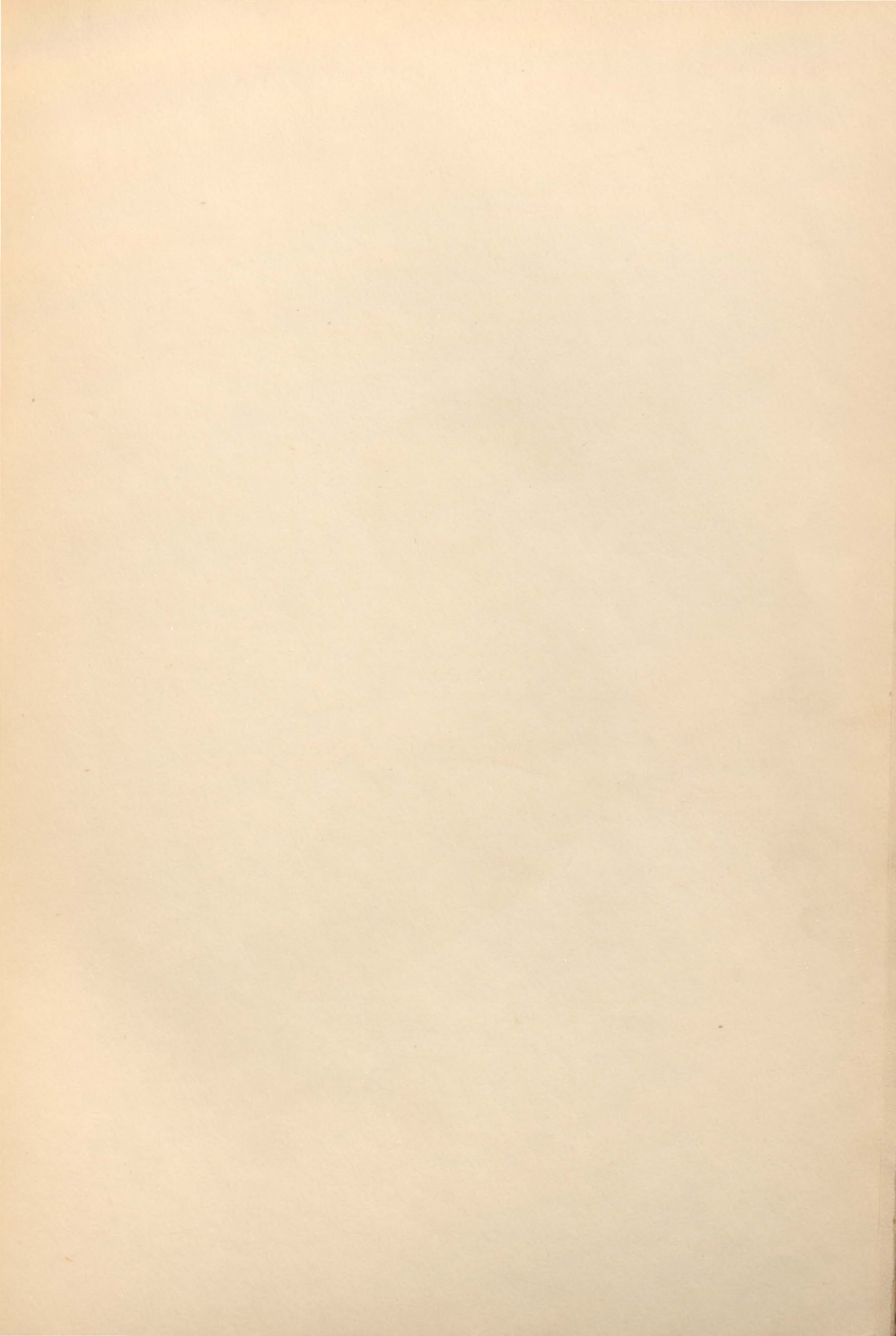
THE BIRDS OF AUSTRALIA.

neat cottage. Hugh Germain came to Van Diemen's Land with Colonel Collins at the first settlement of the colony. He was a private in the Marines, and was for many years employed in hunting kangaroos and Emus for provisions, which the officer, whose servant he was, received from him, and sold to the Government at 1s. 6d. per pound. Germain, assisted by two prisoners, returned 1,000 pounds per month, on an average. Though Emus are now rarely seen on the island, at that time they were frequently met with about New Norfolk, Salt Pan Plains, the Coal River, and Kangaroo Point."*

The bird figured and described is from a skin in the British Museum. There are only three skins known: two in the British Museum and one in the Frankfort Museum in Germany.† The attitude of the bird figured is taken from a photograph from life of an example of *D. novæ-hollandiæ*, and depicts the bird rising just before it stands upright. The photograph was lent me by the Hon. Walter Rothschild.

* James Backhouse, *Narr. Visit Austr. Col.*, p. 212 (1843).

† This skin was chronicled by Dr. Hartert (*l.c.*) though at that time without any specimens to compare it with, he was not aware of any difference between it and *D. novæ-hollandiæ*.





J.G. Keulemans, del.
H. Grönvold, lith.

Witherby & Co

$\frac{1}{8}$
DROMÆUS PARVULUS.
(KANGEROO ISLAND EMU).

DROMAIUS PARVULUS.

KANGAROO ISLAND EMU.

(PLATE 3.)

DROMAIUS PARVULUS Gould, in Broderip's Penny Cyclop., XXIII., p. 145 (1842), Kangaroo Island.

Dromaius ater Vieillot, Gal. des Ois., II., Pl. 226 (1825).

Dromaius parvulus Gould, in Broderip's Penny Cyclop., XXIII., p. 145 (1842).

Dromæus ater (not Vieill.) Bonaparte, Compt. Rend., XLIII., p. 841 (1856); Salvadori, Cat. B. Brit. Mus., XXVII., p. 588 (1895); Campbell, Nests and Eggs Austr. B., II., p. 1068 (1901); Giglioli, Ibis, pp. 1-10 with fig. (1901); Hall, Key B. Austr., p. 109 (1906).

Dromaius novæ-hollandiæ (part.) Gould, Handb. B. Austr., p. 200 (1865).

Dromaius ater (not Vieill.) Milne-Edwards et Oustalet, Notices sur Quelques Espèces d'Ois., pp. 62-67, Pl. V. (1893); Oustalet, Nouv. Arch. Mus. Paris (3) VIII., p. 263 (1896).

The Black Emu Renshaw, Zool., p. 81 (1903).

Dromiceius ater (not Vieill.) Oberhohlser, Smiths. Quart., 48, p. 60 (1905).

Dromaius peroni Rothschild, Extinct Birds, p. 235, Pl. 40 (1907).

Dromæus peroni Mathews, Handl. B. Austral., p. 5 (1908).

Dromæus parvulus Mathews, Bull. B.O.C., XXV., p. 34 (1910).

DISTRIBUTION. Formerly Kangaroo Island; now extinct.

Adult. The top of the head is covered with a crest of recurved feathers, which is continued on to the occiput and nape, in a band of similar but slightly longer feathers. These feathers differ in their woolly nature and their black colour from the brownish hair-like feathers, and the rather short curly feathers which cover the abdomen and nape of the Australian Emu. The cheeks are not entirely bare, and from the base of the neck springs a kind of moustache, which turns backwards and meets the hair-like feathers covering the ears, while in the Australian Emu a naked band extends across the lores and cheeks to the temples, where it begins to blend with another naked zone surrounding the ear and extending along the sides and the front of the neck. On the contrary, in the Emu brought home by the Baudin Expedition, the front of the neck is almost entirely covered with hair-like, blackish feathers, and the naked zones are narrower and turn towards the side of the nape. All the lower part of the neck is covered with a very thick "ruff" of blackish, woolly feathers, very different from those which cover the same part of the Australian Emu. The feathers of the body, instead of being as in the latter, fulvous and marked with black at the tip and along the shaft, are

THE BIRDS OF AUSTRALIA.

mostly, in the Emu from Kangaroo Island, of a fulvous-brown at the base, and of a very dark brown from the middle to the tip; finally, the feathers of the thighs, instead of being of a yellowish-grey colour spotted with brown, are a mixture of fulvous and blackish-brown. The beak and feet are very dark brown, and the naked parts seem to have been blue as in the Common Emu. Total length, 142 cm.; height to back, 65; bill from gape, 75 mm; tarsus, 230; middle toe and claw, 130.

(The above description is translated from the work of Milne-Edwards and Oustalet, *loc. cit.*)

Nest and Eggs unknown.

ON December 27th, 1802, the French corvettes, "Le Géographe" and "Le Naturaliste," under the command of Admiral Baudin, arrived at Kangaroo Island, off South Australia, and stayed there till February 1st, 1803.

During these two months the naturalists, Péron, Mangé, Lesueur, and Le Vilain, explored the island which Flinders had discovered and which Baudin called l'Île Decrès. They found plenty of kangaroos and Emus.

Péron says* :—"But of all the birds that bountiful nature has given to Kangaroo Island, the most useful to man are the Cassowaries; these large birds appear to exist on the island in numerous flocks; but as they are very fleet of foot, and we did not trouble to chase them, we were only able to capture three living examples."

Dr. Oustalet† informs us that a MS. list of the mammals and birds procured on Baudin's Expedition still exists in the archives of the Paris Museum. We are therefore certain that they arrived safely in France, as this document tells us they were distributed as follows: one to the Menagerie of the Museum and two to the Château of Malmaison. These latter were probably sent back to the Museum later on, for Vieillot speaks of several Emus of small size living in his time in the Menagerie of the Jardin des Plantes.

When the birds died, after having lived in captivity about twenty years, they were fortunately preserved in the Museum, otherwise we should never have known what the Kangaroo Island Emu had been like. The late Dr. Oustalet‡ gives the following details respecting the two specimens which remain in the Paris Museum; the third (a skeleton) was apparently sent as a present, or in exchange, to the Florence Museum.

"There still exists in the collection of the Museum a skeleton preserved in the Gallery of Comparative Anatomy, and bearing this inscription, erroneous in so far as locality is concerned:—"A. 3824 Casoar de la Nouvelle-Hollande, mort à la Ménagerie en mai, 1822, de l'Île King, par Péron et Lesueur, expedition du capitaine Baudin."

* *Voyage de Découvertes aux Terres Australes*, Vol. II., p. 78 (1816).

† *Notice sur Quelques Espèces d'Oiseaux du Muséum d'Histoire Naturelle*, par M. A. Milne-Edwards et M. E. Oustalet, p. 63 (1893).

‡ *Cf. Giglioli, Ibis*, pp. 1-10 (1901).

KANGAROO ISLAND EMU.

“ There is also a mounted specimen in the public Gallery of Zoology bearing this very old and partly inaccurate label, ‘*Dromaius ater* V., Port-Jackson, Australie, expédition du capitaine Baudin,’ and on the reverse this inscription, ‘Casoar de la Nouvelle-Hollande *Casuarius australis* Lath., rapporté vivant de Port-Jackson par l’expédition du capitaine Baudin, mort en avril, 1822. Le squelette est à l’anatomie.’ ”

Dr. Oustalet points out that, as the mounted specimen still retains portions of its skeleton, and the skeleton in the Osteological Gallery is complete, it is evident that there were two separate examples prepared for the Museum, the two birds dying within a few weeks of each other in the Menagerie.

Dr. Oustalet is of the opinion, and I believe rightly, that the birds in the Paris Museum undoubtedly came from Kangaroo Island, where they were procured by Péron, who also visited King Island and I believe the white-breasted bird figured in his work is different from the Kangaroo Island bird, and was reproduced from Lesueur’s sketch (see under *D. minor*).

In the *Sale Catalogue of the Bullock Collection*, we learn (p. 75) that on Tuesday, May 18th, 1819, the eleventh day of the sale, two Emus were sold, viz. :—“ Lot 97. *Casuarius Novæ-hollandiæ* of New Holland. Very fine specimen. Lot 98. Lesser Emeu, a distinct species from the last.”

These two birds were sold to the Linnean Society, the first for £10 10s. ; the other for £7 10s. The latter is the specimen mentioned by Gould, in giving the name of *D. parvulus* to the Paris Museum bird, which he considered to be of the same species, though it might have been one of the birds seen by Latham, which I think came from King Island.

What ultimately became of these Emus I do not know, for the late R. Bowdler Sharpe told me that no specimen came to the British Museum when the Linnean Society made over its collection of mounted birds in 1863.

Mr. Broderip* quotes Gould’s MS. and observes :—“ But one species of *Dromaius* has hitherto been recorded ; but the indefatigable zoologist Mr. Gould has arrived at the safe conclusion that a second species has existed, if it does not still exist, though he has his fears that it may be extirpated. Two specimens at least, he kindly informs us, exist in the Museums ; one at the *Jardin des Plantes*, and the other in the Linnean collection. Mr. Gould, to whom we may look for a speedy publication of the characters of this new and most interesting addition of the *Struthionidæ*, has in his MS. designated this smaller species as *Dromaius parvulus*, and has placed that name on the bird in the Paris Museum. By his liberality we are permitted to lay this valuable information before our zoological readers.”

* *The Penny Cyclopædia*, Vol. XXIII., p. 145 (1842).

THE BIRDS OF AUSTRALIA.

Péron evidently considered the Emus from Kangaroo and King Islands to be identical, because in writing of King Island (Vol. II., p. 13) he remarks:—"The interior of the forests conceals a great number of Cassowaries," and on page 14: "The powerful Cassowary of a height of from 16 to 22 decimetres (5 to 7 feet) [*sic*] lays eggs of the size of those of an ostrich, and more delicate than those of the latter. The flesh of this Antarctic bird, intermediate, so to say, between that of a Jungle Fowl and a young pig, is truly exquisite." On both pages he refers to Plate XXXVI. When speaking of the Kangaroo Island bird as quoted above he also refers to Plate XXXVI.

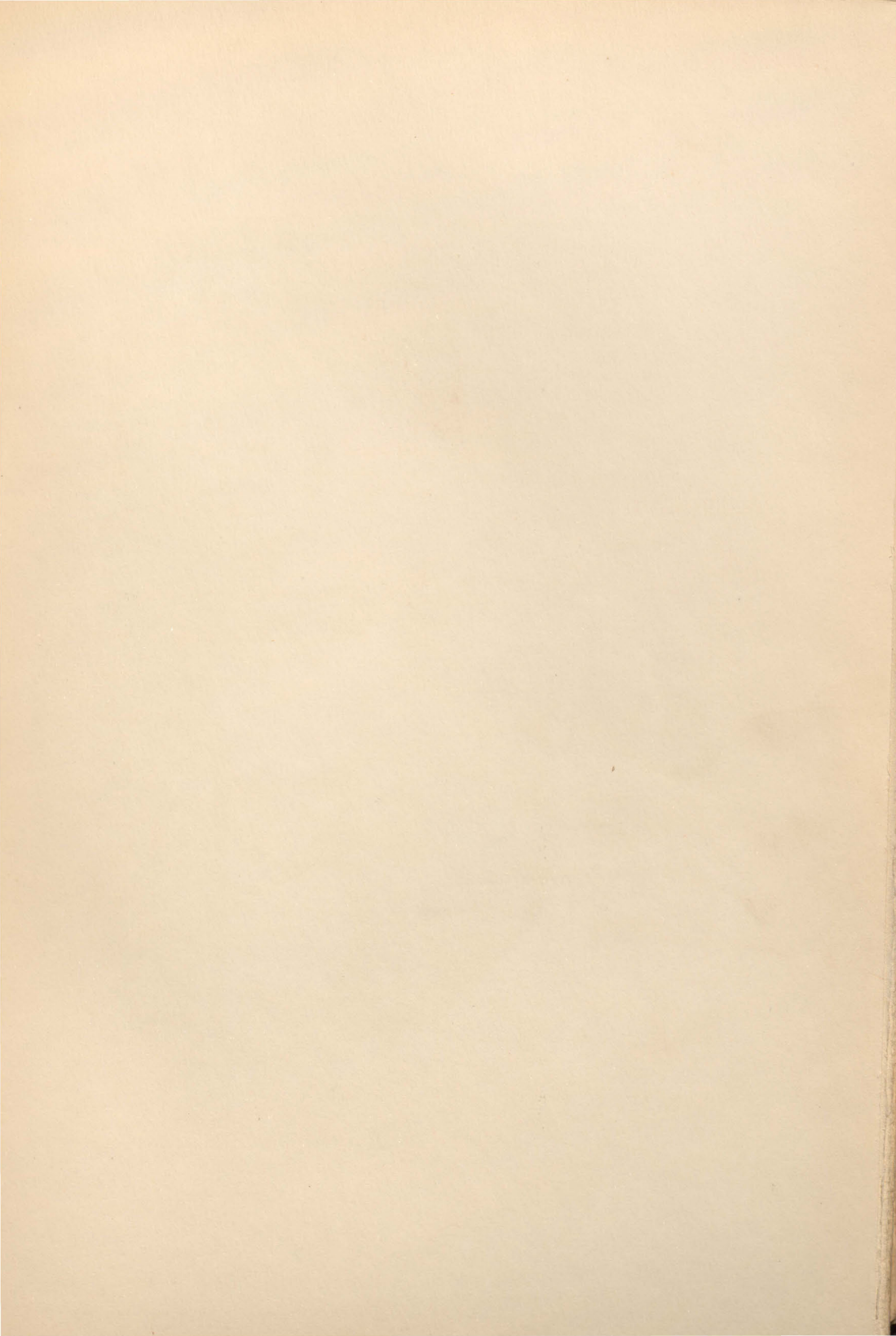
Mr. Dudley Le Souëf tells me that in his opinion the Liverpool specimen (supposed to be this bird) is nothing but the young of *D. novæ-hollandiæ*.

Dr. E. Hartert, of the Tring Museum, who carefully measured this bird in 1905, sends me the following:—Height to top of back, about 67 cm.; tarsus, about 24 cm.; middle toe without claw, 8 cm.; outer toe without claw, 5½ cm.; inner toe without claw, 5 cm.; bill from end of feathering to tip, 43 mm.; from gape, 87 mm.; colour, dark brown; head and neck, blackish; new black feathers appearing on the back; tail and feathers of belly more or less whitish brown, or edged with that colour.

The specimen was presented to the Liverpool Museum by Captain Mathews, of the steamship "Great Britain," 25th March, 1854.

The plate and the description here given are taken from the works of Milne-Edwards and Oustalet, as quoted in the synonymy.

I have examined and measured the mounted specimen in the Paris Museum.





H. Grönvold lith.

Witherby & Co

16
DROMÆUS MINOR.
(KING ISLAND EMU).

DROMAIUS MINOR.

KING ISLAND EMU.

(PLATE 4.)

DROMÆUS MINOR Spencer, Vict. Nat., XXIII., p. 140 (1906), King Island.

Casuarinus novæ-hollandiæ (not Latham) Péron, Voy. Découv. aux Terres Austr., II., p. 19, Pl. XXXVI., left-hand fig. (1816).

? *Van Diemen's Cassowary* Lath., Gen. Hist. B., VIII., p. 384, Pl. CXXXVIII. (1823).

Dromæus novæ-hollandiæ A. G. Campbell, Emu, III., p. 113 (1903).

Dromæus minor Spencer, Vict. Nat., XXIII., p. 140 (1906); A. J. Campbell, in Mathews' Handl. B. Austral., p. 5, note (1908); Spencer and Kershaw, Mem. Nat. Mus. Melbourne, No. 3 (1910).

Dromæus bassi Legge, Emu, VI., p. 119 (1907).

Dromaius minor Rothschild, Extinct Birds p. 237 (1907).

DISTRIBUTION. Formerly King Island; now extinct.

Adult male. "The bill is broad at the gape, lessening by degrees to the point, where it is a trifle bent; the nostrils placed near the edge, about the middle; colour dusky-blue; the space round the eye and some parts of the neck bare, and of the same colour as the bill; irides brown; the top of the head and hind-part clothed with a few straggling crisped feathers or hairs, the rest of the neck and breast covered with very long and loose brown feathers, which are, in the male, nearly white on the fore part; and when the bird walks with the head drawn backwards, gives a remarkable fulness to the breast; the rest of the bird is dark brown, with a tinge of blue or blue-grey, and the feathers everywhere loose and long, with the webs not attached as in the Common species [*D. novæ-hollandiæ*]; and also having two feathers from one quill, totally conceal any appearance of wings or tail; there is, however, a wing, or what may be called such, being a round stump, two inches in length, with a spur at the end, a little bent, having feathers on the sides, giving the appearance of a short wing, but by no means discoverable while the bird is in a quiescent state; the legs are stout, of a dirty bluish colour, and appear to come out of the middle of the body, in the manner of a Duck or Goose, the thighs not at all visible, as in the New Holland species, and the toes are placed all three forwards, as in that bird."

Female. "The female is much like the male, but the bare parts about the head incline more to brown, and the loose feathers on the neck and breast less full and brown."

Immature. "The young, when about three weeks old, are striped longitudinally brown and white, and in five or six weeks become wholly plain brown."*

Nest and Eggs unknown.

* Latham, *Gen. Hist. B.*, VIII., p. 384 (1823), obviously copied from Lesueur's plate. No specimen exists of this species.

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In Péron's narrative of his voyage to Australia,* on Plate XXXVI., some Emus are drawn by Lesueur, who, like Péron, was one of the naturalists attached to Baudin's expedition. This picture represents the "Casoar de la Nouvelle Hollande" from l'Île Decrès (Kangaroo Island).

On the left of the picture is figured a white-breasted Emu, and on the right are two figures of a black-breasted bird, one large, the other small. It would appear that Péron considered these were all of the same species, for, in his account of the Cassowaries of King Island, he refers to this plate, as though the birds from King Island were identical with those from Kangaroo Island. We know, from recent research, that they were not, *D. parvulus* from Kangaroo Island being distinct from *D. minor* from King Island.

Baudin's expedition captured three living specimens of these Dwarf Emus from Kangaroo Island, the history of which has been given under *D. parvulus*. Nothing has been said of the white-breasted Emu figured by Lesueur in Péron's Voyage, and it would seem that the French naturalists did not distinguish between the white-breasted and black-breasted birds, but even considered them to be identical with the Common Emu of the Australian Continent (*D. novæ-hollandiæ*). Anyone examining the figures in Plate XXXVI. of Péron's work can see that the Emu depicted on the left of this plate can hardly be the same as the black-breasted bird figured on the right.

It is evident that at the beginning of the nineteenth century there were more examples of these Dwarf Emus living in Europe than the three which Baudin brought to France. Latham† gives a figure of the "Van Dieman's Cassowary," with a reference to Péron's work. He evidently copies Péron's figure, and says that the bird never grows to the size of the Common Emu. He saw "two specimens alive in a London Exhibition‡ which appeared to exceed the bulk of a large Bustard, though giving the idea of a still bigger bird, owing to the fullness of the plumage"; he then gives a full description of the male, female and young. He states further that "the birds were very tame, submitting to be domesticated like poultry, and handled without resistance, and were different from the Common Emu in general gait, the head and neck being for the most part crouched and drawn backward, and the breast, of course, generally protruded, so as to lose much of its height; the back is also much rounded, and the hind parts depressed, as in the Pintado, and rarely could any part of the joint of the leg be seen from beneath the feathers."

* *Voyage de Découvertes aux Terres Australes* (1816).

† *General History of Birds*, VIII., p. 384, Pl. CXXXVIII. (1823).

‡ Probably Polito's Menagerie at Exeter Change.

KING ISLAND EMU.

There is much difficulty in determining the question whether the Dwarf Emus of King and Kangaroo Islands differed markedly in plumage, but I believe that this was the case. As the black-breasted bird in the Paris Museum is certainly from Kangaroo Island, and it is hardly possible that two species were found there, I think the white-breasted bird must have been the representative Dwarf Emu of King Island.*

It should be observed that Latham named the Dwarf Emu the Van Diemen's Cassowary, without assigning any reason for the designation. The Emu of Tasmania, as we know now, was a big bird, nearly as large as the Common Emu of Australia, and fully double the size of Latham's bird, which I believe to have been the Dwarf Emu of King Island.

Beyond the brief note in Péron's work that Emus were plentiful on King Island, nothing has been recorded of the species.

In 1903 two bones from King Island were sent to the Melbourne Museum. These bones, a thigh and a portion of a pelvis, were identified at the time as belonging to *D. novæ-hollandiæ*.

"The remains, in a fair state of preservation, were found on the margin of a lagoon on the east coast. In other parts of King Island, and also on other large islands in Bass Strait, notably Kent Group, sand drifts sometimes expose remains of the Tasmanian Wombat, now extinct on all islands but Tasmania itself, but this is the only occasion on which the Emu has been associated with them in the dune sands forming the land surface of to-day. It is significant that the specimens show no difference from the corresponding bones of the mainland Emu, from which, then, the Tasmanian variety, extinct only since the white man's advent, could not have essentially differed."†

The following comparative measurements give some idea of the difference in size, between *D. minor* and two of its allies. They are taken from the works of Professor Milne-Edwards and Dr. Oustalet, and Professor Baldwin Spencer :—

| | | Tibia. | Tarso-metatarsus. | Femur. |
|--------------------------|-------|---------|-------------------|---------|
| <i>D. novæ-hollandiæ</i> | .. | 373 mm. | 340 mm. | 210 mm. |
| <i>D. parvulus</i> | .. .. | 342 mm. | 290 mm. | 180 mm. |
| <i>D. minor</i> | .. .. | 330 mm. | 280 mm. | 180 mm. |

Professor Spencer's diagnosis of *D. minor* is as follows :—

Smaller than *D. ater*. Tibia not or only slightly exceeding 330 mm. in greatest length. Tarso-metatarsus not exceeding 280 mm. in greatest length. Pelvis, length not or only slightly exceeding 280 mm.

* In Vol. II., p. 13, of Péron's work it is stated that Lesueur drew the natural history specimens from life and the Plate was certainly drawn from a living bird and not from a stuffed specimen.

† A. G. Campbell, *Emu*, III., p. 113 (1903). This was written before it was known that the Tasmanian and King Island birds were different from *D. novæ-hollandiæ*.

THE BIRDS OF AUSTRALIA.

He thinks that it was a more robust bird than *D. ater* [*parvulus*].

In the Plate, which is a reproduction of the illustration in Péron's work, the left-hand figure represents, in my opinion, the Dwarf Emu of King Island.

Too little is known of this form to enable the question to be settled as to whether it should be regarded as a subspecies of *D. parvulus* or not.

FAMILY—CASUARIIDÆ.

GENUS—CASUARIUS.

CASUARIUS Latham, Ind. Orn., II., p. 664 (1790) *C. galeatus*.

Hippalectryo Gloger, Hand- und Hilfsb., pp. xxxxiii., 452 (1842) *C. galeatus*.

FEATHERS hard and hair-like, with the aftershaft as long as the principal shaft. Wings rudimentary, with about five round black shafts (without indication of webs) in the place of remiges. No rectrices distinguishable. Bill short, laterally compressed. Head and neck bare, the skin in various places carunculated and wattled and of bright colours; forehead ornamented with a more or less developed helmet of various shapes. Metatarsus rather short and robust. Toes three; two outer ones with short claws, inner one with a long, straight, powerful, pointed claw. Adult birds black; young ones brown. Nestling with longitudinal stripes on the upperside.

For anatomical characters see Pycraft, *Trans. Zool. Soc.*, XV., p. 267, 1900.

DISTRIBUTION. North Queensland to Ceram, New Guinea, and some of the adjacent Papuan Islands, as far east as New Britain.

CASUARIUS CASUARIUS AUSTRALIS.

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(PLATE 5.)

CASUARIUS AUSTRALIS Wall, Illustr. Sydney Herald, 3rd June (1854), Queensland; *cf.*, Gould, P.Z.S., p. 270 (1857).

Casuarius australis Wall, Illustr. Sydney Herald, 3rd June (1854); Gould, Handb. B. Austr., II., p. 206 (1865); Sclater, P.Z.S., p. 557 (1866); Bennett and Carron, P.Z.S., p. 473 (1867); Sclater, P.Z.S., p. 376 (1868); Gould, B. Austr. Suppl., Pls. 70-71 (1869); Flower, P.Z.S., p. 32 (1871); Ramsay, P.Z.S., p. 325 (1874); *id.*, P.L.S., N.S.W., I., p. 186 (1876); *id.*, P.Z.S., p. 119 (1876); *id.*, P.L.S., N.S.W., II., p. 376, Pl. XI. (1877); *id.*, Tab. List. Austr. B., pp. 19, 35 (1888); North, Austr. Mus. Cat., No. 12, p. 294 (1889); Lumholtz, Among Cannibals, p. 98 (1889); Salvadori, Cat. B. Brit. Mus., XXVII., p. 594 (1895); Campbell, Proc. Roy. Phys. Soc., p. 229 (1896); *id.*, Nests and Eggs Austr. B., p. 1069 (1901); Oates, Cat. Birds' Eggs Brit. Mus., I., p. 5 (1901); Hall, Key B. Austr., p. 109 (1906); Mathews, Handl. B. Austral., p. 5 (1908).

Casuarius johnsonii F. Mueller, Australasian, December 15th, 1866; *cf.* P.Z.S., p. 242 (1867); Kreff, P.Z.S., p. 483 (1867); *id.*, Ibis, p. 348 (1869); Diggles, Handb. B. Austr., II., Pl. 96A (1877).

Casuarius casuarius australis Rothschild, Trans. Z.S., XV., p. 123, Pl. xxv. (1900).

DISTRIBUTION. North Queensland (Cardwell to Cooktown).

Adult. This species, which is distinguished by its very high casque (thinner above); long nail of inner toe, and the very large wattles on the fore-neck, is black both above and below with dark brown bases to the feathers—the feathers being much elongated, narrow, and disintegrated with black shining shafts which are destitute of webs towards the ends. The wings are rudimentary and furnished with porcupine-like black quills without any webs whatever; head and neck all round, including the two wattles on the lower fore-neck, bare. For colour of soft parts refer to the Plate. Total length about 60 inches from top of casque to tips of feathers at the end of the body; bill from gape, 139 mm., culmen from base of casque, 65; tarsus, 317; middle toe and claw, 159.

Young (quarter-grown). "Head and hind-neck chestnut rufous. Chin, throat and fore-neck densely covered with short downy feathers of a brownish-buff colour. Rest of body clayey brownish-yellow mixed with dark rufous."*

Young (two-thirds grown). "Plumage brown. Head and occiput, dull pale blue; lower hind-neck, orange; fore-neck leaden blue; lower naked sides of neck blue, mixed with livid purple."*

* Rothschild, *Trans. Z.S.*, XV., p. 124 (1900).



H. Grönvold. del.

$\frac{1}{5}$
CASUARIUS AUSTRALIS.
(CASSOWARY).

Witherby & Co.

AUSTRALIAN CASSOWARY.

Chick. "Head and hind-neck pale rufous; fore-neck yellowish buff; rest of body yellowish buff. From base of neck to end of tail along the back run three broad longitudinal black bands, variegated with rufous, and each about seven-eighths of an inch wide. On the sides are three irregular wavy black bands extending from the shoulder-girdle down the sides to the beginning of the metatarsus."*

Nest. "A bed of sticks, leaves, and such-like vegetable débris, usually placed near the base of a large tree in dense scrub" (Campbell).

Eggs. "Clutch, four to six; some authorities state three to five; of a graceful elliptical form, and superficially like shagreen or rough American cloth, but not so rough or granulated as the Emu's (*Dromaius*) egg. General appearance in colour, beautiful light pea-green, but if examined vertically the raised rough particles only of the shell will be found to be green, while the minute interstices are greenish white. Dimensions in inches 5.56 to 5.43 by 3.81 to 3.62" (Campbell).

Breeding season. July to September (Ramsay).

Incubation-period. About eight weeks.

THE announcement of the existence of a species of Cassowary on the Australian continent was one of the chief ornithological events of the year 1854, when a communication was made by William Sheridan Wall, then curator of the Australian Museum, Sydney, to the *Illustrated Sydney Herald* of the 3rd June. The original specimen described by Mr. Wall in this newspaper was collected by his brother Thomas, who was Naturalist to the Kennedy Expedition, which ended so disastrously in 1848.

The exact date and locality seems uncertain. Carron, one of the survivors, in his narrative (written from memory) says that it was shot by Jackey, the black boy, on November 4th, in the vicinity of Princess Charlotte's Bay. Mr. Ramsay† says that Carron told him the type was obtained near Rockingham Bay, and that it has not been recorded north of Cooktown.

Writing to Gould from H.M.S. "Rattlesnake," Moreton Bay, on May 19th, 1849, Macgillivray says that this bird was obtained on the north-east coast of Queensland, "gaudily covered with blue about the head, and furnished with a helmet. Carron, the botanist, one of the survivors of Kennedy's expedition, told me of this, adding that Wall thought so much of his prize that he carried the skin on his back until they arrived at Weymouth Bay, where he died."

However, it is quite certain that the type was lost, and the first specimen that was obtained for science was shot by Mr. Randall Johnson (in the Gowrie Creek scrub) while on a visit to Rockingham Bay in September, 1866, and was described as new, under the name of *Casuarius johnsonii*, by Dr. F. Mueller of Melbourne in the *Australasian* on December 15th of the same year.‡

* Rothschild, *Trans. Z.S.*, XV., p. 124 (1900).

† *Tab. List Austr. B.*, p. 35 (1888).

‡ *P.Z.S.*, p. 241 (1867).

THE BIRDS OF AUSTRALIA.

This bird was presented by Mr. Johnson to the Australian Museum and Mr. Gerard Krefft, the curator, published a correct description, Dr. Mueller's description being not quite accurate.*

Mr. Carron, writing to the *Sydney Herald* on February 8th, 1867, says he has seen Mr. Krefft's specimen, which is identical with that shot by Thomas Wall in November, 1848. "I am aware that in the few remarks on Wall's bird which appear in my narrative of Kennedy's expedition, there is an error as to the colour of its helmet or comb, which was *black*, not *red* (the redness referred to the wattles), an error which I have before corrected. As I was present when Wall's bird was shot, and helped to eat it, I had a good opportunity of knowing something about it. Instead of going in flocks of five or six together, it is certainly a solitary bird, and would appear to be very scarce, as only two others were seen by our party during the whole journey from Rockingham Bay to my furthest camp at Weymouth Bay, in latitude 12° 25' S."††

Mr. E. P. Ramsay (to whom we are indebted for so much of the life-history of this bird), writing from Cardwell, Queensland, on April 2nd, 1874, says he found the Cassowary by no means rare there. He also got the eggs, four having been laid when the nest was found. He also got a young bird, which was fond of bathing. It stood about 3 feet 6 inches in height. He further remarks that this species swims well, and the birds frequently escaped by swimming across the creeks. They were also plentiful on Hinchinbrook Island, two miles from the mainland.§

The following is the best life-history I can find of this species:—

"The Australian Cassowary is a denizen of the dense, dark scrubs scattered over the district of Rockingham Bay, and extending as far north as the Endeavour River. It was tolerably plentiful only a few years ago, even in the neighbourhood of Cardwell, but since the advent of the sugar-planters, etc., on the Herbert River and adjacent creeks, these fine birds have been most ruthlessly shot down and destroyed for the sake of their skins, several of which I saw used for hearth-rugs and door-mats. Formerly they were easily enough procured, but lately, so wary have they become and their numbers so decreased, that it is only with the greatest amount of patience even a stray shot can be obtained. I know of no bird so wary and timid; and although their fresh tracks may be plentiful enough, and easily found in the soft mud on the sides of the creeks, or under their favourite feeding-trees, yet the birds themselves are seldom now seen. During the day they remain in the most dense part of

* *P.Z.S.*, p. 482 (1867).

† *Op. cit.*, p. 473 (1867).

‡ Carron does not give any description in his *Narrative of Kennedy's Expedition*, the description he refers to being Wall's in the *Illustrated Sydney Herald*.

§ *P.Z.S.*, p. 325 (1874).

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the scrubs, wandering about the sides of the watercourses and creeks, diving in through the bushes and vines at the slightest noise. Towards evening and early in the morning they usually visit their favourite feeding-trees, such as the native figs, Leichardt tree (*S. leichardti*), and various species of *Acmena*, *Jambosa*, *Davidsonia*, etc.; they appear to be particularly fond of the astringent fruit of the Leichardt trees and a species of *Maranta*, which produced bunches of large seed-pods filled with juicy pulp, resembling in appearance the inside of ripe passion fruit (*Passiflora edulis*). Fruits and berries of all kinds are eagerly sought after; the tame semi-adult bird which I had the pleasure of forwarding to the Society (1875) became so fond of the fruit of the capemulberry that he would allow no one to come near the tree he had taken possession of. This bird has frequently devoured at a time as much as three quarts of 'loquats' (fruit of *Eriobotria japonica*), and several fair-sized oranges whole, besides its usual amount of bread per diem (about three pounds). In nature, I found that in the afternoons they frequently came out and walked along the scrubs or along the side of the river or creeks, and swallowed large quantities of pebbles and small rough-edged stones. In confinement, plantains and sweet potatoes (in large pieces, which they can swallow whole) are a favourite food, while nothing seems to come amiss to them—grasshoppers, spiders, earthworms, cockroaches, caterpillars of all kinds, dough, and even raw meat. They ascertain the flavour of their diet by first taking it up in the tip of their bills and giving it a slight pinch; and if not suitable, they throw it aside. I found they invariably refused *green loquats*, but always picked them up in the bill first to try them. In confinement they become very tame, and may be allowed to walk about the place without restraint, coming when called, and more often running after and following anyone who is accustomed to feed them. If disappointed or teased, they not unfrequently 'show fight' by bristling up their feathers, and kicking out sideways or in front with force sufficient to knock a strong man down—a feat I have witnessed on more than one occasion. These birds are very powerful, and dangerous to approach when wounded. On more than one occasion a wounded bird has caused a naturalist to take to a tree; the sharp nail of the inner toe is a most dangerous weapon, quite equal to the claw of a large kangaroo, and capable of doing quite as much execution.

"I found the Cassowaries to be excellent swimmers, and frequently tracked them across a good-sized creek or river. On Hinchinbrook Island, situated about one-and-a-half mile from the mainland, they have been frequently met with, and I have myself heard them calling at night and early in the morning as I passed up the channel, at a distance of at least two miles from them. Mr. Johnstone informs me he met with one swimming across a river of considerable width during his explorations while on the 'North-east Coast

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Exploring Expedition.' The note, most usually emitted by the male, is a series of harsh guttural prolonged croakings, quickly repeated, and continued for about three minutes; it is very loud, and may be detected across the water at a distance of at least three miles on a still night. I have listened to it resounding through the scrubs at a distance of one-and-a-half miles on land, and then thought it close, and one of the most unearthly noises I ever heard. They breed during the months of August and September. The first nest procured was found by some of Inspector Johnstone's black troopers, from whom Mr. Miller, a settler on the Herbert River, purchased some of the eggs. One which he kindly presented to me is of the *light-green* variety mentioned hereafter. The nest consists of a depression among the fallen leaves and débris with which the ground in the scrubs is covered, with the addition of a few more dry leaves. The place selected is always in the most dense part, and well concealed by entangled masses of vegetation. The eggs were five in number in the only two instances recorded; and in both cases one of the eggs in each set differed from the other, being of a light-green colour, and having a much smoother shell. The others all have a rough shell, covered rather sparingly with irregular raised patches of dark but bright green on a lighter-green and smooth ground. In the pale (No. 1) variety these raisings on the shell are closer together, and not so well developed; in both varieties they are more thinly spread over the central portion than at the ends. On the whole they closely resemble the eggs of *Casuaricus bennettii*, in which similar variations are noticeable; but they are larger, and of a greater diameter, being greatest in the middle. I am indebted to Inspector Robert Johnstone for the fine series of the eggs of this species which at present grace my collection.

* * * * *

"The young of *Casuaricus australis* are of a dull rusty brown, the feathers having frequently a blackish shaft-stripe, giving to the back a streaked appearance. After the first year the plumage takes a deeper lighter brown hue, and black feathers begin to appear, mixed with brown, some being parti-coloured. After the second season, at the age of 18 to 24 months, the black feathers predominate, and the helmet, which has hitherto been undeveloped, more like the shield of a Coot (*Fulica*), begins to show a *keel* or *ridge* in the *centre*, which rapidly increases in height. The skin round the head, on which still remain a few brownish hair-like feathers, begins to become wrinkled and coloured, varying from bluish-green to orange on the lower part, and bright blue on the sides of the neck, the wattles becoming carmine. The helmet still remains comparatively small and undeveloped long after the wattles and naked parts of the neck become coloured. I believe that the helmet does not attain its full size until the fourth or fifth year at least. In traversing the scrubs the head is carried low to the ground, and the vines and

AUSTRALIAN CASSOWARY.

branches of trees striking the helmet slide over it on to the back. Otherwise in the dense vine-scrubs bordering the Herbert River and elsewhere progress would be greatly impeded; but as it is, the Cassowaries traverse the scrubs with wonderful speed, jumping over fallen trees and logs when in the way. A young bird (the identical specimen, I believe, forwarded by His Excellency the Marquis of Normanby to the Society), while in the possession of Inspector Johnstone, during my visit succeeded in jumping out of its yard over a fence more than six feet in height. I measured the fence, and found it six feet six inches to the top rail, on which its feet-marks were plainly visible; the length of the yard was only 12 by 12 feet. I found the adult Cassowaries in full moult in March; but the new feathers had not all made their appearance in May. During these months specimens in confinement were remarkably irritable and frequently sulky, even refusing their food (which they invariably do when unwell), and were at times very spiteful, even attacking their keepers; but strangers chiefly come in for a share of their dislike. At all times I have noticed they are very fond of bathing; the semi-adult bird before alluded to, which I forwarded to the Society, was remarkable in this respect, and might frequently be seen waiting at the pump in the yard until someone came for water, when he would sit down quietly under a copious shower, stretching out his neck and ruffling his feathers up to allow the water to reach the skin. They do not like any exposure, and always endeavour to get out of the sun. In the wild state they seldom leave the scrubs, and certainly never do so in the heat of the day unless hard pressed; but on the whole they are remarkably hardy, and bear confinement well."*

From my own experience, gained more than fifteen years ago, when I spent a few years between Cardwell and the Johnson River, I can confirm most of what Dr. Ramsay has written. I did not meet with it near Cardwell, the Tully River Scrub being the first place in which I saw it.

I there found the only two nests I have ever seen, both of them situated in the scrub. One had three, the other four eggs.

What most surprised me was the rapidity with which the bird got through the almost impenetrable scrub. It used to appear on the path cut through this jungle for our cattle to pass, but would instantly disappear on our approach.

Mr. A. H. E. Mattingley sends me the following notes:—"Some idea of the strength of this bird can be gauged by its weight, which in an exceptional case weighed 250 lbs., whilst the heaviest Emu has reached only 150 lbs. The average weight of the Cassowary, however, is from 160 to 200 lbs., and of the Emu from 90 to 120 lbs. for adult birds. The Cassowary loves to roam where the lawyer vines (*Calamus*) rope the surrounding vegetation together, forming an almost impenetrable jungle, and where the *Ficus*, or

* Ramsay, *P.Z.S.*, p. 120 (1876).

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fig-trees, and other wild frugiferous and berry-bearing plants flourish. It may be seen feeding on the fallen fruits in these scrubs; the seeds of the *Ficus* are nearly always found in their dung. Great difficulty is experienced in observing their habits in these wilds, since the noise made by a person in penetrating these thorny spots usually disturbs the bird, which makes off with great speed. It then lowers its head and runs with neck thrust forward, so that its thick horny helmet or casque will push aside the thorny brambles, and so save its neck, which is bare, from laceration. Its hard, glossy black body feathers and its strong quills growing from its flightless wings are also specially adapted to protect its body from scratches and injury as it forces its way through these dense growths.

“The Cassowary, timid as it naturally is, is resolute in the defence of its young. On one occasion I was out with a Turkey (*Alectura lathami*) hunter, when his dogs caught and killed a young Cassowary, some distance in the scrub from the road, when we were walking back to our buggy. Suddenly we heard a commotion, and out rushed the male Cassowary with a roar of anger, as he furiously chased the dogs back to the buggy, under which they cowered for protection. Espying us, the Cassowary viciously attacked me, whereupon the hunter had to shoot the bird to save me, since one blow or kick from the Cassowary would easily break a man's leg. The leg development of the Cassowary is twice that of the Emu, so they can be very dangerous when roused, especially as the leg is armed with exceptionally long and strong toes.

“The Cassowary has been known to jump a fence eight feet high in order to fight an adversary enclosed next to it.

“If taken from their dark shady habitat and placed in the bright sunlight in some enclosure, they usually go blind.

“The nest is made in the densest part of the scrub, of loose leaves, and usually on a spot where it would be free from surface drainage after a tropical downpour. The young, in their more immature stage of growth, if separated from their parents, keep up a piteous call. The parents when signalling their whereabouts make a noise something like that of a calf.

“Like the Emu, the Cassowary can swim when compelled to do so.”

Lumholtz* says the Cassowary's usual thunder-like call changes when calling to its young, and reminded him of the lowing of a cow to its calf. He further says the eggs are laid at long intervals, as in one nest he obtained a young just hatched, an egg almost hatched, and another that could easily be blown.

The bird figured and described is a female from Rockingham Bay, Queensland. The colour of the soft parts is taken from the plate in the Hon. Walter Rothschild's *Monograph of the Genus Casuarius*.†

* *Among Cannibals*, p. 98 (1889).

† *Trans. Z.S.*, XV., Pl. xxv. (1900).

SUB-CLASS II.—NEOGNATHÆ.

[PYCRAFT, *Trans. Zool. Soc.*, XV., p. 149 (1900)].

ORDER II.—GALLIFORMES.

FAMILY—MEGAPODIIDÆ.

GENUS—MEGAPODIUS.

- MEGAPODIUS Quoy et Gaimard, *Voy. Uran. et Phys.*, p. 124 (1824) *M. freycineti*.
Alethelia Lesson, *Bull. Sci. Nat.*, VIII., p. 115 (1826) *M. freycineti*.
Alechthelia Hartl., 1842 (*cf.* Gray, *Handl. B.*, II., p. 255 (1870)) *M. freycineti*.
Amelóus Gloger, *Hand- u. Hilfsb.*, p. 375 (1842) *M. freycineti*.

BILL slender; nostrils oval, for their greater part covered with a membrane. Head and neck in some species but scantily feathered. Tail consisting of twelve rectrices, rather short, and not more than half the length of the wing.

DISTRIBUTION. Eastern Islands from the Nicobars to Australia and eastwards as far as Ninafou; north to the Philippine and Marianne Islands.

MEGAPODIUS DUPERREYI TUMULUS.

SCRUB FOWL.

(PLATE 6.)

MEGAPODIUS TUMULUS Gould, P.Z.S., p. 20 (1842), Cobourg Peninsula, Northern Territory.

Megapodius tumulus Gould, P.Z.S., p. 20 (1842); Thienemann, Fortpflanz. ges. Vögel, pp. 10, 51 (1846); Gould, B. Austr., V., Pl. 79 (1848); Macgillivray, Narr. Voy. Rattlesnake, I., p. 62 (1852); Gray, P.Z.S., p. 290, Pl. XXXIV. (1861); Gould, Handb. B. Austr., II., p. 167 (1865); Ramsay, P.L.S., N.S.W., I., p. 184 (1876); *id.*, P.Z.S., p. 118 (1876); Diggles, Handb. B. Austr., II., Pl. 94 (1877); Forbes, P.Z.S., p. 126 (1878); Ramsay, Tab. List. Austr. B., p. 18 (1888); Lumholtz, Among Cannibals, p. 149 (1889); North, Austr. Mus. Cat., No. 12, p. 282 (1889); Mathews, Handl. B. Austral, p. 6 (1908).

Megapodius macgillivrayi (not Gray) Finch, New Guinea, p. 180 (1865).

Megapodius assimilis Masters, P.L.S., N.S.W., I., p. 59 (1875); Ramsay, Tab. List. Austr. B., p. 18 (1888).

Megapodius duperreyi (Part.) Ogilvie-Grant, Cat. B. Brit. Mus., XXII., p. 454 (1893).

Megapodius duperreyi (not Lesson and Garnot) Le Souëf, Ibis, p. 16 (1899); Robinson and Laverock, Ibis, p. 649 (1900); Campbell, Nests and Eggs Austr. B., p. 715 (1901); *id.*, Emu, VI., p. 15 (1906); Hall, Key B. Austr., p. 74 (1906); Le Souëf, Wild Life in Austr., p. 353 (1907).

Megapodius duperreyi tumulus Hartert, Nov. Zool., XII., p. 195 (1905).

DISTRIBUTION. Northern Territory: Queensland.

Adult male (from the Northern Territory). General colour above, including the wings and tail, dark chestnut-brown, becoming darker on the lower back, rump, upper tail-coverts and tail; primary-coverts and quills blackish, paler on the outer webs; head crested, darker than the back, the feathers being lanceolate in form imparts a more or less streaked appearance; hind-neck and upper mantle dark lead-grey like the entire under-surface, except the under tail-coverts, which are dark chestnut like the flanks; under wing-coverts dark lead-grey; forehead, space round the eyes and sides of face very sparsely feathered with dark hair-like plumes; chin and upper throat with very short blackish feathers; "Bill reddish brown with yellow edges; iris dark brown; tarsi and feet bright orange, the scales on the front of the tarsi from the fourth downwards and the scales on the toes dark reddish brown" (J. Gould); "Iris brown; feet red" (J. T. Tunney). Total length, 450 mm.; culmen, from hinder point of nostril, 21; wing, 275; tail, 105; tarsus, 65.



J.G.Keulemans, del.

Witherby & C^o

$\frac{1}{3}$
MEGAPODIUS TUMULUS.
(SCRUB FOWL).

SCRUB FOWL.

Adult female (from the same locality). Similar in every respect to the plumage to the male. "Iris brown; feet red" (J. T. Tunney). Total length, 431 mm.; culmen from hinder point of nostril, 20; wing, 257; tail, 106; tarsus, 70.

An adult female from Port Keats, Northern Territory, received from Mr. Edwin Ashby's collection, is in much abraded plumage and evidently moulting after the breeding season. Many of the feathers of the wings and back are much worn and have paler margins which gives a more or less barred appearance on the upper-surface.

An adult male from Cape York is very similar to the adult male described above in the distribution of colour, but everywhere much paler, the middle of the abdomen is inclining to olive-brown; the lower flanks, thighs and under tail-coverts deep chestnut and inclining to maroon. Total length, 455 mm.; culmen, 20; wing, 266; tail, 105; tarsus, 67.

Immature female (from Bartle Frere, Queensland). Rich chestnut-brown on the head, entire back, upper tail-coverts and wings, the latter showing the remains of indistinct barrings and rufous margins on the edges and tips of the greater coverts as shown in the nestling-plumage. It is also distinguished from the adult by the chestnut colour of the lower flanks, thighs and under tail-coverts; quills and tail-feathers blackish as in the adult. "Bill and iris brown; feet yellow" (E. Olive). Total length, 370 mm.; wing, 234.

Chick (from Port Keats, two weeks old, received from Mr. Edwin Ashby's collection). Dark reddish-brown on the head, wings, lower back and tail; the scapulars and wings show more or less distinct brown and rufous bars; hind-neck and upper mantle olive-brown; sides of face and lower throat lead-grey, becoming more or less whitish on the chin; sides of body and under wing-coverts lead-grey; remainder of under-surface russet-brown; under aspect of tail conspicuously darker.

Another chick, from Cedar Bay, Queensland, is similar to the above, but everywhere paler; the hind-neck and upper mantle slate-grey, as also the lower throat, the sides of the face paler and the chin whiter; the under-surface pale rust-brown more or less mixed with grey; under aspect of tail not conspicuously darker than under-surface.

I have described an adult male from the Northern Territory and Cape York, as these latter may, with more material, be separated as *Megapodius duperreyi assimilis* Masters.

Nest "or egg mound, usually of immense size, rotund in shape, occasionally conical; composed of loose, black vegetable mould or soil, mixed with sticks, leaves, etc., if close to the beach the mound is chiefly sand and shells; usually situated within a few hundred yards of the sea-shore, and protected by thickly-foliaged scrub or trees. Dimensions, about 20 feet in diameter at base, or a circumference of about 60 feet; height about 5 feet" (Campbell).

Eggs. "Clutch or complement to a mound, variously stated, but probably eight to ten; long ellipse in shape, both ends being nearly alike; texture of shell coarse; surface without gloss; colour, pinkish or yellowish buff, the outer or beautiful pinkish buff coating, when removed, shows the yellowish buff. If both colours are scratched off a whitish shell is revealed. Dimensions in inches 3.62 to 3.33 by 2.1 to 1.98" (Campbell).

Breeding season. October to February (Ramsay).

Incubation-period. About six weeks (Le Souëf).

As pointed out by Dr. Hartert,* the Australian bird differs from the New Guinea one by its darker and more rufous upperside and larger size.

Dr. Ramsay, speaking of this bird in Queensland, says:—"This mound-raiser is very plentiful north after passing Port Denison; I found it also

* *Nov. Zool.*, XII., p. 195.

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in tolerable numbers as far south as the Pioneer River. They are strictly confined to the dense scrubs, and seldom, if ever, seen elsewhere. Their noisy cackling at night frequently disturbed us when encamped near one of their favourite resorts; and during the day their hoarse note at once betrays their presence. On the Herbert River they are not much sought after as an article of food, either by the natives or whites; for as their eggs are esteemed a delicacy the birds themselves are not much molested. I examined several nests in March; and although it was not the regular breeding-season, yet fresh eggs were obtained, and newly-hatched young were found singly here and there throughout the denser part of the brushes. Some of the mounds were very ruthlessly destroyed by the whites, and scattered over the ground. This, however, did not cause the birds to forsake the place; and out of one large mound which had been very roughly handled, two new ones were formed, about 10 yards apart, on the base of the old one, which was so matted and interlaced with roots from the neighbouring trees that it appeared to me a marvel how the birds could burrow into it the great length they did; and having once laid their eggs there, however the young birds found their way out through the maze of roots is still a mystery. Once out, however, and their wings dry, they are able to take care of themselves, but remain about the mounds for a day or so, as if waiting for some of their companions; but in less than a week from the day they are hatched they may frequently be seen at least a quarter of a mile away, and well able to fly about. I met one little fellow, only 5.5 inches in total length, fully a mile away from the nearest mound; he flew up and settled in a tree, about 20 feet from the ground. The wings and feet were remarkably developed for so small a bird, which could scarcely be more than four weeks old. Upon more than one occasion I have seen the birds busy at their mound, or feeding near it, but was never so fortunate as to meet with them in the act of burrowing. The largest mound I met with was about 50 feet in length, 10 in height, and 14 feet in width at the base, 8 or 10 on the summit. It seemed to be more like several mounds combined; and certainly more than two pairs of birds frequented it. While stationed, gun in hand, watching for Cassowaries [*Casuaris australis*], I noticed on one occasion five birds arrive at this mound in company; they came very close to me, making a chuckling noise jerked out from their throat, and not unlike that of a domestic fowl when driven from its nest, but not so loud. Usually only a pair are met with together. Their flight is heavy; and they do not readily take wing, unless pursued by a dog, when they rise with a considerable flapping to the most convenient branch, where they are easily approached and shot. Their flesh is dark, rank, and tough.”*

* Ramsay, *P.Z.S.*, p. 118 (1876).

SCRUB FOWL.

Mr. Dudley Le Souëf gives the following account:—"These birds are found on the north-east coast of Queensland, always inhabiting the densest scrub, and never very far from the coast, and in the low-lying country on each side of many of the tidal rivers for a short distance inland. They are also found on many of the small scrub-covered islands of the coast, and although the birds are very poor fliers, they must have winged their way out to the islands somehow, as in many cases they are situated a good many miles from the mainland. It is possible they may have been blown out during a cyclone. The want of water on many of these islands does not seem to make any difference to them.

"The male and female are very similar in appearance, being of a dark brown colour, the male being the darker of the two. They are difficult to detect in the scrub, especially when they remain quiet, which they often do on being first disturbed. Their habits are shy and solitary, and they are rarely seen, as, on being alarmed, they can run very quickly, keeping in the thickest cover, or else they fly into a low branch of a tree, and on perceiving any movement on the part of the cause of their disturbance they fly heavily away. They use their wings much more readily than the Brush Turkey [*Alectura lathamii*], and fly more freely through the scrub. They are generally very silent during the day, but when they are going to roost near the tops of the high trees, they often utter a loud double call, and frequently repeat it all night at intervals of half an hour or so. Their food consists of snails, insects, berries, etc.

"The scrub-hens generally make their mounds in thick scrub, and apparently without any particular choice of locality; they are often placed just above high-water mark on the coast, and of course are then mostly composed of sand mixed with stones, roots, sticks, and leaves, while further inland earth takes the place of sand. But, unlike the Mallee-Fowl [*Leipoa ocellata*] or Brush Turkey [*Alectura lathamii*], they form their mounds mostly of soil, with just sufficient vegetation mixed with it to cause it to heat. Again, they do not scrape out their mounds every season, but add to them, so that, as they are largely composed of soil, in the course of a few years they become of considerable size, and shrubs and trees often grow on them, and in course of time fill them with a net-work of roots. By that time, however, the birds generally desert them, not so much on account of the roots, but because the vegetation has become decomposed and no longer generates sufficient heat. When a pair of birds start a nesting-mound it is often very small the first year, about 2 feet high and 5 feet in diameter at the base, and you find mounds from that size up to 14 feet high and 35 feet in diameter at the base.

"The birds generally make the top portion of the mound up and add to it in July and August, apparently to let sufficient moisture penetrate before they

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commence laying towards the end of September or early in October, in a wet season earlier, in a dry season later. The surface is scraped for a considerable distance round the mound, holes often being made from which they take the soil.

“The temperature of the part of the mound where the eggs are placed is generally 95 degrees, occasionally a little over, and a clutch is nine eggs, that being the largest number I have known to be taken out of one nest. So far as I can judge, only one pair of birds used the same mound, and the male is generally near at hand to repair any damage that may have been done. When the hen bird is ready to lay she scrapes a hole near the top of the mound to the depth of from 6 inches to 5 feet, and the egg having been lain in the hole she places it on end, with the small end downwards, and covers it up to the level of the rest of the mound. Occasionally she makes an excavation straight in from the side, but not often. The various holes are not placed in any particular order, nor are they all of one depth. The egg is laid at daybreak, and three days elapse between the laying of each egg. The egg being so large compared with the size of the bird will quite account for the time between the layings. The white shell of the egg is covered with a pink substance, which easily flakes off when the egg is dry. The eggs are about the same size and colour as those of the Mallee Fowl [*Leipoa ocellata*], so much so that the eggs of one bird can easily be mistaken for those of the other. Incubation takes about six weeks, and the young when hatched make their way out, as the parent birds, by frequently scratching, prevent the soil from becoming caked and hard. Only one egg is laid in each excavation, and the holes are about a foot in diameter; sometimes they go down straight and sometimes at an angle. In a moist neighbourhood the eggs are not so far from the surface as they are in the drier sandy soil.

“The young when hatched are well feathered and can fly, and at once commence an independent existence, as they do not stay with their parents. Scrub-fowls are difficult to keep in confinement, being very restless, and generally end by accidentally killing themselves. Consequently, adult birds of this species are rarely seen in captivity.”*

This bird was fairly plentiful in the scrubs near Cardwell in the early nineties, when I was there.

The bird figured and described is a male from the South Alligator River, Northern Territory, and was collected in September, 1903, by Mr. J. T. Tunney.

* Le Souëf, *Ibis*, p. 16 (1899).

GENUS—LEIPOA.

LEIPOA Gould, P.Z.S., p. 126 (1840). (Also spelt *Leiopa*, *Lipoa*). . . *L. ocellata*.

BILL shorter and stouter than in *Megapodius*, nostrils covered with a membrane, so that only a slit-like opening remains. Head and neck feathered; the feathers of the crown elongated, forming a sort of crest. Tail consisting of sixteen rectrices, which are about two-thirds the length of the wing. Upper and under tail-coverts rather long; the upper ones almost or quite reaching to the tip of the tail.

DISTRIBUTION. Australia.

LEIPOA OCELLATA.

MALLEE FOWL.

(PLATE 7.)

LEIPOA OCELLATA Gould, P.Z.S., p. 126 (1840), Swan River, Western Australia.

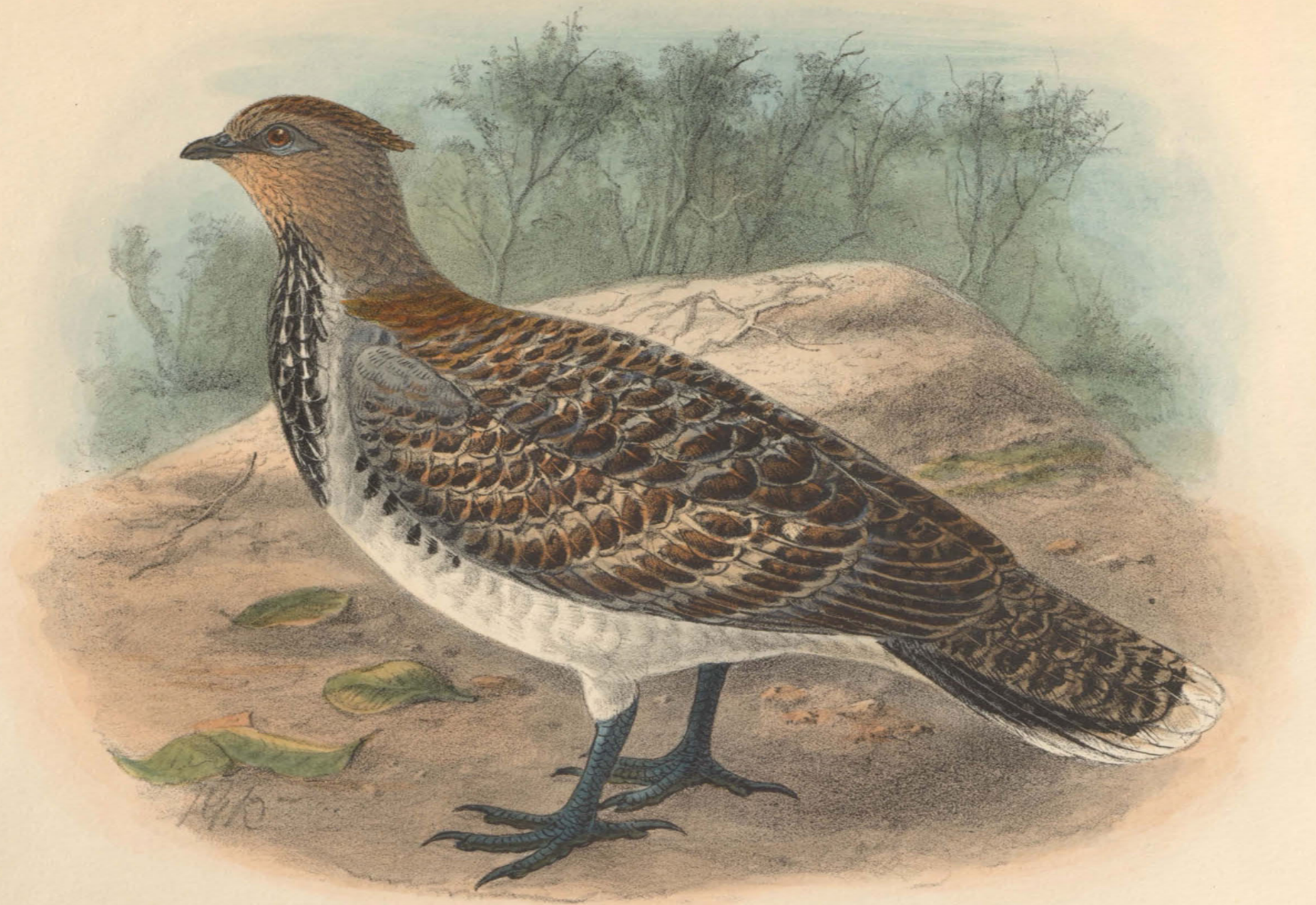
Leipoa ocellata Gould, P.Z.S., p. 126 (1840); *id.*, B. Austr., V., Pl. 78 (1848); *id.*, Handb. B. Austr., II., p. 155 (1865); Ramsay, P.L.S., N.S.W., I., p. 184 (1876); Bennett, P.L.S., N.S.W., VIII., p. 193 (1883); Campbell, Vict. Nat., I., p. 125 (1884); Ramsay, Tab. List. Austr. B., p. 18 (1888); North, Austr. Mus. Cat., No. 12, p. 281 (1889).

Megapodius (Leipoa) ocellatus Thienemann, Fortpflanz. ges. Vögel, pp. 12, 52, Pl. XII. (1845).

Leipoa ocellata Ogilvie-Grant, Cat. B. Brit. Mus., XXII., p. 463 (1893); Le Souëf, Ibis, p. 10 (1899); Hall, Insect. B. Vict., p. 203 (1900); *id.*, Vict. Nat., XVIII., p. 22 (1901); Campbell, Nests and Eggs Austr. B., p. 698 (1901); Oates, Cat. Birds' Eggs Brit. Mus., I., p. 18 (1901); Milligan, Emu, II., p. 76 (1902); Carter, Emu, III., p. 173 (1904); Hall, Key B. Austr., p. 74 (1906); Campbell, Emu, VI., p. 197 (1907); Le Souëf, Wild Life in Austr., p. 136 (1907); Hall, Useful B. South Austr., p. 224 (1907); Mathews, Handl. B. Austral., p. 6 (1908); Mattingley, Emu, VIII., pp. 53 and 114 (1909); Ogilvie-Grant, Ibis, p. 190 (1910).

DISTRIBUTION. New South Wales, Victoria, South Australia, Western Australia.

Adult male. General colour above grey and rufous-brown, barred on the wings and tail with black and white, which gives the bird a banded appearance; head grey, with dark lanceolate feathers tipped with whitish on the middle of the crown, which imparts a more or less streaked appearance; feathers of the hind-neck lead-grey, some of them margined with rufous-brown; the back covered with silky or down-like feathers also grey with paler tips; mantle grey barred with black, white, and rufous-brown, as also the scapulars, median and greater wing-coverts; sides of neck and lesser wing-coverts ashy-grey, the latter fringed with paler edgings and some of the outer ones showing dark shaft-streaks; primary-coverts pale brown tipped with whitish; primaries blackish, paler on the outer webs, marbled towards the ends and margined with white at the tips; secondaries blackish on the inner webs, irregularly barred with tawny, scimitar-shaped white and black marks on the outer webs; the long inner secondaries vermiculated and barred with these colours on both webs; the upper tail-coverts and middle tail-feathers are similar in colour to the secondaries; remainder of tail blackish tipped with white; cheeks, chin and upper throat ferruginous; on the lower throat a patch of black feathers which are streaked with white down the middle, some fringed with white at the ends and the lateral ones with white outer webs; sides of breast grey, barred with black, becoming paler on the sides of the body, and the dark bars broader and more pronounced; middle of abdomen and



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$\frac{1}{3}$
LIPOA OCELLATA.
(MALLEE FOWL).

MALLEE FOWL.

vent silvery-white; lower flanks, thighs and under tail-coverts buff, more deeply tinted on the latter, and with black shaft-streaks to the long under tail-coverts towards the base; wing-coverts grey on the outer margins, some of the inner ones barred with ferruginous and black like the axillaries; "Bill, slate black; bare skin below the eye bluish white; remainder of bare skin round eye dusky black; iris light hazel; feet, blue grey" (Life). Total length, 569 mm.; culmen from hinder point of nostril, 25; wing, 345; tail, 197; tarsus, 75.

Adult female. Similar to the male, but distinguished by the marblings or vermiculations on the outer webs of the primaries, on their lower aspect. Total length, about 565 mm.; wing, 346; tarsus, 71.

Immature male (three-quarters grown). Similar in every respect to the adult, but has the under wing-coverts and axillaries more rufous and the remains of mottlings on the outer webs of the primaries below.

Immature female (of the same age). Similar to the above.

Immature (about half-grown). Under wing-coverts more numerous but faintly barred and less rufous; the mottlings on the under-surface are more pronounced.

Chick. "The general colour of the dorsal surface of the downy plumage of the young bird shortly after leaving the mound is a mottled rufous-brown, whilst the ventral surface is an ashy-cream-buff. The legs and feet are well developed and strong and the toes are provided with long and powerful claws capable of scratching vigorously for food. The primaries and secondaries are fully developed and are of a brown colour, barred with white. The wing-coverts, which are of a downy nature, are brown, mottled with white. The downy feathers situate on the flanks and abdominal surface and throat are a creamy-buff. The lores, auriculars and forehead feathers which are also downy are a brownish cream-buff. Crown, nape, back and rump feathers are a light-mottled brown washed with buff. The tail, which is downy, is a light brown barred with white on the dorsal surface, and is an inch long, whilst the ventral surface is somewhat lighter in colour. The breast, which has a mottled appearance and downy, is an ashy-buff, whilst the sides are somewhat similar in colour only possessing a barred appearance. Total length, 200 mm.; culmen, 10; wing, 100; tarsus, 25" (Mattingley).

Nest. "A large conical-shaped heap or mound of sand, etc., covering a bed of leaves and other vegetable *débris* about 8 inches in thickness, usually situated in a water track in the dense scrub of sandy tracts, or in reddish ironstone gravel country, such as the Mallee, etc. Dimensions, 10 to 12 feet in diameter at base, or a circumference 30 to 40 feet, and height 2 to 4 feet" (Campbell).

Eggs. "Clutch, twelve to eighteen—other authors seven to eight; long oval in shape or elliptically inclined; texture coarse, but shell exceedingly thin; surface without gloss; colour, when first laid, light pink or pinkish buff, which on being scratched or removed shows a yellowish-buff ground; this, in turn, as incubation proceeds, chips off in patches and reveals a whitish shell. Dimensions in inches, 3.73 to 3.44 by 2.35 to 2.26" (Campbell).

Breeding season. October to February (Ramsay); September to December (Mattingley).

Incubation-period. 42 to 45 days (Mattingley).

MR. BENNETT gives the following notes on this bird in New South Wales:—

"About the month of October the birds (two only) commence (if new to construct—if old to repair) their huge mound nests. In the former case, they select a slight depression, such as where a stump has been burned out. This they fill with a mass of leaves, fragments of 'porcupine grass,' Mallee bark, etc., etc., and in doing this the whole surface of the surrounding ground for

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many yards is swept perfectly clean. The method of doing this is to go out some distance from the site of the intended nest, and then, walking backwards, alternately raking with each of their powerful feet, and assisted by their wings, sweep everything loose to a common centre. In the case of an old nest, they clean out the sand used for covering the eggs the previous year, and should they deem it necessary place more leaves, etc., in the hollow. Should the weather be moist at the time, the work goes on uninterruptedly, but should it be dry, they wait until a passing shower has damped the mass of vegetable deposit. This they then cover with three or four inches of sand, when the female commences the work of depositing her eggs. This she does by laying the egg on the sand covering the leaves, etc., and then leaning backwards grasps the egg in both feet, placing it in an upright position (small end down), then, holding it with one foot, she with the other gently rakes some sand around, and changing feet does the same on the other side until the egg will stand; it is then covered, as well as the other part of the nest, with several inches of sand. And here comes in the immense amount of work the birds have to perform at each subsequent laying, for the whole of the sand down to the level of the first egg (until the first layer or tier is completed) has to be removed, and so on with each successive layer; and as the mound increases in height the labour increases in proportion, for should the weather be dry, as it usually is, the sand runs like so much water, and a person has only to open one of these mounds himself to understand the difficulty the birds have to contend with in keeping the sand from running back. The removal of the sand is effected by the aid of wings and feet, the bird dragging each small quantity thus obtained a sufficient distance to ensure its not running back.

“The circumference of the cavity in the centre of the mound in which the eggs are deposited is about three feet, and around the edge of this space the eggs (usually three, sometimes four) are placed, this completes the layer; the whole are then covered with sand to the depth of four or five inches, which is allowed to remain, and the second layer is commenced, and so on until the whole (generally four) are completed. The bird lays about twice a week, thus a long time intervenes between the laying of the first egg and the last, and consequently eggs in all stages, from fresh laid to just on the point of hatching, and young birds are to be found at the same time.

“During the period of incubation the parent birds, as a rule, visit the nest morning and evening every day; in the earlier stages this is done to repair the damages caused by native dogs and iguanas, who scratch at the nests in the hopes of obtaining the coveted eggs or young, and also to repair the damage often caused by their more destructive biped foes. As an instance of which I may mention that on one occasion I opened a nest about ten o'clock in the morning, which contained three eggs. I took only one, as I knew from its

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delicate colour that it was quite fresh. I left the nest open, and having occasion to repass it about two hours afterwards to revisit it, I found the bird had, in my absence, made it up again. Thinking it might be possible that the egg I had taken was not of that morning's laying, and that whilst I was away the bird laid another, I again opened the nest, but there was but the two eggs. On this occasion I opened the mound to a much greater extent, drawing the sand back to a considerable distance and again leaving it open. Shortly before sundown I returned to the nest again, and found all damages repaired.

“ As the process of incubation progresses, these visits have an additional motive, viz., that of assisting any young bird out of the superincumbent mass by opening the nest; but that this is absolutely necessary so far as the chick is concerned, I do not believe, for on many occasions when opening nests I have found the chick so near the surface that a few minutes more would have effected its liberation unaided, and if it could, by its own exertions, come up from the lower layer, it could certainly have passed through the few inches of loose sand between it and the exterior of the mound, and from careful observations on this point I am convinced that the chick can liberate itself. The egg is of large size, consequently the chick is large and possessed of considerable strength, and on emerging from the shell, which is extremely fragile, its natural instincts prompt it to struggle for air and light; its struggles displace the sand, which runs down beneath the bird, and thus gradually it gets higher and higher. Its passage through the warm, dry sand completely removes any moisture clinging to it on emerging from the shell, and, when at last it reaches the summit of the mound, it is a fully-developed bird, able to fly, run, and take care of itself, which, in fact, it has to do, for the old bird, having so far conformed to maternal instincts as to assist it in getting out of the nest, now totally ignores its presence; whilst the young one, equally devoid of affectionate instincts, evinces fear of its parent and quickly runs off amongst the dense ‘porcupine grass,’ and commences its lonely existence; for lonely this bird decidedly is, leading a solitary life; for, except at the period of incubation, it is very rarely that two are seen together, and when met with quietly feeding, its actions are suggestive of melancholy, for it has none of the liveliness that characterises almost all other birds, but stalks along in a solemn manner as if the dreary nature of its surroundings and its solitary life weighed heavily on its spirits. Its note (not often uttered) is a most mournful sound, something like that of a bronze-winged pigeon, but much louder and each note much more prolonged. The food of this bird consists of insects, the seeds and berries of various shrubs, and the tender shoots of plants. In its wild state it is entirely independent of water, but will sometimes drink when domesticated. It is easily domesticated, but evinces no intelligence or affection, and its habits and actions are marked by the same cheerlessness and

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love of solitude as in its wild state. Although I have had a number of them reared together until full grown, yet, when liberated, they would not associate, but each go its own way, although so tame that they would take food from a person's hand and allow themselves to be handled. The mounds are of great size. One I measured a few days since was 37 feet in circumference, and this was by no means an exceptional case. I have seen them much larger."*

Mr. P. J. Sandland, writing from Burra, in South Australia, says:—"I have seen an odd, very old mound, but eggs have not been taken anywhere round the district for many years. There are a few birds further up the river, but these are fast disappearing, as the foxes scratch the eggs out and eat them."

Mr. Campbell says the eggs weigh $6\frac{1}{2}$ ozs. He also says:—"To produce the noise the bird has a peculiar habit of placing its head between its legs, with the back of its head almost touching the ground."

Mr. Tom Carter sends me the following notes:—"These birds used to breed (and probably still do so) in the dense coastal scrub between the Gascoyne River and Cape Farquhar in Western Australia, but, as much of this country has recently been stocked with sheep, the birds will probably disappear before long. When travelling with sheep in September, 1887, great numbers of egg mounds were observed in thick Mallee scrub between Sharks Bay and the Murchison River. It was then too early for eggs, but the natives there said they usually lived there a little later on for the purpose of collecting the eggs to eat. I was shown egg mounds of this bird on the south-west coast in 1902, which are under supervision of a settler who will not allow them to be disturbed. The top of one mound was freshly scratched out on November 25th. I was told of another nest which had been robbed of fifteen eggs about December 12th, situated a few miles away. They occur now in the dense thickets of Malok, Mallee and other Eucalyptus scrub, on the eastern side of the railway near Broome Hill, but the rapid opening up of this district will soon extirpate them. After severe bush fires there last summer I drove almost on to a bird on a fenced high road on this side of the railway. It attempted to get through the wire sheep netting, and I jumped out of my buggy and almost put my hand on it, when it flew. I saw another in one of my paddocks, about the same time."

Mr. Mattingley sends me the following notes on this bird:—"Although the 'Mallee' is the principal habitat of this bird, yet it is sometimes found frequenting a mixed class of country. They prefer, however, the more arid southerly regions of Australia, partly on account of the type of vegetation which these dry areas support. Being essentially a ground frequenting bird it is necessary that they should be protected by an open jungle through which they can readily run to avoid their enemies on the one hand, and on the other where they can search for food unhampered by a dense undergrowth. Nevertheless,

* Bennett, *P.L.S.*, N.S.W., VIII., p. 194 (1883).

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the main reason why they frequent the Mallee is that this type of growth is essential for the successful incubation of their eggs. The Mallee scrub is open, and its narrow lanceolate shaped leaves, set on the tops of this Eucalypt's slender trunks (which usually branch out from the root in separate stems to a height of between 4 to 20 feet, averaging some 10 feet in height) allows the sun's rays to penetrate and warm the mound, thereby assisting the heat engendered by the fermenting vegetable material, with which the *Lipoa* surrounds its eggs, the warmth of which is necessary to successfully hatch them out. Years ago, before the country was opened up, the Mallee hens existed within 35 miles to the West of Melbourne, and ranged through Southern Australia to Wilcannia in New South Wales, laying between the 31st and 32nd latitude, to which position also they have been found to reach in South Australia, whilst they extend as far north as the tropical Murchison River in West Australia, which lies between the 26th and 28th parallels of south latitude. Evidences of the existence of this bird have been found between Cue and Separation Wells in the great North-West Desert of West Australia.

“ In choosing a site for its nesting-mound the *Leipoa*, in its Mallee habitat, usually selects an open space in the scrub with a break or opening to the north or east, so as to admit the sun's rays, which have so important an influence on the incubation. On the opposite side of the mound the scrub is usually dense, and offers protection against the windy weather that blows from these quarters. As the outer covering of the mounds in Mallee country is composed chiefly of sand, this break-wind prevents the undue displacement of the superimposed material. The choosing of a site where the rays of the sun can fall upon the mound and warm it, as well as the selection of a place where the mound is protected by a break-wind, together with the circular style of architecture of the mound, which renders it less liable to damage by wind, emphasises the truly marvellous knowledge of the laws of physics possessed by the *Leipoa*. Although the mounds are constructed as a rule in these sites in the Mallee, yet I have examined a mound which had been built in the centre of a patch of scrub, the stem of which stuck up through the mound in all directions, whilst the leaves of the Mallee scrub overhead shielded the mound to a great extent from the sun's rays. Within the egg chamber of this mound, however, there was a greater supply of decomposing vegetable matter to create greater heat. Mr. Charles M'Lennan, better known as 'Mallee Bird,' who has had over twenty years experience of the ways of the *Leipoa*, and who has greatly assisted me in my investigations of the life-history of these birds, informs me that he has found the *Leipoa* utilizing the heaps of sand thrown out of a rabbit-warren for building their mound, which they had erected in the centre of the burrows, thereby saving a large amount of toil, which represented a fortnight's work for the birds. In other districts outside the 'Mallee' area, which the *Leipoa* frequents

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and which is clotted with scrub, the birds choose sites in accordance with the above conditions as far as possible. Many mounds are found in the troughs between the sand-dunes in the Mallee or in depressions in these arid places, yet there are many exceptions to this rule. The theory that the mounds are placed in these depressions so as to get a greater supply of moisture to aid in the fermentative action does not hold good. The mounds are placed in these sites for protection from the wind as well as to obtain the advantage of the higher and more even temperature prevailing in these miniature valleys.

“The foundation of the mound of the *Leipoa*, which is the smallest structure of all the Australian mound builders, is formed by first scratching out a circular depression in the ground about 2 feet wide and 1 foot deep. The sand or gravel is next scraped up and placed around this circular hollow, and so the outside wall of the nesting mound is formed. When completed the height of the mound ranges from 2 feet 6 inches to 3 feet 6 inches, with a diameter at the base of between 12 feet and 18 feet. The size of the mounds vary from 110 cubic feet of material to 200 cubic feet. Only a pair of birds work at the same mound, and into the concavity, which now has the appearance of the crater of a miniature volcano, they scrape leaves, vegetable matter, brambles, bits of bark and small branches, and heap it up in a circular fashion to a height of from 18 inches to 2 feet. The material is raked and swept up by the birds from every convenient direction around about the mound, and is often brought a distance of 40 or 50 yards. The manner in which they sweep up this débris with their wings and breast, and also rake it, as it were, with their powerful legs, and the clear appearance which the ground afterwards presents, gives an impression that some gardener had been cleaning up the garden with a fine-toothed rake. The wings of the birds are much worn by this sweeping. The vegetable material in the centre of the now saucer-shaped mound is left for about four or five months uncovered, during which time it usually receives a good soaking by the winter rains, which cause decomposition to set up and change it into a regular hot-bed. That the *Leipoa* prepares the mound months ahead of the egg-laying period is a remarkable trait in this bird's character, evidencing the knowledge possessed by it of the seasonal changes, as well as the physical requirements necessary to set in motion the fermentative action. Six to nine days before the hen commences to lay, the egg chamber is formed in the centre of all this vegetable matter. A hole, ranging from 14 inches to 20 inches in diameter and 18 inches to 2 feet in depth, is scratched out by the female. The sides of the hole forming the egg chamber being usually hard and well defined, consisting as it does of interlaced sticks matted together with leaves and twigs. This condition of the walls of the chamber has an important bearing on the future welfare of the eggs. In the first place, the foundation and inner walls of the mound being solid and

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laced together, so to speak, prevent the displacement of the whole mass, which would crush the eggs were it to start moving in any given direction, whilst the eggs would be liable to be broken if subjected to the compression of such a weight of sand out of which the *Leipoa* forms this mound, heaping it high above its eggs, and which is of such an unstable nature. The forming of the egg chamber occupies the bird for about one and a half hours. The vegetable débris thrown out by the formation of the egg chamber is placed back into the hole the same day, and being mixed with sand becomes more friable and loose. The mound is then heaped up into a pyramidal form, and after six or nine days have elapsed the female opens out the egg chamber and deposits her egg. To construct a new mound and prepare it for the formation of the egg chamber occupies the pair of *Leipoa* from twenty-five to thirty-three days. The birds work at the building of the mound only early in the morning for about four hours, and again late in the afternoon for a short time. On moonlight nights Mr. McLennan has seen them working for a few hours. The energy displayed by these birds in making their mounds is truly marvellous, whilst the labour entailed in scraping and gathering together the enormous quantity of material which forms it is prodigious. But what is still more astonishing is the amount of labour which devolves upon the hen bird every time she lays a fresh egg, since she has to scratch out the egg chamber and refill it each time, and as she lays in ordinary seasons about fourteen eggs, she has to re-open and refill it fourteen times. This reopening and refilling, together with the necessity of repeatedly opening up and refilling the egg chamber after the bird has ceased laying, so as to keep the material around the eggs loose, whereby sufficient oxygen can be supplied to the embryo in the egg, is a further cause of wonderment. The time occupied by the bird in cleaning out the egg chamber and preparing it to receive the egg and refill it again, after depositing her egg, takes the hen from three-quarters of an hour to one hour. Occasionally the cock assists the hen to open out the mound. About nine o'clock a.m. the Mallee hen visits her mound, and between that hour and ten o'clock a.m. she lays her egg. The same mound is not used every year by its original architects, since the *Leipoa* does not breed every season. In Victoria during the months of April and May the birds usually start to dig out the old mound, or else construct a new one. The date of commencement varies according to the season and locality, but the governing factor is the rainfall, on which the *Leipoa* is dependent for the moisture to soak the vegetable material of the egg chamber, as well as the subsequent food-supply. During periods of drought egg-laying is suspended, and although a season may have started propitiously, yet should a dry atmospheric condition manifest itself, the *Leipoa* leaves off depositing its eggs, influenced no doubt by the change wrought in the food-supply, as well as by the condition of the vegetable material of the egg chamber,

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which, owing to the extreme dryness of the air, has become so dry that it probably would not set up sufficient heat to incubate its eggs with any degree of certainty. During the greater part of the time of incubation the heat of the egg chamber is many degrees hotter than the surrounding atmosphere, and ranges from 90 to 97 degrees Fahrenheit, whilst the external covering of sand on the mound often becomes so hot from the heat of the sun's rays that it is extremely painful for a person to recline on it. When starting to open up the mound to deposit its eggs, the bird scratches out a channel all around the exterior of the summit of the mound about a foot from the top. Over the outer edge of this the birds scrape the material resting on top of the egg chamber, and when this has been removed the mound presents the appearance of a miniature volcano or funnel. Usually in dull or wet weather the birds cap the peak of the mound with sticks placed crosswise in a careless litter, evidently to turn aside the water which would percolate to the egg chamber and interfere with the proper rate and progress of the fermentation, whilst the sticks would help materially to detract from the prominence of the sharp cone and so make detection more difficult, as well as preventing the loose sand from being scattered by the wind. Thus sticks on the mound are nearly always a sign that the birds have started to lay. In warm and sunny days the apex of the mound is removed and a concave opening made, so that the warmth of the sun's rays may penetrate and assist in the incubation.

“The *Leipoa* does not start to breed until two years old, and the first clutch of eggs laid is notably smaller in size than those laid by aged birds. It is impossible to say with any degree of certainty what is the precise interval between the laying of each egg, since in some mounds observations made show that an egg was laid every fourth day, in others every fifth day, whilst the record for others range from two eggs in eighteen days to three eggs in two and twenty days. Usually the *Leipoa* lays its eggs regularly every third or fourth day during the first half of the breeding season, but then the periods between the depositing of each subsequent egg varies according to the constitution of the bird and the food supply in the vicinity of a particular mound, as well as to other conditions. For instance, hot and dry seasons have a noticeable effect on the birds, and at these times they lay few eggs. Some of the mounds were examined when it had been exceptionally hot and dry, contained from two to five eggs, but a great many mounds were found to be deserted. During the laying season of 1907 at Pine Plains, Victoria, forty-five different mounds were placed under observation at which the birds had been working in the usual manner during May and June gathering up the dead leaves, etc., and placing them in the egg chamber which the birds had already opened out in the old mounds a week or so beforehand. Fifteen of the Mallee hens completed their mounds and started to lay early in September, which is the usual month for the birds to start

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laying in that district. These birds laid, as usual, an egg every three or four days and continued to lay regularly up to the end of October, after which time only one fresh egg was added to the number with an interval of two to four weeks between each egg. This irregularity continued to the middle of December. The largest clutch obtained from one mound up to the 12th December was eight eggs. Then again, over twenty of the owners of the balance of the mounds, discovered in September, when the birds had got all the material scraped up and had formed their mound in the usual manner ready to receive the eggs, did not lay in that month, and had not done so when examined in December. On visiting these mounds regularly at intervals of about one week or ten days, it was seen that the birds had only just gathered up the dead leaves and other débris and had placed the material at the side of the mound, and had done nothing further to complete the nest. The general dryness bordering on drought at this particular time influenced the birds and so caused this phenomena. It is interesting to note that the *Leipoa* has the power to cease laying. This condition is no doubt due to attrition brought about by the scarcity of food as well as by the change in the general environment which reacts on the internal mechanism of these birds. In the nesting season the bird is never very far from the mound in which its eggs are incubating, and if the eggs be taken from it they soon repair the damage and place everything in order once again and continue laying. At Nhill, in Victoria, a friend of mine opened the top of a mound and then retired to his work a little distance away. Returning to the mound some time after he found that it had been repaired. He repeatedly uncovered the mound several times in one day, and on each occasion the mound was renovated. This proves that the birds constantly watch the mound, and although my friend was unable to see the birds, yet they must have been close at hand. Should an egg be placed upside down, that is, on the larger end (although there is very little difference in the size of the apices of the egg), and left in the mound in this position, the Mallee hen will set it up on its proper end again. When laying the egg the bird places it with the smaller end downwards, so that the head of the chick, which is formed in the larger end of the egg, is uppermost. It is marvellous how the bird does not break her thin-shelled egg when adjusting it in its proper position in the mound with her feet; and also when opening up the mound each time to lay a further egg or when working at the mound during the time when incubation is proceeding. That these birds should place their eggs on the smaller and most difficult end on which to balance it, shows a wonderful inventiveness and aforethought, since it is from the position in which the egg reclines in the egg chamber that the young are born in a posture ready to work their way out of the mound, *i.e.*, with their feet and head uppermost. The number of eggs that a Mallee fowl lays in a season, ranges from one to twenty, varying, as before stated,

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according to the environment and climatic conditions. The egg is of an unpolished delicate salmon pink colour varying to a warm pinkish red when freshly taken from the mound, but it readily fades to an earthy brown. Occasionally eggs have been found that are white, but they usually have an epidermis or coating which is readily scraped off, showing a buff-white shell beneath. As the hatching proceeds, this epidermis chips off in patches as well as fades. Although no absolute plan of ovi-disposition in the mound can be stated, yet it is certain that the eggs are laid in tiers, the usual number in the bottom tier being four. However, I have found five eggs, the odd or fifth egg was tilted, and as this mound had been opened once before to make observations, the finding of the fifth egg in the lower tier was no doubt the result of abnormal conditions due to interference. Sometimes, however, only three eggs constitute the lower tier which is the first of the series deposited in the egg chamber. There is no regular spacing between the eggs forming any one tier, but the eggs comprising it are usually on the same plane, being uniformly level, yet this formation is not constant. The eggs are separated from one another by six to twelve inches of sand and are placed close to the solid interlaced decaying vegetable matter forming the wall of the egg chamber. This position serves two purposes, firstly, it brings the eggs near to the warmth radiated by the decomposing vegetable mass, and, secondly, it also prevents undue lateral pressure that would otherwise fall on the weakest part, *i.e.*, the side of the egg as it reposes vertically in the mound and thus prevent the egg from being crushed by the superimposed mass of sand or gravel which is usually heaped about two feet high above them as well as being banked several feet thick through the walls that compress the material of the egg chamber on all its sides. Above the first or bottom tier three or four more tiers or circles of eggs, one tier above the other, are deposited, with no one egg immediately over another; sometimes the tiers will number:—

EXAMPLE.

| Tier. | No. 1 Mound. | No. 2 Mound. | No. 3 Mound. | No. 4 Mound. |
|----------------|--------------|--------------|--------------|--------------|
| First (Bottom) | 4 eggs | 4 eggs | 3 eggs | 5 eggs |
| Second .. | 5 „ | 6 „ | 5 „ | 6 „ |
| Third | 3 „ | 4 „ | 4 „ | 4 „ |
| Fourth .. | — | — | 3 „ | 2 „ |

Usually three or four inches of sand divide the eggs in one tier from those in another, but this is not constant. The temperature of the egg chamber varies from 90 degrees to 97 degrees, which heat is sufficient to hatch out the eggs successfully. The bird, however, as before stated, *regulates* the temperature according to the external atmospheric conditions, thereby earning the cognomen of Thermometer Bird. The usual clutch of eggs laid totals sixteen eggs. The egg is of large proportions when compared to the size of the bird which lays it, and is excellent eating, either in a cooked or raw condition.”

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“In a sense the young are born fully fledged, although the plumage varies materially from that of the adults. It takes usually from forty-two to forty-five days for the chick to hatch out. Experiments were made by Mr. M'Lennan to ascertain the condition of the chick at birth, and upon breaking an egg after forty-one days of incubation in the mound, he found a somewhat helpless-looking little creature. This small mite after a short space of time became clothed, as it were, as the gelatinous-like material that cause the feather-sheaths to adhere to the skin of the chick, became dry and allowed the sheathed feathers to separate. In this condition the chick possessed a filo-plumaceous or hairy appearance. By throwing some dry sand upon the fledgling, and placing it in the sunshine, the sheaths soon burst, leaving the feathers to expand, and in less than one hour it was fully fledged, and could fly from ten to fifteen yards as well as run at a fair speed. It soon learned to hide, which it did by lying flat down upon the ground with its neck outstretched. Its mottled rufous brown and buff plumage harmonising with its surroundings rendered the young *Leipoa* inconspicuous. Born with its head up and with its toes in front of its beak, the young chick works its way out of the mound by scratching, and as it reclines partially on its back, the sand, which is naturally loose, works down under it, and at the same time raises the bird and brings it nearer the surface of the mound. No sound is made by the chick such as cheeping when in its earthen womb. The head of the chick always appears first through the mound, and when it finally frees itself, the first thing it does is to give a good shake, then a wide gasp. Looking around, as if to comprehend the reason of its sudden transition and being stimulated by the awesome appearance of its surroundings, it suddenly rushes off and disappears in the scrub. If caught and buried again it cannot work its way out once more, because it is soon smothered. Although the young when leaving the mound are fully fledged and capable of taking short fluttering flights within half an hour of the emersion, if stimulated by fear, yet they prefer to run out of harm's way by trusting to their legs that have so ably assisted them in working their way out of the mound. Having once left the mound they never return to it again. The chick soon learns to nourish itself after leaving the mound, and remains in its vicinity, where it is afterwards joined by the other chicks of the same mound when they have effected an escape from it. The old birds have never been observed to assist the young ones in search for food and have never been found accompanying them, hence the young lead an independent existence from their birth. Until they are about half grown the young ones camp at night in the centre of a thick brush, a place where they also shelter in during the daytime. When about half-grown they begin to perch in the trees at night and are then free from ground enemies which up to this time take a heavy toll of the immature birds. It is exceedingly difficult to capture

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the chicks. If the old birds are shut out from the mound the chicks become smothered in the shell, as the mound becomes hard and impervious to the oxygen of the air. Once the chicks are hatched out in this way the old birds pay no further attention to them.

“The Lipoa is a shy and cautious bird and is not readily found by those unacquainted with its habits. When it sees or hears anyone approaching, it stands quite still and with body in an erect position and with outstretched neck it simulates its surroundings with which its mottled pale coloured plumage harmonises. The bird recognises the protective value of the colour of its plumage, and therefore remains perfectly quiet to escape detection. It is believed that they mate for life, since a pair of birds are always in company, but when feeding, never actually together, however, but rarely more than 50 or 80 yards apart. They enjoy a mid-day siesta together, and if startled give a fright note like ‘Koonk’ as they take wing, but they prefer to trust to their legs to escape. They are very fleet and are not so readily perceived, as they rush through the scrub as when on the wing. They love solitude, each pair having its own feeding ground, but when food is scarce and when not burdened with nesting cares they wander some distance away in search of wattle (acacia) seeds. They retire to other tracts of country if hunted or disturbed by settlers. The cock and hen birds differ very little in their markings. In the dry rarified atmosphere of the ‘Mallee,’ which on a calm moonlight night has a deathly stillness, the loud call which the cock bird occasionally emits can be heard two miles away. The note which is shrill and harsh, when heard in these solitudes, is weird in the extreme and calculated to cause a cold shiver to run down one’s spine. The cock is especially wary, and if they detect anyone watching them they will not go near to their nesting mound. They have wonderfully fine eyesight and quickly observe any strange object. In the extreme heat of the summer they feed chiefly early in the morning and again late in the afternoon, but in cool cloudy weather they wander in search of their food all day. They love to bask in the morning sun, like domestic fowls, and scoop out a hole in the loose earth in which they lie sunning first one side and then the other, and occasionally dusting themselves. On excessively hot days the birds seek a cool place under the grateful shade of some bush where the ground is cooler, and there they scratch a hole and lie in it until the worst of the heat is over. They can go without water for a considerable time, but when it is conveniently near they drink frequently and freely. The most noticeable difference in the plumage of the sexes is the whiter marking on the throat of the cock, where it is more brown in the hen. General dorsal appearance leaden-grey washed with rufous brown and barred with white.”

The bird figured and described is a male from South Australia collected in December, 1875.

GENUS—ALECTURA.

ALECTURA Latham, Gen. Hist. B., X., p. 455 (1824); Gray, Zool.

Misc., p. 3 (1831) *A. lathamii*.

Catheturus Swainson, Class B., II., p. 206 (1837) *A. lathamii*.

BILL high, laterally compressed; higher than wide at the base. Nostrils large, open, round. Head and neck bare with a scanty covering of short bristly feathers. A large fleshy wattle at the base of the sides of the neck. Tail with eighteen rectrices, middle as well as lateral pairs of tail-feathers much shorter, so that the tail is rounded as well as emarginated, as if consisting of two rounded halves. Tarsi and feet very large and strong.

DISTRIBUTION. Australia.

ALECTURA LATHAMI LATHAMI.

BRUSH TURKEY.

(PLATE 8.)

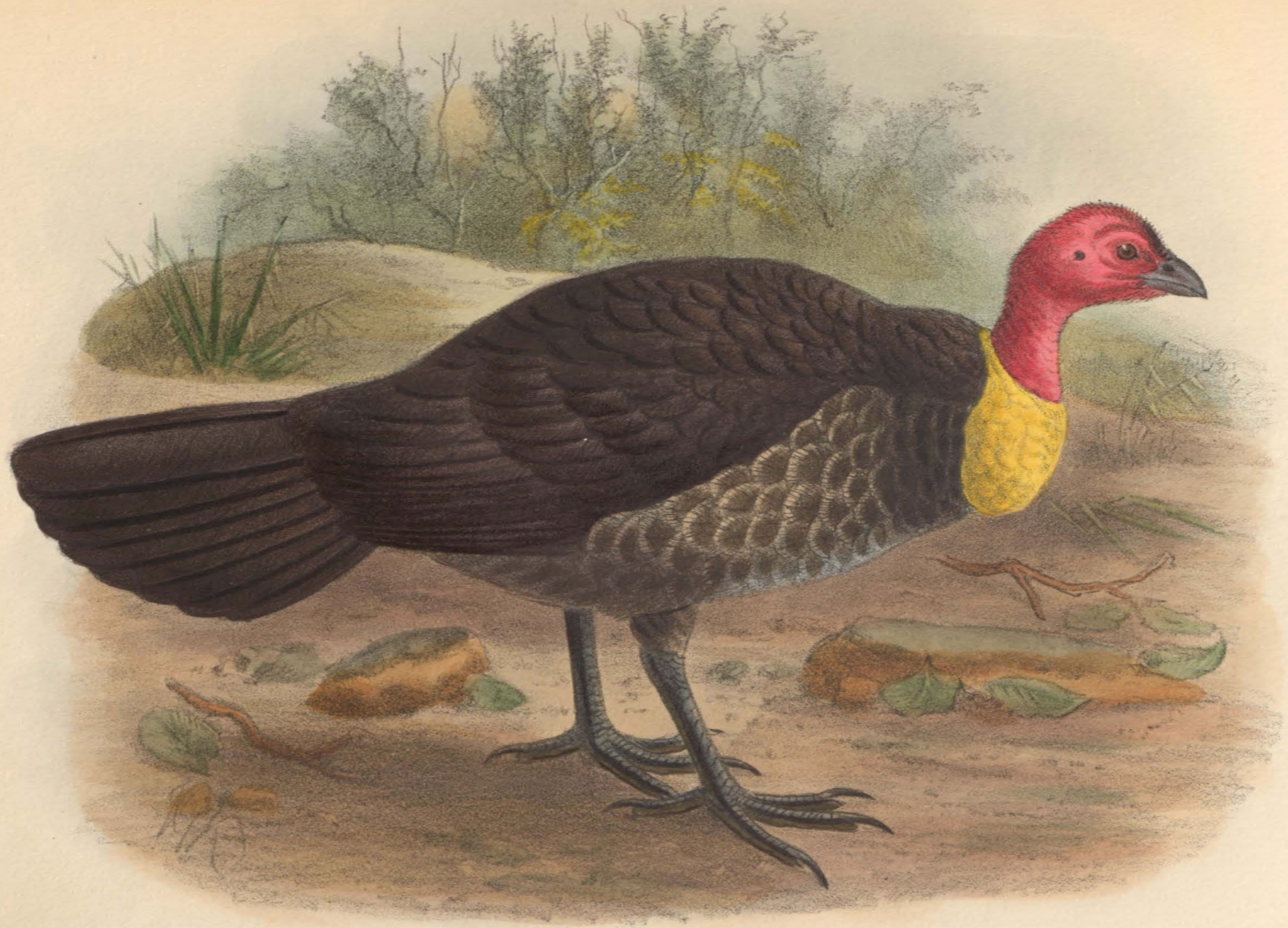
ALECTURA LATHAMI Gray, Zool. Misc., p. 4 (1831), New South Wales.*New Holland Vulture* Latham, Gen. Hist. B., I., p. 32, Pl. VI. (1821); Swainson, Class B., I., p. 284, Fig. 92 (1836).*Alectura* Latham, Gen. Hist. B., X., p. 455 (1824).*Alectura lathamii* Gray, Zool. Misc., p. 4 (1831); Jardine and Selby, Ill. Orn., III., Pl. 140 (1835); Gould, Tasmanian Journal, I., p. 21 (1841).*Catheturus australis* Swainson, Class B., II., p. 206 (1837).*Meleagris lindesayii** Jameson, Mem. Wernerian Nat. Hist. Soc., VII., p. 473 (1838).*Talegalla lathamii* Gould, P.Z.S., p. 111 (1840); *id.*, B. Austr., V., Pl. 77 (1848); Bartlett, P.Z.S., p. 426 (1860); Lumholtz, Among Cannibals, p. 326 (1889).*Megapodius (Telegallus) lathamii* Thienemann, Fortpflanz. ges. Vögel, p. 12; pl. XII., f. 1 (1845).*Talegallus lathamii* Gray, Gen. B., III., p. 489 (1849); Gould, Handb. B. Austr., II., p. 150 (1865); Ramsay, P.L.S., N.S.W., I., p. 184 (1876); *id.*, P.Z.S., p. 116 (1876); *id.*, Tab. List. Austr. B., p. 18 (1888); North, Austr. Mus. Cat., No. 12, p. 279 (1889)." *Catheturus novæ-hollandiæ* (Latham) " Bonaparte, † Compt. Rend., XLII., p. 876 (1856).*Catheturus lathamii* Reichenbach, Tauben, p. 10, Pl. 277 (1862); Ogilvie-Grant, Cat. B. Brit. Mus., XXII., p. 468 (1893); Le Souëf, Ibis, p. 14 (1899); Robinson and Laverock, Ibis, p. 648 (1900); Campbell, Nests and Eggs Austr. B., p. 708 (1901); Oates, Cat. Birds' Eggs Brit. Mus., I., p. 10 (1901); Hall, Key B. Austr., p. 74 (1906); Le Souëf, Wild Life in Austr., p. 306 (1907); Mathews, Handl. B. Austral., p. 6 (1908).

DISTRIBUTION. New South Wales; Queensland.

Adult male. Sides of neck, upper back, wings above and below and tail black; middle of back covered with down-like feathers which are sooty-grey at base and blackish at the tips; under-surface blackish, the feathers of the upper breast narrowly, and those of the lower breast and abdomen broadly edged with white as also the thighs; under tail-coverts composed of black down-like feathers. Skin on head and upper part of neck red, remainder of neck yellow; "Bill black; iris brownish white; feet yellow" (E. Olive). Total length, 586 mm.; culmen, from hinder point of nostril, 29; wing, 296; tail, 200; tarsus, 93.

* Type in the Royal Scottish Museum, Edinburgh, examined.

† Latham never gave this bird a specific name.



J.G.Keulemans, del.

Witherby & C^o

‡
CATHETURUS LATHAMI.
(BRUSH-TURKEY).

BRUSH TURKEY.

Adult female. Similar to the male, distinguished only by the absence of the wattle at the base of the neck. "Bill black, iris brownish white; feet yellow" (E. Olive). Total length, 577 mm.; culmen, 24; wing, 291; tail, 210; tarsus, 77.

Young (British Museum). Covered with down of a dark fulvous-brown colour, with some black feathers appearing on the back; wings and tail black, and the feathers on the under-surface of the same colour, with whitish margins, as in the adult bird.

Chick (British Museum). Has the down much lighter colour, wing-feathers pale brown with paler margins. Under-surface of body more inclining to whitish.

Nest. "A large rotund mound of earth, chiefly black vegetable mould, with an admixture of decaying matter, some of the mounds being surrounded with sticks. Usually situated in dense scrub or forest. Dimensions about 12 feet in diameter at the base, or a circumference of about 34 to 36 feet, and height about 2½ feet" (Campbell).

Eggs. "Complement to a mound, if used by a pair of birds, twelve to fifteen; if used by several birds, *i.e.*, three pairs, thirty-five to thirty-six; elliptical in shape, while some are more or less compressed at one end; texture of shell coarse; surface without gloss, and rough; colour pure white, more or less stained with the earth of the mound. Dimensions in inches 3.85 to 3.5 by 2.42 to 2.38" (Campbell).

Breeding season. September to January (Ramsay).

Incubation-period. About forty-two days (Le Souëf).

IN 1821 Latham, in the first volume of his *General History of Birds*, p. 32, described this bird as a Vulture and gave a coloured figure of it, from a drawing given to him by General Davies. Latham says that when General Davies gave him the drawing and told him it was a Vulture he had doubts as to the correctness of this. These doubts were confirmed when Lord Stanley gave him a specimen to examine. He then proposed that it should form a new genus and suggested the name of *Alectura* for it. A proper and detailed diagnosis was given by Gray in the *Zoological Miscellany*. He adopted Latham's generic name and called the bird *Alectura lathamii*.

As *Alectura* was considered too much like *Alectrurus* of Vieillot, Swainson's name of *Cathetus* was adopted, but I do not consider this change necessary.

Mr. Bartlett gives the following notes of this bird in captivity:—"These birds formed a large mound of leaves, grass, earth, and other materials, in the Zoological Gardens, London, in 1860, during the spring and summer. On the morning of the 26th August a young *Talegalla* crept out of the mound, and, quite regardless of its parents, ran about searching for worms and other insects, upon which it fed with as much adroitness and apparent knowledge as the chick of a common fowl would exhibit at a month old.

"Towards night this young bird flew about the branches of the trees and shrubs in search of a safe roosting-place, and, having selected one about 6 feet from the ground, settled down and appeared as comfortable and unconcerned as an adult bird,—the female taking no further notice whatever of her offspring.

"Upon carefully looking into the mound two days afterwards (on the 28th), I observed a second young bird moving about and busily engaged cleaning its feathers with its bill, the wing feathers at that time being encased in quill-

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sheaths. This young bird remained in the mound about twenty-four hours after it had escaped from the shell ; and during this time the wing and other feathers were freed from the covering, so that the bird was enabled to fly immediately upon quitting the mound, which it did on the morning of the 29th. This second young bird conducted himself in the same manner as his predecessor. The two young birds took no notice whatever of each other, or of the old female, the three birds appearing perfectly independent of each other, *eating, drinking, and roosting separately* ; and although an occasional small voice was heard from the young birds, it did not appear to indicate or excite any notice among them.”*

Dr. Ramsay, writing about this bird in Queensland, says :—“ However plentiful this species may have been formerly in the Rockingham Bay district, it is now very scarce, only one having been obtained during my visit. They are still plentiful in the New South Wales scrubs. I found that two or more females visited the same mound to lay their eggs in ; and when this is the case the mound is often twice as large as an ordinary mound. It seems probable that several individuals assist in scratching the mound together, when a space often 50 yards in diameter (on level ground) is found cleared of almost every fallen leaf and twig. The mounds are often 6 feet in height, and 12 to 14 feet wide at the base ; sometimes they are more conical. The central portion consists of decayed leaves mixed with fine débris, the next of coarser and less rotted materials ; and the outside is a mass of recently gathered leaves, sticks, and twigs not showing signs of decay. In opening the nest these are easily removed and must be carefully pushed backwards over the sides, beginning at the top. Having cleared these, and obtained plenty of room, remove the semi-decayed strata ; and below it, where the fermentation has begun, in a mass of light fine leaf-mould will be found the eggs placed with the *thin end downwards*, often in a circle, with three or four in the centre, about 6 inches apart. At one side, where the eggs have been first laid, they will probably be found more or less incubated ; but in the centre, where the eggs are placed last, quite fresh ; and if only one pair of birds have laid in the mound, about twelve or eighteen will be the complement and will be found arranged as described above. On the other hand, if several females resort to the same nest, the regularity will be greatly interfered with, and two or three eggs in different stages of development will be found close to one another, some quite fresh, others within a few days of being hatched. There are usually ten eggs in the first layer, five or six in the second, three or four only in the centre. I found that the females return every second day to lay, but never succeeded in ascertaining which of the parent birds opens the nest. . . . After robbing a nest, it is necessary to replace the different layers as they are found ; if the lowermost is too much mixed up with the others, or the top tumbled into the excavations made in the

* Bartlett, *P.Z.S.*, p. 426 (1860).

BRUSH TURKEY.

bottom one, the birds will invariably forsake the mound. . . . They frequently bring the débris from a considerable distance ; and in one instance on the Richmond River I noticed a place where about a cartload had been scratched through a shallow part of a creek 3 or 4 inches deep in water and up the other side of the bank to the mound, which was over 40 yards distant. The débris is *always thrown behind them*. The greatest number of eggs taken from one mound at one time was thirty-six. This was a very old mound and resorted to by several individuals.”*

“ In disposition these birds are shy and wary, dwelling in the thickest and most scrubby bushes ; eluding pursuit rather by swiftness of foot than by their powers of flight, which are limited ; when hard pressed, they spring into a tree, and, by a succession of leaps ‘ upwards ’ from branch to branch, soon attain a sufficient elevation to enable them to fly off to a place of greater security.”†

Mr. Dudley Le Souëf writes :—“ They are generally silent, but during the nesting season the male, when at the mound, often makes a hoarse kind of call, and also when roosting in the evening. Their food consists of insects and berries, and at night they roost as high on scrub trees as they can get.

“ They make their mounds in the dense scrub anywhere, either on the level surface or on the side of a hill ; when at the latter place they scrape the material for the mound from the upper side only. The same site is used year after year, but the mound is entirely remade, and is composed largely of leaves and twigs, with comparatively little soil, consequently very little of the mound is left when the next nesting season comes round. The birds scrape together the surface leaves and other stuff which form the mound without previously preparing the ground, and the male bird does nearly all the work. Not only so, but when the mound is finished, he is always near at hand, walking over and adding to it, and seems to constitute himself sole guardian. The mounds vary in size, but average about 3 feet 6 inches high in the centre, and 10 feet in diameter at the base. They are generally made up early in September, and the birds commence laying in October or early in November. The leaves are scraped together during damp weather to cause them to heat, and the large powerful claws of the birds enable them to do this very quickly.

“ When the mound is sufficiently heated for eggs, the hen bird scrapes a hole in it on one side near the top, from a foot to 18 inches deep, and, laying her egg in it, places it on end with the small end down, and then covers it up ; but while she is on the mound the male bird vigorously beats her, apparently trying to drive her off, and on one occasion, in confinement, to my knowledge, killing her.

* Ramsay, *P.Z.S.*, p. 116 (1876).

† Gould, *Tasm. Journ.*, I., p. 22.

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“The temperature of the mound where the eggs are is about 95 degrees or 96 degrees; the egg is laid early in the morning and every third day, and a clutch consists of from 12 to 16 eggs. These are pure white, granulated and rather fragile, and are generally placed irregularly round the top of the mound. During dry weather the birds add much vegetation to their structure, evidently to keep the material round the eggs from becoming too dry, but in wet weather they scrape it off again. The time of incubation is about six weeks. The young, when hatched, make their own way out, and do not need any assistance from their parents, but are able to fly and take care of themselves, leading a more or less solitary existence.

“The male bird soon repairs any damage that may have been done to the mound, and a single pair of birds use one mound, but occasionally another hen will lay her eggs in it. The young when hatched are of a dark brown colour and difficult to detect in the scrub; they grow quickly, and in nine months are barely distinguishable from the parents.”*

“The male bird is always in the neighbourhood of the mound, and generally busy scraping it over to the depth of a foot or more, to keep the leaves, etc., loose and friable, so that the young can easily work their way out. Shortly before the eggs are laid he daily makes a hole in some part of the mound, and then rests his head and wattles against the bottom as if to feel the temperature, which in the mounds we tested was 96 degrees.”†

“Mr. H. R. Elvery, of Alstonville, Richmond River district, removed from a mound eggs of the Brush Turkey that were nearly incubated, and placed them in an ordinary incubator. When the young was ready to be hatched it did not chip the shell, after the manner of domestic poultry, but, with a shake or a struggle the shell, which is exceedingly brittle at this stage, burst or exploded into small pieces. When the young emerged, each feather was encased in a kind of conical-shaped gelatinous cap, which fell off as soon as it was dry, and the feather expanded. When liberated in the yard, the young bird ran strongly, carrying its head downwards, like a Quail threading grass.”‡

During the breeding season, when the wattles of the male bird are fully developed, he has the power of inflating them, making a bulging all round the neck, when emptied again the wattles fall on one or other side of the neck.

As winter approaches these wattles slowly decrease, till there is not much difference between the necks of the male and female.

The bird figured and described is a male collected near Cairns in October, 1899. The attitude is copied from a living bird in the Zoological Society's Gardens, London.

* Le Souëf, *Ibis*, p. 14 (1899).

† *Id.*, *Wild Life in Australia*, p. 306.

‡ Campbell, *Nests and Eggs Austr. B.*, p. 713.

ALECTURA LATHAMI PURPUREICOLLIS.

PURPLE-WATTLED BRUSH TURKEY.

Talegallus purpureicollis Le Souëf, Ibis, p. 51 (1898), Cape York.

Talegalla lathamii Forbes, P.Z.S., p. 127 (1878).

Talegallus purpureicollis Le Souëf, Ibis, p. 51 (1898).

Cathetus purpureicollis Le Souëf, Ibis, p. 16 (1899); Campbell, Nests and Eggs Austr. B., p. 714 (1901); Hall, Key B. Austr., p. 74 (1906); Mathews, Handl. B. Austral., p. 6 (1908).

DISTRIBUTION. Cape York.

Adult male and female. Similar to *A. lathamii lathamii*, but the lower portion of the neck and wattles purplish white.

Nest. Similar to that of *Alectura lathamii lathamii*.

Eggs. "Oval in shape and smaller at one end; they are pure white and finely granulated. One obtained at Somerset by Mr. Barnard on November 3rd, 1896, measures 3.61 by 2.36 inches" (Le Souëf).

Breeding season. October to January (Le Souëf).

THIS bird represents *Alectura lathamii* at Cape York. "Mr. K. Broadbent observed it during his extended visit there some years ago. Mr. Jardine, of Somerset, Cape York, and Mr. H. G. Barnard have lately noticed the variations between it and the southern form, and the latter has kindly sent me some skins. The principal difference between the two birds is in the coloration of the lower portion of the neck and wattles, which in *Talegallus purpureicollis* is of a purplish white, and in *Talegallus lathamii* red, with yellow wattles. Otherwise the birds are very similar; but as Mr. H. G. Barnard says, 'Anyone who has seen the bird in life will at once observe the difference.' The bright colours soon fade on the death of the bird, and the difference is not then so noticeable, although it can still be observed. During the breeding season, from October until January, the wattle of the male is 1½ inch in length, hanging from the lower portion of the neck. When the breeding season is over the wattle shrinks and disappears; it is then more difficult to tell the male from the female when seen in the scrub."*

The type specimen, collected by Mr. Barnard at Somerset, Cape York, on the 20th October, 1896, is in the Tring Museum, and the difference pointed out by Mr. Le Souëf is noticeable.

* Le Souëf, *Ibis*, p. 51 (1898).

FAMILY—PHASIANIDÆ.

GENUS—COTURNIX.

- COTURNIX Bonnaterre, Tabl. Encycl. Méth., I., pp. lxxxvii., 216
 (1791) *C. coturnix.*
- Ortygion* Keyserling and Blasius, Wirbelthiere Europa's, pp. lxvi.,
 112, 202 (1840) *C. coturnix.*
- Perdortyx* Montessus, Mem. Soc. Saone, VI., p. 36 (1885) .. *C. coturnix.*

THE Quails have a short curved bill with large nostrils near the base, free of feathers, but covered with a strong membrane. The wings are not very long, not reaching to the end of the tail, but strong and powerful. The first and second primaries are almost or quite equal in length, and together with the third, which is very slightly shorter, form the tip of the wing. The axillaries are about half as long as the wing, and white. Feet without spurs, middle toe as long as the tarsus. Tail short, soft, not quite half the length of the wing, much rounded, upper coverts reaching to the end. A Quail looks uncommonly like a small Partridge, from which, however, it differs by the much more pointed wing, and the shortness of the tail, which consists of only ten to twelve rectrices.

DISTRIBUTION. Australia and New Zealand, where it is said to be now nearly or quite extinct, to Asia, Europe and Africa.



J.G.Keulemans, del.

Witherby & Co.

†
COTURNIX PECTORALIS.
(STUBBLE -QUAIL).

COTURNIX PECTORALIS.

STUBBLE QUAIL.

(PLATE 9.)

COTURNIX PECTORALIS Gould, P.Z.S., p. 8 (1837), New South Wales.

Austral Partridge Lath., Gen. Hist. B., VIII., p. 308 (1823).

Coturnix pectoralis Gould, P.Z.S., p. 8 (1837); *id.*, Syn. B. Austr., Pl. 29 (1837); *id.*, B. Austr., V., Pl. 88 (1848); Sturt, Narr. Exped. Centr. Austr., App., p. 46 (1849); Gould, Handb. B. Austr., II., p. 190 (1865); Diggles, B. Austr., II., Pl. 95 (1877); Ramsay, P.L.S., N.S.W., I., p. 185 (1876); *id.*, Tab. List. Austr. B., p. 19 (1888); North, Austr. Mus. Cat., No. 12, p. 289 (1889); Ogilvie-Grant, Cat. B. Brit. Mus., XXII., p. 244 (1893); North, B. County Cumb., p. 106 (1898); Keartland, B. Melbourne Distr., p. 113 (1900); Campbell, Nests and Eggs Austr. B., p. 721 (1901); Oates, Cat. Birds' Eggs Brit. Mus. I., p. 46 (1901); Hall, Key B. Austr., p. 73 (1906); *id.*, Useful B. S. Austr., p. 230 (1907); Le Souëf, Wild Life in Austr., p. 48 (1907); Berney, Emu, VI., p. 106 (1907); Batey, Emu, VII., p. 13 (1907); Mathews, Handl. B. Austral., p. 6 (1908); Ogilvie-Grant, Ibis, p. 190 (1910); Littler, Handb. B. Tasmania, p. 105 (1910).

Synoicus australis Ramsay, Ibis, p. 86 (1865); (*cf.*, Ibis, p. 334, 1866).

DISTRIBUTION. Queensland; New South Wales; Victoria; Tasmania; South Australia; West Australia.

Adult male. Head, neck, entire back and scapulars rufous-brown and black streaked with white; a white streak from the middle of the crown to the hind-neck, another one which commences at the base of the bill and goes over the eye and along the sides of the neck forming a white eyebrow; mantle and upper back rufous-brown more broadly streaked with white, some of the feathers broadly barred with black, and narrowly with rufous bars; some of the feathers of the back black with very narrow zig-zag markings; scapulars like the back with grey margins to the tips of the feathers; lower back and rump show more black, with ashy tips to the feathers, the rufous-brown broken up into very narrow cross bars; tail-feathers dark grey, with a white shaft streak and white bars on both webs towards the margins; lesser wing-coverts, median and primary-coverts ashy-grey with paler shaft-lines; primary and secondary-quills ashy-grey with dark shaft-lines somewhat paler on the inner webs; lores, sides of face, chin and throat rufous, with a few black dots from the gape, which indicate a line along the sides of the neck and meet on the middle of the lower throat; the feathers on the chest and breast almost entirely black and some with white outer webs, the feathers of the lower breast white with a broad streak of black down the

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middle, those on the sides of the breast and sides of the body are white narrowly lined on each side with black and margined with rufous; the feathers on the lower flanks more broadly centred with white, the dark brown on the outer webs divided by a narrow longitudinal line of buff; middle of abdomen, thighs and under tail-coverts white, the latter more or less lined with black; under wing-coverts and axillaries white; "Bill bluish horn; iris red hazel; feet yellowish" (T. Carter). Total length, 191 mm.; wing, 110; culmen from base of forehead, 15; tail, 32; tarsus, 26.

Adult female. Differs from the male in having less black above, the rufous much paler and the grey more in evidence; the throat white instead of rufous, the feathers of the chest are less black, some of them margined with buff. Total length, 180 mm.; wing, 107; culmen, 17; tarsus, 26.

Another female from Western Australia has the head almost entirely black with the exception of the white eyebrow; the back more rufous-brown with no appearance of grey; sides of face isabelline becoming paler on the throat, but not white; feathers of the breast and abdomen fulvous with submarginal lines of black; the long feathers on the sides of the body and flanks with broad white shaft-streaks lined on each side with black and mottled with fulvous on the margins.

Young male. Has the white streak of the adult just appearing on the middle of the crown; sides of the crown, chin and throat are covered with buff hair-like feathers; the feathers of the back and scapulars pale brown crossed by ferruginous and black bars broadly lined with white; the long inner secondaries and upper tail-coverts with longitudinal lines of black next to the pale shaft-streak; under-surface buffy-white with twin black spots on each feather, the long flank-feathers with broad white shaft-streaks and three dark spots on each web.

Nestling. Tawny and black above, these colours arranged in four lines, more or less longitudinally, from head to tail; under-surface fulvous.

Nest. "Upon the ground in crop or herbage, the nesting hollow, $4\frac{1}{2}$ inches across, being lined with straw or grass as the case may be" (Campbell).

Eggs. Clutch, about eight; three eggs collected in Victoria are oval in shape, with a slight gloss on the surface, and have the ground-colour buff, freckled and blotched with reddish-brown over the entire surface. Axis, 30 to 32 mm.; diameter, 21 to 22.

Breeding season. Usually September to January (Ramsay), but eggs have been taken much later.

Incubation-period. (In captivity) eighteen days (Seth-Smith).

MR. E. J. CHRISTIAN, writing to me from Northern Victoria, says:—"This bird prefers the open plain and is also found in the crops. I have often found its nest, containing young, shortly after the reaper and binder has passed through. When one comes on a nest containing young, they scatter in all directions with incredible swiftness. If the nest is placed in a well-grassed locality it is impossible to trace the young. When disturbed these birds rise very quickly, making a whirring sound.

"They move about, according to the supply of food. In 1906 there was plenty of food and the Quails were numerous. The birds stayed on till the following autumn, until the surplus food of the year before was finished; they then moved south, where, although colder, there was more food to be had.

"A favourite haunt of the Stubble Quail in Victoria is along the Gippsland coast, where rank grasses, chiefly spear grass, grow. The head of this grass is

STUBBLE QUAIL.

full of a blackish seed, on which the bird feeds. They only move at night. Often, when sitting out of doors in the evening have I heard the quick whirring of their wings overhead.

“The nest is placed in a small depression in grass or in a crop. The clutch varies from seven to ten. The eggs vary, some having thick black blotches, thinly distributed over the surface; others have dense blotches all over.

“On May 10th, 1909, I found a nest from which the chick had been hatched about a week. On November the 17th of the same year I found a nest with eight eggs.”

Mr. F. E. Howe of Melbourne sends me the following notes:—“I found a nest containing seven or eight young; as usual they all scattered. Two, I noticed, after running a few yards, crouched and flattened themselves out, the throat touching the ground. The female fluttered along as if she had a broken wing.

“Whenever a nest containing eggs or young was found by flushing the bird, it was always the female. The call is a sharp double whistle.”

Mr. P. T. Sandland tells me that in good seasons they are numerous at Burra in South Australia.

Mr. Tom Carter tells me he only secured one example of this species at Point Cloates, West Australia; it was shot on a flat near his house. He found it plentiful at Broome Hill, and has sent me adult and half-grown birds as well as chicks.

Mr. C. F. Belcher says:—“The call of three notes in quick succession is first heard about mid-October in Southern Victoria, and the eggs are laid in November and December. It is never seen where the timber is thick. There seems to be a migration southward in September and northward in April or May, but it is irregular and depends largely on rainfall.”

The following note, giving the date of completion of the clutch, is of interest:—

“Bird commenced to lay 30th November (1891), and laid for seven consecutive days, the smallest egg (a brownish-coloured example) being the last. The nest on the first day was a bare hole scraped in the ground, but after the eggs were all laid some slight attempt was made at lining it.”*

The male described and figured was given me by Mr. Edwin Ashby, who collected it at Bolivar in South Australia in December, 1894.

The female and immature bird were given me by Mr. Tom Carter, who collected them at Broome Hill, Western Australia.

* Grove, in Campbell's *Nests and Eggs Austr. B.*, p. 722 (1901).

GENUS—SYNOICUS.

SYNOICUS Gould, B. Austr., V., Pl. 89, text (1843) *S. australis*.
(Also spelt *Synæcus* and *Synaecus*.)

THIS genus is very closely allied to *Coturnix*, but its members differ in having very short and greyish axillaries, and the wing differently shaped, the outer four primaries being about equal and longest.

DISTRIBUTION. Australia, Papuan Islands and thence along the South-West Islands to the Lesser Sunda Islands.



H. Grönvold. del.

Witherby & Co

†
SYNŒCUS AUSTRALIS.
(BROWN QUAIL).

SYNOICUS AUSTRALIS AUSTRALIS.

BROWN QUAIL.

(PLATE 10.)

PERDIX AUSTRALIS Latham, Ind. Orn. Suppl., p. LXII. (1801), New Holland (New South Wales).

New Holland Quail Latham, Gen. Syn. Suppl., II., p. 283 (1801); *id.*, Gen. Hist. B., VIII., p. 306 (1823).

Perdix australis Latham, Ind. Orn. Suppl., p. LXII. (1801); Vieillot, Nouv. Dict. d'Hist. Nat., XXV., p. 262 (1817); *id.*, Gal. des Ois., II., p. 46, Pl. 215 (1825); Thienemann, Fortpflanz. ges. Vögel, p. 35 (1845).

Coturnix australis Temminck, Fig. et Gall., III., pp. 474, 740 (1815); Gould, Syn. B. Austr., Pl. 28 (1837).

? *Synoicus sordidus* Gould, P.Z.S., p. 33 (1847); *id.*, B. Austr., V., Pl. 91 (1848); *id.*, Handb. B. Austr., II., p. 195 (1865); Ramsay, Tab. List. Austr. B., p. 19 (1888).

Synæcus sordidus Mathews, Handl. B. Austral., p. 7 (1908).

Synoicus australis Gould, B. Austr., V., Pl. 89 (1848); *id.*, Handb. B. Austr., II., p. 193 (1865); Ramsay, P.L.S., N.S.W., I., p. 185 (1876); Diggles, B. Austr., II., Pl. 96 (1877); Ramsay, Tab. List. Austr. B., p. 19 (1888); North, Austr. Mus. Cat., No. 12, p. 289 (1889); Keartland, B. Melb. Distr., p. 113 (1900).

Synæcus australis Mueller, P.Z.S., p. 280 (1869); Ogilvie-Grant, Cat. B. Brit. Mus., XXII., p. 247 (1893); North, B. County Cumberland, p. 107 (1898); Campbell, Nests and Eggs Austr. B., p. 724 (1901); Oates, Cat. Birds' Eggs Brit. Mus., I., p. 46 (1901); Sharpe, Hist. Coll. Brit. Mus. Birds, p. 146 (1906); Hall, Key B. Austr., p. 73 (1906); Batey, Emu, VII., p. 14 (1907); Mathews, Handl. B. Austral., p. 7 (1908).

DISTRIBUTION. South of a line drawn from Brisbane to Shark's Bay (roughly speaking).

Adult male. Brown, more or less rufous or vinous, washed with bluish-ash colour, and with narrow and evanescent shaft-lines of white to the feathers of the back. Head brown, mottled with broad black markings, not very distinct, but more so on the sides of the crown, the centre of the latter being rather more vinous and showing narrow white shaft-lines which are continued to the nape, and appear in a lesser degree on the hind-neck and mantle, which have a more vinous tint, with ill-defined wavy blackish bars, most of the feathers bluish-ash colour at the ends, imparting an ashy shade to the upperparts; scapulars, remainder of back and upper tail-coverts similarly shaded and marked, the white shaft-lines scarcely perceptible, but the black cross-bars more distinct; wing-coverts rufous-brown, with indistinct blackish bars, but no

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conspicuous ashy shade, and the white shaft-lines obsolete; quills brown, the primaries externally mottled with dull rufous, crossed with blackish bars, the secondaries more conspicuously freckled and barred with rufous externally, the pattern being rufous with irregular dusky bars and spots, the inner secondaries being entirely rufous, vermiculated with blackish-brown, and having a black sub-terminal bar before a pale rufescent tip; tail-feathers dusky-brown, with zig-zag bars of rufous, the centre feathers with black and fulvous bars; eyebrow, lores, and sides of face dull ashy-brown, the ear-coverts with narrow shaft-lines of white; the throat uniform pale vinous, whiter on the chin; lower throat and remainder of under-surface vinous buff, varied with wavy bars of black, with white shaft-lines or centres to the feathers, the white often dividing the wavy black bar in the middle; the black bars more distinct and broader on the abdomen, sides of body and flanks; under tail-coverts like the abdomen and broadly barred with black; under wing-coverts pale ashy, as also the axillaries and quill-lining. Total length about 189 mm.; culmen, 18; wing, 96; tail, 41; tarsus, 25.

Adult female. Differs from the male in having the back blotched with broad black spots or bars, the latter mostly reaching one side of the white shaft-streak, thus causing the latter to stand out in bolder relief; the sides of the crown blackish, forming a broad band on each side, slightly mottled with rufous; along the centre of the crown a distinct line of white, corresponding to the whitish superciliary streak over each eye, the feathers being white, edged with black; throat ashy-whitish; remainder of under surface pale ochraceous-buff, regularly barred with wavy lines of black, with white shaft-lines, generally dividing the latter, the waved bars much broader on the sides of the body and especially on the flanks; under tail-coverts also broadly barred with black; under wing-coverts and axillaries, as well as quill-lining, ashy-grey; Bill bluish; eyes dark red; feet orange. Total length, 197 mm.; culmen, 16; wing, 100; tail, 45; tarsus, 18. The absence of vinous colour and grey on the upper-surface, as well as the coarser black markings, distinguish the female from the male.

Younger male birds closely resemble the females, but are everywhere more coarsely barred below, and mottled above with bars of black on the back and wings.

Sometimes in very old birds the cross bars of the chest and breast are reduced to a very small wavy line, and a vinous colour pervades the under-surface.

The adult females are much more coarsely blotched with black spots, more thickly barred below and with more distinct white shaft-streaks.

Nestling. Chestnut-red above, with black bars on the back and wings; two chestnut patches on the head divided by a white line from the middle of the crown to the hind-neck, each of these patches is margined on the inner side with black; a black line from the base of the bill to the middle of the crown; a white line on each side of this black streak from the base of the bill over and behind the eye; a black line immediately above the eye and a second immediately below it; under-surface of the body whitish.

Nest. A hollow in the ground, under the shelter of a tuft of grass or rushes, lined with a few dead grass stems and leaves.

Eggs. "Seven to eleven, roundish in form, sharply compressed at one end; texture, somewhat coarse and strong; surface glossy; colour sometimes of a uniform dull white, occasionally showing a perceptible bluish tone, but more frequently more or less finely freckled with olive or light brown. The markings when fresh may be removed by moisture. Dimensions in inches of a clutch of typically marked eggs from New South Wales 1.14 to 1.24 by .89 to .93" (Campbell).

Breeding season. October to February (Ramsay).

Incubation-period. (In captivity) twenty days (Seth-Smith).

AFTER examining one hundred and fifty-two skins of *Synoicus* from all parts of Australia, I have not succeeded in finding any definite characters by which

BROWN QUAIL.

any subspecies can be recognised. I have, however, admitted three races, the largest, *Synoicus diemenensis*, from Tasmania. The second, *Synoicus australis*, inhabiting that portion of Australia lying south of a line drawn from Brisbane to Shark's Bay; and the third, *Synoicus cervinus*, inhabiting the remainder of Australia. It is difficult to tell where *Synoicus australis* and *Synoicus cervinus* meet.

I have not seen a specimen of *Synoicus*, collected in Australia, resembling the bird figured in Gould's folio work, Vol. V., Pl. 91, which he calls *S. sordidus*, said to have come from South Australia, and the only bird approaching it in markings is the New Guinea form. All the birds I have examined from South Australia were typical examples of *S. australis*. I have not seen a specimen with red legs.

The Brown Quail is sought after by the sportsman, both for the pleasure it gives to the gunner and for the dainty flavour of its flesh. It is found in moist grassy flats and swampy localities.

It generally goes in coveys of about a dozen or so. In suitable localities, one may often flush a bird almost from one's feet, when it will fly off, and settle again a little way ahead of the intruder.

Its food consists of seeds, insects, etc., and Mr. Frank Littler tells me the crops of several birds examined by him towards the end of the breeding-season were full of dock seed and green grass in half-inch lengths.

Mr. Keartland, writing of this bird from Melbourne, says:—"During the winter months it feeds largely on clover and other vegetable food, which adds to the delicacy of its flesh. The Swamp Quail is local, and can be found throughout the year in favourable situations."*

Dr. G. Horn of Victoria says that in captivity this bird has a peculiar note, which he first mistook for the mewling of a kitten.

Mr. Frank Littler writes the call is a loud whistle-like note, which may be heard for some considerable distance on still mornings. Just before daybreak is perhaps the best time to hear it.

Of the birds figured, the male is from Victoria and the female from Long Bay, Sydney.

* Keartland, *Birds of the Melbourne District*, p. 113 (1900).

SYNOICUS AUSTRALIS DIEMENENSIS.

TASMANIAN BROWN QUAIL.

SYNOÏCUS DIEMENENSIS Gould, P.Z.S., p. 33 (1847), Tasmania.

Synoicus diemenensis Gould, P.Z.S., p. 33 (1847); *id.*, B. Austr., V., Pl. 90 (1848); *id.*, Handb. B. Austr., II., p. 194 (1865); Ramsay, Tab. List. Austr. B., p. 19 (1888); North, Austr. Mus. Cat., No. 12, p. 290 (1889).

Synœcus diemenensis Mueller, P.Z.S., p. 280 (1869); Campbell, Nests and Eggs Austr. B., p. 727 (1901); Mathews, Handl. B. Austral., p. 7 (1908); Littler, Handb. B. Tasmania, p. 108 (1910).

DISTRIBUTION. Tasmania.

Adult male and female. Similar to male and female of *S. australis*, but slightly larger, the wing measuring as much as 106 mm.

Nest. Similar to that of *S. australis*.

Eggs. Clutch, six to twelve; the eggs are much rounder than those of *Synoicus cervinus*. Ground colour, yellowish-white, thickly covered with spots of greenish-brown. Surface smooth and slightly glossy. Axis, 30 to 31 mm.; diameter, 25.

DR. G. HORN, writing to me from Victoria, says he had a solitary female of this race in captivity. In one season she laid eighty-seven eggs, the ground colour of the later ones being very pale.

Mr. Frank Littler tells me the breeding season is during the summer months and into early autumn. He also says:—

“They do not return to their usual feeding ground after sheep have been grazed there.”



H. Grönvold del.

Witherby & Co

†
SYNŒCUS CERVINUS
(WESTERN BROWN QUAIL).

SYNOICUS AUSTRALIS CERVINUS.

WESTERN BROWN QUAIL.

(PLATE 11.)

SYNOICUS CERVINUS Gould, Handb. B. Austr., II., p. 195 (1865), Port Essington.

Synoicus cervinus Gould, Handb. B. Austr., II., p. 195 (1865); Ramsay, Tab. List. B. Austr., p. 19 (1888); North, Austr. Mus. Cat., No. 12, p. 291 (1889).

Coturnix australis Finsch, Neu Guinea, p. 179 (1865)

Synœcus cervinus Forbes, P.Z.S., p. 127 (1878); Mathews, Handl. B. Austral., p. 7 (1908).

Synœcus australis Robinson and Laverock, Ibis, p. 648 (1900); Berney, Emu, VI., p. 106 (1907).

Synoicus australis Hartert, Nov. Zool., XII., p. 195 (1905).

Synœcus sordidus Mathews, Emu, IX., pp. 1 and 53 (1909).

DISTRIBUTION. North of a line drawn from Brisbane to Shark's Bay (roughly speaking).

Adult male and female. Similar to the male and female of *S. australis*, but smaller; wing, 92 mm. "Bill brown, base of lower mandible leaden grey; eyes dark red; feet and tarsus yellow" (J. P. Rogers).

Nest. Similar to that of *S. australis*.

Eggs. Clutch, four to eleven. A clutch collected on the Dawson River, North Queensland, has the ground colour yellowish-white, with fewer and paler markings than the eggs of *Synoicus diemenensis*. Axis, 30 to 31 mm.; diameter, 22 to 23. Another egg collected on March the 5th, 1890, has the ground colour of a bluish-white without markings. Axis, 28 mm.; diameter, 22.

Breeding season. September to November (Carter), January (Rogers).

MR. TOM CARTER sends me the following note:—"In wet seasons these birds were fairly plentiful in the dense herbage growing along inland creeks in the North-West of Australia, but they disappeared when the grass dried off. Nests were occasionally found on the coast at Point Cloates. Eleven fresh eggs were found in a nest there on the 11th September, 1900. Young birds were shot while flying on the 4th November, 1900."

My collector, Mr. J. P. Rogers, sends me the following notes from Wyndham, in North-West Australia:—

November 25th, 1908.—Saw a covey on Parry's Creek.

December 10th, 1908.—Saw a few scattered birds.

THE BIRDS OF AUSTRALIA.

December 15th, 1908.—Appeared to be separating into pairs for the breeding season.

January 10th, 1909.—Observed in pairs and appeared to be breeding.

February 10th, 1909.—Heard them calling near my camp to-day. First heard for some time.

March 30th, 1909.—Many birds were calling, but one cannot flush any as the grass is too thick.

May 16th, 1909.—Have not seen any of these birds since leaving Wyndham, and I am now at Wild Dog, 170 miles south of that place.

Mr. F. L. Berney, writing from the Richmond District, North Queensland, says:—"The appearance of the Brown Quail in this district varies much, owing, doubtless, to our uncertain climate. They appear to favour the months January to June; it is not usual to come across them from July to September, while I find I have no record at all of this Quail during the last three months of the year. This does not show any migratory movement, but simply that they avoid these parts during the drougthy half of the year. Actually July to October are our driest months; November and December may bring us early storms, but they are so uncertain and patchy that the Quail would derive little benefit from them until January, when some of the grasses would be seeding and insects had time to multiply.

"To me it is pleasant to hear them calling in the evening from the vicinity of a bore stream: 'Bee'e quick, bee'e quick,' the first two syllables drawn out almost into one—for it reminds me of Partridges in the old country, to which, too, they bear a strong resemblance when on the wing. Commencing a trifle before sundown, they relapse into silence about midnight, and, starting again as daylight approaches, they ease off towards sunrise and cease calling altogether shortly after. They generally go in coveys up to a dozen, and frequent moist ground where the vegetation is green and grows rank.

"On June 10th this year our cat brought in a bird that proved on dissection to have a hard-shelled dull white egg in the oviduct, which I judge would have been laid within twenty-four hours.

"They appear to be partly insectivorous and partly granivorous, as the stomach of one I examined contained nothing but seeds of what is locally called wild sorghum (*Chionachne barbata*). The bird's crop, I may mention, contained a hundred of these large seeds, swallowed, of course, with their husks, while Mr. A. S. Le Souëf, to whom I forwarded two stomachs for examination, kindly wrote me that one contained beetles only, and the other beetles, grasshoppers, and one grass seed."*

The bird figured is a female from Wyndham, North-West Australia, sent to me by Mr. J. P. Rogers, who collected it on September 29th, 1908.

* F. D. Berney, *Emu*, VI., p. 106 (1907).

GENUS—EXCALFACTORIA.

EXCALFACTORIA Bonaparte, Comptes Rendus, XLII., p. 881 (1856) *E. chinensis*.

Compsortyx Heine, Nomencl. Mus. Hein. Orn., p. 292 (1887) .. *E. chinensis*.

ALSO closely allied to *Coturnix*, but very much smaller; plumage softer, more silky. The very short tail-feathers soft and entirely hidden by the tail-coverts. Number of rectrices eight only.

DISTRIBUTION. Australia to China and India.

EXCALFACTORIA CHINENSIS LINEATA.

CHESTNUT-BELLIED QUAIL.

(PLATE 12.)

ORIOIUS LINEATUS Scopoli, Del. Flor. et Fauna, Insubr. II., p. 87 (1786) (*).

Oriolus lineatus Scopoli, Del. Flor. et Fauna, Insubr. II., p. 87 (1786).*Tetrao manillensis* Gmelin, Syst. Nat., I., p. 764 (1789).*Perdix manillensis* Latham, Ind. Orn., II., p. 655 (1790).*Coturnix manillensis* Bonnaterre, Tabl. Encycl. Méth., I., p. 221, Pl. 97, fig. 4 (1791).*Tetrao sinensis* Raffles, Trans. Linn. Soc., XIII., p. 324 (1822).*Chestnut-bellied Partridge* male; *Undulated Partridge* female; Latham, Gen. Hist. B., VIII., p. 305 (1823).*Coturnix nana*, Schinz, Nat. Abbild. Vög., p. 277 (1830).*Synoicus chinensis* Gould, B. Austr., V., Pl. 92 (1848); Sturt, Narr. Exped. Centr. Austr., App., p. 47 (1849); Diggles, B. Austr., II., Pl. 96 (1877).*Coturnix chinensis*, Sclater, P.Z.S., p. 221 (1863).*Excalfactoria chinensis* Walden and Layard, Ibis, p. 106 (1872).*Excalfactoria australis* Gould, Handb. B. Austr., II., p. 197 (1865); Ramsay, Ibis, p. 279 (1868); *id.*, P.Z.S., p. 119 (1876); *id.*, Tab. List. Austr. B., p. 19 (1888); North, Austr. Mus. Cat., No. 12, p. 291 (1889); Keartland, B. Melb. Distr., p. 113 (1900).*Coturnix australis* Gray, List Gallinæ Brit. Mus., p. 63 (1867).*Coturnix sinensis* Finsch, Neu Guinea, p. 179 (1865); Swinhoe, Ibis, p. 348 (1869).*Synoicus (Excalfactoria) sinensis* Ramsay, P.L.S., N.S.W., I., p. 186 (1876).*Excalfactoria lineata* Ogilvie-Grant, Cat. B. Brit. Mus., XXII., p. 253 (1893); North, B. County Cumberland, p. 107 (1898); Oates, Cat. Birds' Eggs Brit. Mus., I., p. 48 (1901); Seth-Smith, Bull. B.O.C., XIII., p. 72 (1903); North, Austr. Mus. Spec. Cat., No. 1, Pl. B vii. (1904); Hall, Key B. Austr., p. 73 (1906); Mathews, Handl. B. Austral., p. 7 (1908).*Excalfactoria chinensis lineata* Robinson and Laverock, Ibis, p. 648 (1900); Campbell, Nests and Eggs Austr. B., p. 728 (1901).

DISTRIBUTION. Queensland; New South Wales; Victoria; South Australia. (Philippines. Palawan, Sulu Islands, Borneo, Java, Sumatra.)

* Doubtless from Sonnerat, *Voy. Nouv. Guinée*, p. 54, pl. 24 (1776); Luzon.



J.G. Keulemans, del.

Witherby & Co.

†
EXCALFACTORIA LINEATA.
(CHESTNUT-BELLIED QUAIL).

CHESTNUT-BELLIED QUAIL.

Adult male. General colour above black with pale shaft-lines which are broader and more pronounced on the lower back and rump; crown of head black with a longitudinal line of white from the middle of the crown to the hind-neck; feathers of the mantle rufous-brown crossed with black, streaked with narrow white shaft-lines and margined with lead-grey; scapulars lead-grey with broken up markings of black which are sub-marginal on some of the longer feathers; upper tail-coverts black with lead-grey margins; wing-coverts greyish-brown with more or less tracings of black bars; primary-coverts and quills pale brown; tail-feathers lead-grey at the base and with a marginal notch at tips; remainder deep chestnut like the under tail-coverts and middle of the abdomen; sides of crown, breast and sides of body deep slate colour, some of the feathers bordering the chestnut of the under-surface; a small white line from the base of the bill to the eye, followed by a black line below the eye which is continued along the sides of the face and joined to the black of the throat; a longitudinal white patch enclosed between the black line below the eye and the black of the throat; a semi-circular white collar which commences at the back of the ear-coverts and meets on the middle of the throat where it is broader; this white collar is followed by a narrow line of black which separates it from the slate colour of the chest and upper breast; sides of breast more or less barred with black. "Bill, black; iris, red; feet, yellow" (J. T. Tunney). Total length, 130 mm.; culmen, 12; wing, 74; tail, 26; tarsus, 20. Two apparently adult birds still retain a trace of chestnut on the outer margin of the greater wing-coverts.

Adult female. General colour above reddish-brown streaked with white shaft-lines and black blotches or cross markings; crown of head black with a white line down the middle; sides of crown, sides of face, and lower throat tawny; wing-coverts pale reddish-brown finely barred with black and longitudinal white shaft-lines; primary-coverts and quills pale brown; outer primary white along the outer edge; under-surface fulvous crossed by narrow black bars broad on the sides of the body and flanks, less on the thighs and under tail-coverts. Total length, 130 mm.; culmen, 12; wing, 70; tail, 25; tarsus, 18.

Nestling. Sooty-black everywhere except the throat which is buff, and three indistinct streaks of the same colour on the top of the head.

Mr. D. Seth-Smith tells me that the chicks are able to fly when ten days old, and are practically in adult plumage at six weeks.

Nest. "A hollow in the ground, lined, more or less, with grass, etc., and sheltered by herbage" (Campbell).

Eggs. Clutch, four; oval in form, with a glossy surface; and drab ground colour, minutely freckled with reddish-brown over the entire surface, but more thickly at the larger end. Axis, 14-15 mm.; diameter, 17-18.

Breeding season. August to January (Ramsay). March and April in Central Queensland (Barnard).

Incubation-period (in captivity). Eighteen to twenty days (Seth-Smith).

DR. RAMSAY says:—"The Little Swamp-Quail is found tolerably abundant in the marshy parts about Botany Bay and Southhead, in which situations it breeds freely, rearing often three broods in a season. It usually lays five eggs, in shape resembling those of *Synæcus australis*, but much smaller in size, being 1.1 inch in length, by .8 inch in breadth, and when fresh of a pale light green colour, dotted all over with blackish umber; in some the ground colour is a dirty olive-yellow; others, again, are almost brown, with black dots. This species is known by our Sydney sportsmen under the name of the 'King

THE BIRDS OF AUSTRALIA.

Quail,' and is by most people considered a rare bird; but if its natural haunts be visited it will be found plentiful enough, although hard to 'raise.' It shows preference for the long tall grass in low damp situations, particularly bordering swamps and lagoons. I have received the eggs from various localities, as far inland as Lake Bathurst, from the Hunter River, and also from Sydney, or, rather, the Botany, swamps.

"The nest is like that of the rest of the family, a few pieces of grass, upon which the eggs are laid, but on the whole greatly depending on the nature of the ground.

"The breeding-season lasts from August to January.

"The young upon leaving the shell are of a dusky hue, almost black."*

Dr. G. Horn of Victoria observes:—"We have frequently reared these beautiful birds. The female incubates the eggs, but when hatching commences the male takes his place by her side; and the young, on chipping out, go at once to him. He takes charge of the brood when foraging, the female going in advance and calling up the party when food is found. The choice morsel is handed over to the male, to be passed on to the chicks. Such tiny mites are they that the half-inch mesh of our aviaries was not even recognised by them as an obstruction. Fortunately the male promptly calls up the stragglers with a sharp cheep, at the same time lifting his head and displaying the transverse markings of his throat. The male seems to have a natural aptitude for looking after young. Some Quail hatched in an incubator were put in a light coop in the aviary, and he never rested until he had scraped a hole beneath the coop and taken them into his care."

Mr. Campbell writes:—"According to the season many of the Chestnut-bellied Quail reach their southern limit, Victoria, during spring and summer, and breed, retiring northward again on the approach of winter.

"Breeding season from September to February, and sometimes the autumn months. Mr. Harry Barnard has observed that March and April are the usual breeding months in Central Queensland for this quail."†

Of the birds figured, the male was collected on the Richmond River in New South Wales in November, 1874, and the female in Queensland, November, 1889.

* Ramsay, *Ibis*, p. 279 (1868).

† Campbell, *Nests and Eggs Austr. B.*, 729 (1901)

ORDER III.—TURNICIFORMES.

FAMILY—TURNICIDÆ.

GENUS—TURNIX.

| | |
|--|------------------------|
| TURNIX Bonnaterre, Tabl. Encycl. Méth., I., pp. lxxxii., 5 (1790) | <i>T. sylvatica.</i> |
| <i>Tridactylus</i> Lacépède, Mém. de l'Inst., p. 512 (1801) | <i>T. sylvatica.</i> |
| <i>Ortygis</i> Illiger, Prodrusus, p. 242 (1811) | <i>T. sylvatica.</i> |
| <i>Hemipodius</i> (Reinwardt) Temminck, Fig. et Gall., iii., p. 607, 753 | |
| (1815) | <i>T. nigricollis.</i> |
| <i>Ortygodes</i> Vieillot, Analyse, p. 52 (1816) | <i>T. ocellata.</i> |
| <i>Areoturnix</i> Bonaparte, Compt. Rend., XLIII., p. 414 (1856) .. | <i>T. taigoor.</i> |
| <i>Areortyx</i> Heine, Nomencl. Mus. Hein. Orn., p. 290 (1888). | |

IN the genus *Turnix* the hind toe is absent. This with the genus *Pedionomus* together form the order *Turniciformes*. Although outwardly having the appearance of Quails, these birds differ from them and all other Game-birds in many important characters.*

The nasals are not holorhinal, but schizorhinal. The sternum has only one very deep notch on the posterior margin. The shape of the palatines, pterygoids and basipterygoids resembles those of the Waders, rather than as in the Game-birds.

In opposition to the *Gallinæ*, where the males are generally much finer in plumage, larger and stronger than the females, or about equal in size, the females of the *Turniciformes* are the larger, finer and more brilliantly coloured birds, the males smaller and simpler in coloration, and the females do the fighting, which is done by the cocks in all the *Gallinæ*.

DISTRIBUTION. Australia, Papuan Islands, China, India, Europe and Africa.

* Cf. Huxley, *P.Z.S.*, p. 303 (1868).

THE BIRDS OF AUSTRALIA.

Key to the Species.

- A. Generally smaller; wing about 80 mm. or less; under-surface rufous or vinous.
- a'*. Bill slender; sides of upper breast with large black spots *maculosa*, p. 79.
- b'*. Bill stout.
- a''*. Upper-parts more or less grey; sides of upper breast narrowly barred with black and white .. *pyrrhothorax*, p. 91.
- b''*. Upper-parts more or less reddish or vinous .. *velox*, p. 93.
- B. Generally larger, wing about 80 mm. or more; no rufous or vinous on the under-surface.
- c'*. Abdomen and flanks dull ashy-grey *melanogaster*, p. 81.
- d'*. Abdomen and flanks white or buff.
- c''*. Chest and breast uniform without spots; forehead slate-colour *olivii*, p. 89.
- d''*. Chest and breast spotted or barred; forehead spotted with white.. .. .
- a'''*. Bill stout; sides of crown chestnut .. *castanota*, p. 87.
- b'''*. Bill slender; sides of crown blackish .. *varia*, p. 83.



J. G. Keulemans. del.

Witherby & Co

†
TURNIX MACULOSA.
(BLACK-BACKED QUAIL).

TURNIX MACULOSA.

BLACK-BACKED QUAIL.

(PLATE 13.)

HEMIPODIUS MACULOSUS Temminck, Fig. et Gall., III., p. 631 (1815), New Holland.

Hemipodius maculosus Temminck, Fig. et Gall., III., pp. 631, 757 (1815).

Turnix maculosus Stephens, in Shaw's Gen. Zool., XI., p. 394 (1819).

Turnix maculatus Vieillot, Nouv. Dict. d'Hist. Nat., XXXV., p. 47 (1819); *id.*, Gal. des Ois., II., p. 51, Pl. 217 (1825).

Hemipodius melanotus, Gould, P.Z.S., p. 8 (1837); *id.*, Syn. B. Austr., Pl. 30 (1837); *id.*, B. Austr., V., Pl. 84 (1848).

Turnix melanotus Gould, in Grey's Journ. Disc., Vol. II., p. 419 (1841); *id.*, Handb. B. Austr., II., p. 182 (1865); Ramsay, P.Z.S., N.S.W., I., p. 185 (1876); *id.*, Tab. List. Austr. B., p. 18 (1888); North, Rec. Austr. Mus., I., p. 195 (1891).

Turnix beccarii Salvadori, Ann. Mus. Civ., Genova, VII., p. 675 (1875).

Turnix melanota Forbes, P.Z.S., p. 127 (1878).

Turnix melanonota Salvadori, Ann. Mus. Civ., Genova, XVIII., p. 9 (1882), part.

Turnix maculosa Ogilvie-Grant, Ibis, p. 468 (1889); North, B. County Cumberland, p. 107 (1898); Ogilvie-Grant, Cat. B. Brit. Mus., XXII., p. 546 (1893); Campbell, Nests and Eggs Austr. B., p. 730 (1901); North, Austr. Mus. Spec. Cat., No. 1, Pl. B. V. (1904); Hall, Key B. Austr., p. 74 (1906); Mathews, Handl. B. Austral., p. 7 (1908); *id.*, Emu, IX., p. 53 (1909).

Turnix maculosus Hartert, Nov. Zool., XII., p. 195 (1905); Rothschild and Hartert, Nov. Zool., XIV., p. 448 (1907).

DISTRIBUTION. North-West Australia; Northern Territory, Queensland; New South Wales; Victoria and South Australia; (South-East New Guinea; South-East Celebes).

Adult female. Head greyish-brown, barred with black; feathers of the forehead margined with rufous; hind-neck and sides of neck bright rufous; back slate-grey, barred with black and chestnut; scapulars similar in colour, margined with white or ochreous-buff on the outer webs; lower back, rump and upper tail-coverts black, the feathers very narrowly barred or margined with chestnut or white; tail-feathers brown, with indications of black bars; lesser wing-coverts dusky; median and greater wing-coverts barred with ochreous and black; bastard-wing dark brown margined on the outer web with buffy-white; primary-coverts blackish; quills dark brown, the outer one edged with white; the innermost secondaries like the

THE BIRDS OF AUSTRALIA.

back, with ochreous, black and white markings; lores and a line over the eye. ear-coverts, sides of face and throat pale rufous, as also the flanks and under tail-coverts; fore-neck and sides of breast brighter rufous, the feathers on the latter barred or spotted with black; middle of abdomen whitish; axillaries and aspect of wings below pale grey. "Bill, distal portion brown, basal part yellow; iris greyish-brown; tarsi and toes dull yellow" (J. P. Rogers). Total length, 160 mm.; culmen, 14; wing, 80; tail, 25; tarsus, 21.

Adult male. Smaller than the female, but similar in plumage, with less chestnut on the upper-surface, and less vinous-chestnut on the neck; the inner secondaries without any chestnut, but mottled with black and ochreous-buff vermiculations. Bill yellow, the distal half and the tip of the lower mandible brown; iris white; feet yellow. Total length, 135 mm.; culmen, 12; wing, 78; tail, 20; tarsus, 17.

Nest. "A scantily grass-lined hollow in the ground, sheltered by a convenient tuft of grass or low bush" (North).

Eggs. Clutch, four. Eggs collected on the Dawson River, North Queensland, have the ground colour very pale slaty-grey, almost entirely hidden by brown spots, intermixed with larger blotches of dark slaty-grey. Surface smooth and very glossy. Axis, 25 mm.; diameter, 19.

"These eggs can easily be distinguished from those of *T. velox* by being much darker and the surface of the shell bright and glossy" (North).

Breeding season. October to January (Ramsay).

THE present species belongs to the section of the genus, in which, according to Mr. Ogilvie-Grant, the tarsus is longer than the middle toe and claw; the plumage of the two sexes is not conspicuously different, though they are not precisely alike in colour. The centre tail-feathers are not lengthened or pointed, nor are they edged with white or buff, while the feathers of the back do not show any scaly appearance. There are no bars on the breast, and the throat is never black. The margins of the scapulars are, however, edged with golden-buff, this being the most conspicuous character of the species. Mr. Ogilvie-Grant* further says: "In the female the rufous and black markings of the upper surface become rather more faint as age advances, and a wide light rufous nuchal collar is developed, while the superciliary stripe and ear-coverts become bright buff, as also the throat, but to a less degree."

Little seems to have been written of the life-history of this bird. Mr. A. J. North† writes: "Of the three small species of *Turnix* found in Australia, two of them, *T. velox* and *T. pyrrhothorax*, give decided preference to the open grassy plains of the inland districts, while *Turnix melanotus* is essentially an inhabitant of the low marshy ground and damp scrubs contiguous to the eastern coast of Australia. Near Sydney the latter species is not uncommon in the neighbourhood of Randwick, Botany, and La Perouse."

The birds figured and described were collected on Parry's Creek, near Wyndham, North West Australia, by Mr. J. P. Rogers, in December, 1908.

* *Ibis*, p. 468 (1889).

† *Rec. Austr. Mus.*, I., p. 195 (1891).



J.G. Keulemans, del.

Witherby & Co

†
TURNIX MELANOGASTER.
(BLACK-BREASTED QUAIL).

TURNIX MELANOGASTER.

BLACK-BREASTED QUAIL.

(PLATE 14.)

Hemipodius melanogaster Gould, P.Z.S., p. 7 (1837), Queensland.*Hemipodius melanogaster* Gould, P.Z.S., p. 7 (1837); *id.*, Syn. B. Austr. Pl. 31 (1837); *id.*, B. Austr., V., Pl. 81 (1848).*Turnix melanogaster* Gould, in Grey's Journ. Disc., II., p. 419 (1841); *id.*, Handb. B. Austr., II., p. 178 (1865); Ramsay, P.L.S., N.S.W., I., p. 184 (1876); *id.*, Tab. List. Austr. B., p. 18 (1888); Ogilvie-Grant, Ibis, p. 472 (1889); North, Austr. Mus. Cat., No. 12, p. 285 (1889); Ogilvie-Grant, Cat. B. Brit. Mus., XXII., p. 550 (1893); Campbell, Nests and Eggs Austr. B., p. 730 (1901); Oates, Cat. Birds' Eggs Brit. Mus., I., p. 72 (1901); Hall, Key B. Austr., p. 75 (1906); Mathews, Handl. B. Austral., p. 7 (1908).

DISTRIBUTION. Queensland; New South Wales.

Adult female. General colour above brown, with a good deal of chestnut on the mantle, upper back and scapulars, which are all crossed with narrow bars of black, the scapulars with a broad black subterminal bar, and having a longitudinal white streak on the edge of either web; these streaks of white, bordered by a line of black, are also apparent on the mantle and upper back; but less marked on the lower back, which is almost entirely brown, save for a few indistinct bars of rufous and black; rump and upper tail-coverts with a slight shade of chestnut, but otherwise brown, sparsely barred across with black, and having a few white, black-edged, streaks or spots of white on the margins of the feathers, some of the upper tail-coverts with whitish spots or bars, followed by a terminal bar of black; wings much more thickly spangled with white, the wing-coverts in the main ashy-brown, but mixed with chestnut, most of them being of the latter colour, narrowly barred with black towards the ends, and having a broad white streak along the outer margin, before which is a conspicuous black streak; the lesser coverts nearly uniform dark brown, slightly tinged with chestnut, but devoid of white streaks; the greater coverts dusky-brown, with sandy-brown margins; primary-coverts and quills uniform dusky-brown, the two outer primaries sandy-brown along the outer web; secondaries also dusky-brown, more or less sandy-buff towards the end of the outer web, the inner secondaries externally tinged with chestnut, and with a few dusky cross-bars; tail-feathers dusky-brown, freckled with a few cross-lines of black; crown of head black, with a slight tinge of chestnut towards the nape, and a few white spotted feathers above the eye, continued above the ear-coverts to the sides of the neck, the feathers of which are black, with a broad subterminal spot of white, these white spotted

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feathers extending across the hind-neck ; lores, ear-coverts and cheeks black, with a streak of white on the fore-part of the cheeks below the eye ; throat and entire breast black, with white spots or subterminal bars on the feathers, the white bars being very distinct on the sides of the breast, where a few feathers are chestnut ; abdomen and flanks dull ashy-grey, with a blackish bar on the ends of some of the feathers, the flanks also showing an occasional subterminal white spot between two bars of black ; the long feathers of the lower flanks and the under tail-coverts vermiculated with blackish, and having a subterminal spot of dull white or buff ; under wing-coverts and axillaries dull ashy ; the marginal coverts darker ; quills dull ashy below. Total length, 190 mm. ; culmen, 19 ; wing, 114 ; tail, 38 ; tarsus, 23.

Adult male. Distinguished from the female by the absence of the black on the head and throat, paler abdomen and smaller size. Total length, 164 mm. ; culmen, 16 ; wing, 104 ; tail, 40 ; tarsus, 23.

Nest. "Merely a slight depression in the ground, in grassed or open scrub country" (Campbell).

Eggs. Clutch, three to four ; two eggs collected on the Dawson River, in North Queensland, are smooth and glossy, with the ground-colour greyish-white, minutely freckled over the entire surface with blue-grey, and bolder blotches of blackish-brown ; with underlying blotches of blue-grey. Axis, 26-27 mm. ; diameter, 21.

Breeding season. September to February (Ramsay).

IN this and the remaining species of Australian Turnix the tarsus is equal to or shorter than the middle toe and claw.

When originally describing this bird, Gould* states that it came from New South Wales or Tasmania, but in his Folio work† he states that all the specimens he had seen were procured at Moreton Bay, which is situated in what is now called Queensland.‡

I can find no account of the habits of this bird. Mr. A. J. Campbell, *l.c.*, quoting Mr. Barnard, says : "This bird always inhabits the scrub, and is very shy and rare."

The female described and figured was collected in the Gowrie scrub in Queensland in December, 1889.

* Gould, *P.Z.S.*, p. 7 (1837).

† *Birds of Australia*, V., Pl. 81 (1848).

‡ Formerly New South Wales included what is now known as that State ; Victoria, which was separated in 1850 ; and Queensland, which was separated in 1859.



J.G. Keulemans, del.

†
TURNIX VARIA.
(PAINTED QUAIL).

Witherby & Co.

TURNIX VARIA.

PAINTED QUAIL.

(PLATE 15.)

PERDIX VARIA Latham, Ind. Orn. Suppl., p. lxiii. (1801), New South Wales.

New Holland Partridge Latham, Gen. Syn., Suppl., II., p. 283 (1801).

Perdix varia, Latham, Ind. Orn. Suppl., p. lxiii. (1801); Thienemann, Fortpflanz. ges. Vögel, p. 53 (1846).

Turnix varius Vieillot, Nouv. Dict. d'Hist. Nat., XXXV., p. 47 (1819); Gould, in Grey's Journ. Disc., Vol. II., p. 419 (1841); *id.*, Handb. B. Austr., II., p. 179 (1865); Ramsay, P.L.S., N.S.W., I., p. 185 (1876); *id.*, Tab. List. Austr. B., p. 18 (1888); North, Austr. Mus. Cat., No. 12, p. 285 (1889); Ogilvie-Grant, Ibis, p. 473 (1889); Keartland, B. Melb. Distr., p. 112 (1900).

Varied Quail Latham, Gen. Hist. B., VIII., p. 344 (1823).

Hemipodius varius Temminck, Pl. Col., No. 454 (1828); Gould, Syn. B. Austr., Pl. 31 (1837); *id.*, B. Austr., V., Pl. 82 (1848); Sturt, Exp. Centr. Austr., App., p. 46 (1849).

Hemipodius scintillans Gould, P.Z.S., p. 62 (1845); *id.*, B. Austr., V., Pl. 83 (1848).

Turnix scintillans Gould, Handb. B. Austr., II., p. 181 (1865); Ramsay, Tab. List. Austr. B., p. 18 (1888).

Turnix varia Ramsay, Ibis, p. 334 (1866); Ogilvie-Grant, Cat. B. Brit. Mus., XXII., p. 551 (1893); North, B. County Cumberland, p. 107 (1898); Campbell, Nests and Eggs Austr. B., p. 731 (1901); Oates, Cat. Birds' Eggs Brit. Mus., I., p. 72 (1901); Milligan, Emu, II., p. 75 (1902); *id.*, Nat. Hist. West. Austr., p. 120 (1903); Maclaine, Emu, IV., p. 21 (1904); Hall, Key B. Austr., p. 75 (1906); *id.*, Useful B. South Austr., p. 234 (1907); Mathews, Handl. B. Austral., p. 7 (1908); Littler, Handb. B. Tasmania, p. 109 (1910).

DISTRIBUTION. Australia and Tasmania.

Adult female. General colour above chestnut, varied with black and grey, and linearly streaked with white. Mantle and back chestnut, with a few bars or spots of black, the feathers of the back more plainly barred with wavy cross-lines of black, and having a broad black subterminal band; on each side of the feathers a margin of white, producing a striped appearance; scapulars like the back, grey, with chestnut and black markings towards the end of the feathers, which have somewhat broader white linear margins; lower back and rump like the rest of the back, but more mottled with chestnut, and black bars, and with the white marginal streaks less strongly developed; upper tail-coverts like the rump, but with broader white edges

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to some of the feathers ; wing-coverts dull ashy, the lesser series with a few black bars, the median and inner greater coverts chestnut towards their ends, which have a white tip preceded by a black subterminal bar ; primary-coverts and quills blackish-brown, the primaries with narrow margins of paler brown, the three outermost edged with ashy-white ; the innermost secondaries much varied, being chestnut, with black cross-bars, of which the subterminal one is very broad ; the distal aspect of some of them notched with buffy-white and edged with this colour, before which is a subterminal line of black, preceded by some blackish vermiculations ; tail-feathers ashy-grey, with slight blackish vermiculations ; crown of head black, the hinder crown and nape barred with chestnut ; the base of the forehead, lores, and a line of feathers along the sides of the crown white, with black edges, producing a spotted appearance ; ear-coverts dark ashy-grey, with white shaft-lines below the eye ; cheeks white, with black margins, resembling the sides of the neck, which are similarly spotted, the hind-neck mostly ashy-grey, with a twin bar of white and black and a chestnut tip, this followed by an area of nearly uniform chestnut, which over-spreads the upper mantle, and has only a few black bars ; chin and upper throat white ; the lower throat, chest, upper breast and sides of the body dull plumbeous grey, each feather centred with an ovate spot of buff, with more or less of a blackish margin, the buff taking the form of bars on the sides of the breast, where there are a few black bars ; on the sides of the fore-neck and chest an area of chestnut continuous with the chestnut of the upper mantle, and extending down to the sides of the upper breast, where there are a few white spots and black bars ; middle of the breast and abdomen white, with a slight tinge of buff ; under tail-coverts sandy-buff, with some lateral black spots ; under wing-coverts, axillaries, and inner lining of quills dull ashy-grey. Total length, 190 mm. ; culmen, 18 ; wing, 108 ; tail, 43 ; tarsus, 23.

Adult male. Differs from the female in being smaller ; the distribution of colour above is similar, but everywhere duller, particularly on the mantle, where the extended colour of the back takes the place of the bright chestnut patch, which is conspicuous in the female ; the feathers of the lower throat and chest are buffy-white, with twin black spots, which gives an irregular barred appearance. " Bill bluish-horn-colour ; iris deep orange ; tarsi and feet deep yellow " (T. Carter).

Nestling. Covered with black, white and grey down, with an admixture of chestnut on the middle of the back and wings ; a white line on each side of the crown, from the lores to behind the eye ; a black line from the base of the forehead, which widens out on the crown and encloses a narrow white line on the hinder crown ; there is also a more or less pronounced double white line on the middle of the back ; under-surface entirely dusky-grey.

Two other young individuals, a little more advanced in age, have the head similarly coloured to that of the nestling ; the feathers of the back are black, with white or rufous margins ; primary and secondary quills brown, with buffy-white edges ; throat covered with grey down ; the feathers of the breast and sides of neck sandy-rufous, with black shaft-lines in one specimen ; in the other the black takes the form of bars ; abdomen and flanks buffy-white, becoming tawny on the under tail-coverts.

Nest. " A slight depression in the ground, sometimes lined with a little grass or fine leaves, and sheltered by a tussock, stone, etc. ; usually in an exposed dry locality " (Campbell).

Eggs. Clutch, four ; a full clutch collected on the Dawson River, North Queensland, are smooth and glossy, with a whitish ground colour, minutely freckled with blue and brown spots over the entire surface, as well as reddish-brown spots more sparsely distributed. Axis, 26-27 mm. ; diameter, 21-22.

Breeding season. September to February (Howe).

Incubation-period. (In captivity) thirteen days (Seth-Smith).

PAINTED QUAIL.

THIS bird is found in all the States of the Australian Commonwealth, except the North-Western portion of the Continent.

Mr. Frank E. Howe, writing from Victoria, says :—" This bird is plentiful throughout the district. I have seen it endeavour to lead me away from the nest by feigning a broken wing ; as I approached it retreated, fluttering along in front of me, and occasionally tumbling over ; if I retreated it would turn and quickly follow. This was repeated again and again. Sometimes fairly grown young have been flushed and on settling again have allowed themselves to be taken by hand. They breed from September to February and two broods are reared."

Mr. Tom Carter, writing to me, says :—" This species was not observed in the North-West, but is fairly numerous about Broome Hill, in South-West Australia, and at Albany, Denmark, and the coastal hills. At Broome Hill they are plentiful from August to November, when the grass is at its best, but are much fewer in numbers during the rest of the year. They are to be found mostly on flats, but they also occur in thick scrub, and I have frequently flushed them from a rugged stony ridge, covered with timber and scrub.

" They begin to call about the middle of July, but I have heard them in February. The call is like the lowing of a bull at a distance and is usually heard in the night. I have found eggs here in October. The young when just hatched follow the parent birds."

Mr. C. F. Belcher sends me some notes from Southern Victoria :—" This species is fairly local and resident. It frequents all kinds of bush country, having a preference for localities where there is Kangaroo-grass, and for the timbered banks of rivers and the edges of lagoons. The note is a musical ' coo,' not unlike that of the Bronze-wing Pigeon. Four eggs are the usual clutch, but in September, 1899, I found a single hard-set egg in a leaf-lined hollow in the ground behind a tussock, from which the bird flew."

Miss Fletcher gives me the following notes from Tasmania :—" In Banksia forest with slight undergrowth, on November 20th, 1909, I saw four young fully fledged, but accompanied by only one adult bird."

Sturt,* writing from Central Australia, says :—" This bird is very common in many of the located parts of South-Eastern Australia, but is not a bird of the interior, and was not observed beyond the flats of the Darling, where it was occasionally flushed from amongst the long grass."

Gould† writes :—" It runs remarkably quick, and when flushed flies low, its pointed wings giving it much the appearance of a Snipe or Sandpiper. When running or walking over the ground the neck is stretched out and the head carried very high, which, together with the rounded contour of the back, gives it a very grotesque appearance.

* Sturt, *Exp. Centr. Austr.*, App., p. 46 (1849).

† Gould, *Handb. B. Australia*, II., p. 180 (1865).

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“The young run as soon as hatched, and their appearance then assimilates so closely to that of the young Partridges and Quails that they can scarcely be distinguished.

“The food of this species consists of insects, grain, and berries ; of the former many kinds are eaten, but locusts and grasshoppers form the principal part ; a considerable quantity of sand is also found in the gizzard, which is very thick and muscular.”

Mr. G. A. Keartland* observes :—“They are very local in their habits and feed largely on insects, but they fly swiftly when disturbed and run rapidly on alighting. They are highly esteemed as game.”

Mr. A. J. North† writes :—“This bird sits very close and will allow itself to be almost trodden upon before leaving its eggs or young.”

Mr. A. W. Milligan‡ remarks :—“They are early breeders, young birds having been obtained in August. Owing to a decided preference to rely upon their running powers, they are difficult to flush, but when flushed they fly with great speed and offer excellent sport.”

From Mr. Seth-Smith's§ notes from observations of this species in captivity I gather the following :—

In May the female began to display before the male by running backwards and forwards in front of him with tail erect and crop puffed out like that of a Pouter pigeon. The male squats down amongst the grass, and the female runs round him in a circle with tail more or less erected and crop extended and carried close to the ground. Having run round him once or twice, she stands facing him at a distance of perhaps a foot or eighteen inches, and commences ‘booming’ or ‘cooing’ to him like a cock-pigeon, at the same time stamping and scratching with her feet, while the male responds with a faint chuckling note. An egg was laid each day for five days. Incubation lasted thirteen days. The male took charge of the young, the female taking no notice of them. When the young were ten days old they could fly, they then took everything from the bill of the male. When sixteen days old they were independent.

The bird described and figured is a female, collected in New South Wales in December, 1889. The male and young were collected in South-West Australia by Mr. Tom Carter.

* *Birds Melb. Dist.*, p. 112 (1900).

† *Austr. Mus. Cat.*, No. 12, p. 286 (1889).

‡ *Nat. Hist. West Austr.*, p. 120 (1903).

§ *Avicultural Magazine*, 1905.



J.G. Keulemans, del.

Witherby & Co

†
TURNIX CASTANONOTA.
(CHESTNUT-BACKED QUAIL).

TURNIX CASTANOTA.

CHESTNUT-BACKED QUAIL.

(PLATE 16).

Hemipodius castanotus Gould, P.Z.S., p. 145 (1839), North-West Coast of Australia.

Hemipodius castanotus Gould, P.Z.S., p. 145 (1839); *id.*, B. Austr., V., Pl. 85 (1848).

Turnix castanotus Gould, in Grey's Journ. Disc. Austr., II., p. 419 (1841); *id.*, Handb. B. Austr., II., p. 183 (1865); Ramsay, Tab. List. B. Austr., p. 18 (1888); Hartert, Nov. Zool., XII., p. 195 (1905).

Perdix (Hemipodius) castanotus Thienemann, Fortpflanz. ges. Vögel, p. 54, Pl. XII., fig. 7 (1846).

Turnix castanota Grey, Handl. B., II., p. 270 (1870).

Turnix castanonota Ogilvie-Grant, Ibis, p. 474 (1889); *id.*, Cat. B. Brit. Mus., XXII., p. 552 (1893); Campbell, Nests and Eggs Austr. B., p. 733 (1901); Oates, Cat. Birds' Eggs Brit. Mus., I., p. 73 (1901); "Editor," Emu II., p. 40 (1902); Le Souëf, Emu, II., p. 94 (1902); Hall, Key B. Austr., p. 75 (1906); Mathews, Handl. B. Austral., p. 7 (1908).

Turnix olivii Milligan,* not Robinson, Rep. Expl. N.W. Kimberley, p. 58 (1902).

DISTRIBUTION. North-west Australia; Northern Territory; North Queensland.

Adult female. General colour above vinous-chestnut, the feathers edged on either web with white, producing a streaked appearance; these white marginal lines accompanied by an inner line of black; towards the end of the feathers some more or less broken bars of black; lower back, rump and upper tail-coverts, dull vinous-chestnut shaded with ashy-grey, and having nearly obsolete blackish bars; scapulars like the back, but with somewhat broader white margins externally; wing-coverts vinous-chestnut, the marginal coverts edged with black, the median and greater series slightly ashy-grey on the edges, and having ovate spots of white, bordered with black on their upper margins; primary-coverts and quills sepia-brown, almost black, with narrow rufescent edges, the first primary whitish along the outer web; tail-feathers vinous-chestnut with faintly indicated dusky cross-bars; crown vinous-chestnut, with a line of ashy-grey down the middle of the crown to the nape, the sides of the crown with scarcely any spots or bars of black, forming a broad band of vinous-chestnut on each side of the mesial grey band; forehead, lores, and a broad eyebrow mottled with small white spots, each of which has a black margin, this spotted appearance being continued on to the sides of the nape; ear-coverts streaked with white, the feathers narrowly edged with black; sides of neck, hinder neck and upper mantle vinous-chestnut, with ovate spots of white, each spot narrowly margined

* Specimen examined.

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with black ; this vinous colour extending down the sides of the breast, where the spots are somewhat larger ; throat dull white, tinged with pale ochre on the lower part ; fore-neck, chest, and upper breast ashy with a slight ochreous tinge and plentifully marked with ovate spots of pale ochre, increasing in size, on the sides of the breasts, which are also somewhat ashy ; centre of breast and abdomen white, the sides of the body and flanks pale ochreous-buff, the flanks more dusky and having ashy bases to the feathers ; under tail-coverts sandy-buff ; axillaries and under wing-coverts leaden grey, the former slightly washed with rufous ; quills leaden-grey below, tinged with rufous along the inner web ; " Iris yellow ; feet yellow " (J. T. Tunney). Total length, 162 mm. ; culmen, 16 ; wing, 85 ; tail, 37 ; tarsus, 19.

Adult male. Differs from the female chiefly in being smaller ; and the grey of the breast being mixed with buff. Total length, 158 mm. ; culmen, 15 ; wing, 79 ; tail, 41 ; tarsus, 21.

Nest. " A depression beneath a tussock of grass or where the grass grows long, especially in the neighbourhood of water " (Le Souëf).

Eggs. " Clutch four, rounded, glossy and finely pitted ; they are greenish white, and some are boldly speckled with very dark brown, or almost black markings, especially on the larger end, while others have much smaller faint spots of purplish-brown. The markings beneath the surface appear grey. The eggs vary somewhat in size, and measurement. Dimensions in inches 1.1 to .93 by .82 to .75 " (Le Souëf).

Breeding season. January (Le Souëf).

THE type was sent to Gould by Mr. Bynoe. Little is known of its life-history.

Gilbert*, writing to Gould from Port Essington, says:—"This species inhabits the sides of stony hills in coveys of from fifteen to thirty in number ; which, when disturbed, seldom rise together, but run along the ground, and it is only upon being very closely pressed that they will take wing, and then they merely fly to a short distance ; while running on the ground their heads are thrown up as high as their necks will permit, and their bodies, being carried very erect, a waddling motion is given to their gait, which is very ludicrous. The stomachs of those dissected were very muscular, and contained seeds, and a large proportion of pebbles."

Dr. House† observed them in North-West Kimberley, in sandstone country, in the neighbourhood of Charnley and Calder Rivers. Only two or three birds were seen together.

The bird described and figured is a female, collected on the South Alligator River, by Mr. J. T. Tunney, on June 28th, 1903.

* Gould's *Handb. B. Austr.*, II., p. 184 (1865).

† *Cf. Rep. Expl. N.W. Kimberley*, p. 58 (1902).



J. G. Keulemans, del.

Witherby & Co

†
TURNIX OLIVEI.
(ALLIED QUAIL).

TURNIX OLIVII.

ALLIED QUAIL.

(PLATE 17.)

TURNIX OLIVII Robinson, Bull. B.O.C., X., p. XLIII. (1900) (Cooktown, North Queensland).

Turnix olivii Robinson, Bull. B.O.C., X., p. XLIII. (1900); *id.*, and Laverock, Ibis, p. 649 (1900); Campbell, Nests and Eggs Austr. B., p. 1083 (1901).

Turnix olivei Mathews, Handl. B. Austral., p. 7 (1908).

DISTRIBUTION. Cooktown, North Queensland.

Adult female (type of the species). General colour above, pale vinous-chestnut with lavender-grey edges to the feathers of the upper-surface; on the mantle and back a certain number of feathers are crossed with black bars towards their ends and broadly edged with ashy-white, forming streaks, which have a coterminal line of black accompanying the white streaks on their inner side; these banded and white-streaked feathers being present among the scapulars but absent on the rump, upper tail-coverts and tail which are pale cinnamon; wing-coverts vinous-chestnut like the back and with the same ashy-grey edges to the feathers, which are differently marked, being spotted with white on the inner median and greater coverts, these white spots having a more or less distinct subterminal line of black; lesser wing-coverts more dusky, having black centres to the feathers; primary-coverts blackish, forming a wing-patch; quills sepia-brown, with ashy or dull rufous margins and slightly paler ends, the first primary externally whitish, the next ones edged with hoary-grey, inner secondaries spotted with white, like the coverts; head pale slaty-grey with a line of chestnut feathers on each side of the crown which are barred with black; sides of face and ear-coverts ashy-grey spotted with minute specks of white; chin white followed by buff on the throat which spreads over the breast, where it is washed more or less with ashy-grey; on the sides of the body the feathers are vinous-chestnut edged with pale grey; abdomen whitish, more or less suffused with buff; flanks and under tail-coverts sandy-buff; under wing-coverts, axillaries and the under aspect of quills pearly grey with a certain amount of pale vinous on the under wing-coverts; the margin of the wing below is dotted with black. "Bill brown; iris yellow; feet yellow" (E. Olive). Total length, 190 mm.; culmen, from base of skull, 21; wing, 106; tail, 42; tarsus, 25.

The only known specimen of this bird is the type which is in the Tring Museum.

THIS species was described by Mr. Herbert C. Robinson at the meeting of the British Ornithologists' Club held on February 21st, 1900. Mr. Robinson, named the species after Mr. E. Olive, who had obtained it near Cooktown on June 25th,

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1899. It is closely allied to the female of *T. castanota*, but differs in its large size. The forehead is "grey, without white tips to the frontal feathers, and with the superciliaries and sides of the face not conspicuously marked with white; the feathers of the lower neck and breast with a decided wash of oily greyish green, and with slightly indicated bars of dull greyish, without white centres as in *T. castanonota*."

The nest and eggs are undescribed, and nothing is known of its life-history. I am indebted to the Hon. Walter Rothschild for permission to figure and describe this species.



J.G. Keulemans, del.

Witherby & Co

†
TURNIX PYRRHOTHORAX.
(RED-CHESTED QUAIL).

TURNIX PYRRHOTHORAX.

RED-CHESTED QUAIL.

(PLATE 18.)

Hemipodius pyrrhorthorax Gould, P.Z.S., p. 150 (1840), New South Wales.

Hemipodius pynrothorax Gould, P.Z.S., p. 150 (1840); *id.*, B. Austr., V., Pl. 86 (1848).

Turnix pyrrhorthorax Gould, in Grey's Journ. Disc. Austr., II., p. 419 (1841); *id.*, Handb. B. Austr., II., p. 186 (1865); Ramsay, Tab. List. Austr. B., p. 19 (1888); North, Austr. Mus. Cat., No. 12, p. 287 (1889); Ogilvie-Grant, Ibis, p. 474 (1889); *id.*, Cat. B. Brit. Mus., XXII., p. 553 (1893); Campbell, Nests and Eggs Austr. B., p. 733 (1901); Le Souëf, Emu II., p. 94 (1902); Hall, Key B. Austr., p. 75 (1906); Berney, Emu, VI., p. 107 (1907); Mathews, Handl. B. Austral., p. 8 (1908); *id.*, Emu, IX., p. 53 (1909).

Turnix (Hemipodius) pyrrhorthorax Ramsay, P.L.S., N.S.W., i., p. 185 (1876).

DISTRIBUTION. North-West Australia; Northern Territory; Queensland; New South Wales; Victoria; South Australia.

Adult female. General colour above, dark ashy-grey, varied with black in the form of narrow vermiculated bars, with cross-lines of dull rufous on many of the feathers, several of which are edged with dull white, producing a slightly streaked appearance; these streaks more apparent on the margins of the scapulars, which have black markings, and reddish and black vermiculations towards their ends; wing-coverts dull ashy-grey, with faint fulvescent edges; the inner median and greater coverts rufescent buff with a few black cross-bars; bastard-wing and primary-coverts blackish-brown, forming a wing-patch; quills dusky-brown, with very narrow fulvescent margins, lighter on the four outer primaries, the first of which is conspicuously margined with buffy-white, like the edge of the wing; the secondaries fringed with ashy-white at the ends, the inner ones barred with buffy-white, and vermiculated and barred with black; rump and upper tail-coverts rather darker than the back, and regularly barred across with black and dull rufous, resembling the scapulars; tail-feathers ashy-brown, with indistinct blackish bars; crown of head dusky-brown, with cross bars of black and a narrow line of white down the middle of the head; the hind-neck like the mantle, spotted with small white streaks, edged with blackish; on the sides of the neck, a slightly scaly appearance, the feathers being white, barred with black; lores, eyebrows, cheeks, and ear-coverts white, minutely barred with black, the ear-coverts appearing as if streaked with white; entire throat and breast orange-chestnut, like the flanks and under tail-coverts; on the sides of the breast a patch of mottled grey, the feathers being grey, barred with fulvous and black; the abdomen whiter; under wing-coverts very pale ashy-grey, with a slight fulvous

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wash; quills dull ashy below; "Bill blue grey; the culmen brown; iris white; feet fleshy white" (J. P. Rogers). Total length, 141 mm.; culmen, 13; wing, 81; tail, 27; tarsus, 17.

Adult male. Smaller than the female, with the chin, upper throat and the whole of the abdomen white; the eyebrow and sides of face, as also the line of feathers down the crown reddish-buff, and more uniform than the white, black-edged plumage of these parts in the female; the sides of the neck buffy-white, with dusky-brown edges to the feathers, producing an scalloped appearance, which is continued down the sides of the breast; the lower throat and breast orange-chestnut, like the tail and under tail-coverts; the upper-surface of the body less distinctly streaked, the white margins of the scapulars, and inner secondaries being more isabelline or rufescent. Total length, 147 mm.; culmen, 13; wing, 75; tail, 31; tarsus 19.

Nest. "A slight depression in the ground, scantily lined with grasses, usually protected by a grass tuft or sheltered in a grain crop" (Campbell).

Eggs. Clutch, four; ground-colour buffish-white, spotted, but not so thickly as *Turnix velox*, with slate-grey, chestnut, and dark brown; surface dull. Axis, 22 mm.; diameter, 17.5.

Breeding season. September to December (Ramsay).

MR. F. L. BERNEY*, writing from the Richmond District, North Queensland, says: "This species is the most commonly seen Quail in the district, but, like the last species [*Synoicus*] and probably for the same reason [food supply] it avoids these parts during the latter half of the year, only odd individuals being seen after June. Just what it is that governs their coming and going I find it hard to decide, for 1904 was anything but a good season from a pastoralist's point of view, yet it was an exceptionally good Quail year about Richmond—and, I think, all over Queensland—while, on the other hand, 1906, so far (October) has been one of the best recorded for grass and water, and yet all the Quails have been most rare. I have seen chicks in the down in March, and I once flushed a bird with four small downy youngsters early in July.

"Found generally in high, dry country."

Of the specimens figured and described, the male was collected at Parry's Creek, East Kimberley, North-West Australia, by Mr. J. P. Rogers, on February 14th, 1909, and the female at the same place on April 3rd, 1909.

* *Emu*, VI., p. 107 (1907).



J. G. Keulemans. del.

Witherby & Co

†
TURNIX VELOX.
(LITTLE QUAIL).

TURNIX VELOX.

LITTLE QUAIL.

(PLATE 19.)

HEMIPODIUS VELOX Gould, P.Z.S., p. 150 (1840), New South Wales.

Hemipodius velox Gould, P.Z.S., p. 150 (1840); *id.*, B. Austr., V., Pl. 87 (1848).

Turnix velox Gould, in Grey's Journ. Disc. Austr., II., p. 419 (1841); *id.*, Handb. B. Austr., II., p. 184 (1865); Ramsay, Tab. List Austr. B., p. 18 (1888); North, Austr. Mus. Cat., No. 12, p. 286 (1889); Ogilvie-Grant, Ibis, p. 475 (1889); *id.*, Cat. B. Brit. Mus., XXII., p. 553 (1893); Keartland, B. Melbourne Dist., p. 112 (1900); Campbell, Nests and Eggs Austr. B., p. 734 (1901); Le Souëf, Emu, II., p. 155 (1903); Hall, Emu, III., p. 42 (1903); Carter, Emu, III., p. 174 (1904); North, Austr. Mus. Spec. Cat., No. 1, Pl. B. V. (1904); Hartert, Nov. Zool., XII., p. 195 (1905); Hall, Key B. Austr., p. 75 (1906); North, Rec. Austr. Mus., VI., p. 342 (1907); Berney, Emu, VI., p. 107 (1907); Mathews, Handl. B. Austral., p. 8 (1908); *id.*, Emu, IX., p. 53 (1909).

Perdix (Hemipodius) velox Thienemann, Fortpflanz. ges. Vögel, p. 53 (1846).

Turnix (Hemipodius) velox Ramsay, P.L.S., N.S.W., I., p. 185 (1876).

Turnix leucogaster North, Ibis, p. 342 (1895); *id.*, Rep. Horn Sci. Exp., II., p. 102 (1896); Campbell, Nests and Eggs Austr. B., p. 736 (1901); Hall, Key B. Austr., p. 75 (1906).

DISTRIBUTION. Australia generally.

Adult female. General colour above pale vinous, becoming darker on the back and scapulars, where the feathers incline to chestnut, barred with black, a submarginal line of black and edged with white, which gives a streaked appearance; lesser and median wing-coverts pale vinous with a few dark spots here and there; bastard-wing and primary-coverts blackish; primary-quills dark brown, the three outer ones margined with buffy-white on the outer webs, the remainder mottled with sandy-buff on the outer edges; innermost secondaries and tail-feathers similar to the back; head with a dotted line of black on each side of the crown; sides of the face, neck, and body pale vinous; chin, throat, middle of the abdomen, flanks, and under tail-coverts white, more or less tinged with sandy-rufous; axillaries grey; under wing-coverts buffy white; under aspect of quills pearl-grey. "Bill, culmen and tip leaden-brown, remainder leaden-blue; iris yellowish white; tarsus and feet fleshy white" (J. P. Rogers). Total length, 145 mm.; culmen, 13; wing, 80; tail, 28; tarsus, 16.

Adult male. Distinguished from the female by its smaller size and more streaked appearance above, the median line of white on the middle of the head, the white bars on the sides of the neck, and the submarginal black lines on the side of the

THE BIRDS OF AUSTRALIA.

breast; also by the more pure white of the abdomen. Soft parts similar to those given in the female. Total length, 140 mm.; culmen, 12; wing, 75; tail, 26; tarsus, 15.

Nest. "Formed of grass placed in a hollow of the ground behind some convenient tuft of grass" (North).

Eggs. Clutch, four; ground-colour buffish-white thickly spotted with slate-grey, chestnut, and odd spots of purplish-brown; surface with faint trace of gloss. Axis, 20 to 21 mm.; diameter, 16.5 to 17.

Breeding season. The usual breeding season is from September to December, but individuals may be found breeding practically all through the year.

THIS bird is distributed all over the Australian Commonwealth except Tasmania.

Mr. Keartland* gives us the following notes:—

"The home of the Swift-flying Turnix is undoubtedly the arid plains of Northern Australia, but they occasionally migrate southwards in great numbers. Owing to their small size and rapid flight they test the skill of the sportsman to the utmost.

"These birds are found in North-West Australia throughout the year, frequenting alike the Flinders and Mitchell grass plains, the spinifex of the desert, and the tall kangaroo grass along the creek flats, but are most numerous near the junction of the Fitzroy and Margaret Rivers. After rain falls they become exceedingly numerous in the green grass which immediately springs up. They seem to breed nearly all through the year."†

"Great numbers of these birds were found throughout the grass country north of Charlotte Waters. At Illamurta on May 30th, a clutch of hard-set eggs were found, and afterwards young birds were frequently picked up. At Petermann Creek half-grown young ones ran about our camp. Wherever grass was plentiful, particularly near Heavitree Gap and on Missionary Plains, they were also numerous."‡

Mr. Sandland, writing from South Australia, remarks:—"This bird occurs in good seasons. During 1903-4 they came in thousands, and hundreds of nests were obtained. They all left before Christmas. They generally come in August."

Dr. G. Horn, Victoria, says:—"This Quail does not always come to Victoria, but in 1905 it was very plentiful in the north-eastern part of this State. Their eyes appeared more nearly white than yellowish."

Mr. Tom Carter writes:—"These birds were very abundant in the North-West of Australia, especially in good seasons. They sit very closely and at times allow horses to walk over them without rising. They lay after rains at

* *Birds of the Melbourne District*, p. 112 (1900).

† Keartland, in *Campbell's Nests and Eggs Austr. B.*, p. 735 (1901).

‡ *Id.*, in *Rep. Horn Sci. Exp.*, II., p. 103 (1896.)

LITTLE QUAIL.

any time. In May, 1898, I found many eggs as well as young in down. In April, 1890, I saw many eggs. In July, 1900, eggs were hard set, and young on the wing were seen. In September of the same year I found fresh eggs. So no doubt more than one brood is reared in good seasons. The note is a loud 'coo-coo' most frequently uttered at night, and I judge them to be largely nocturnal in feeding."

The birds figured and described were collected near Derby, North-West Australia, in February, 1902.

GENUS—PEDIONOMUS.

PEDIONOMUS Gould, P.Z.S., p. 114 (1840) *P. torquatus*.

Turnicigralla Des Murs, Rev. Zool., p. 276 (1845) *P. torquatus*.

DIFFERS from *Turnix* in having a well-developed, though feeble, hind toe; the bill more elongated, and the structure of the plumage different, the feathers being softer, shorter, more rounded, and somewhat scaly in appearance.

DISTRIBUTION. Australia (one species only).



J.G. Keulemans, del.

Witherby & Co

†
PEDIONOMUS TORQUATUS.
(PLAIN WANDERER)

PEDIONOMUS TORQUATUS.

PLAIN WANDERER.

(PLATE 20.)

PEDIONOMUS TORQUATUS Gould, P.Z.S., p. 114 (1840), Interior of South Australia.

Pedionomus torquatus Gould, P.Z.S., p. 114 (1840); *id.*, B. Austr., Pl. 80 (1848), Sturt, Narr. Exp. Central Austr. App., p. 45 (1849); Gould, Handb. B. Austr., II., p. 187 (1865); Legge, P.Z.S., p. 236 (1869); Ramsay, P.L.S., N.S.W., I., p. 185 (1876); Diggles, Handb. B. Austr., II., Pl. 95 (1877); Ramsay, Tab. List Austr. B., p. 19 (1888); North, Austr. Mus. Cat., No. 12, p. 288 (1889); Gadow, Rec. Austr. Mus., I., p. 205 (1891); Ogilvie-Grant, Cat. B. Brit. Mus., XXII., p. 554 (1893); North, B. County Cumberland, p. 107 (1898); Keartland, B. Melb. Distr., p. 112 (1900); *id.*, Vict. Nat., XVII., p. 167 (1901); Campbell, Nests and Eggs Austr. B., p. 737 (1901); Hall, Key B. Austr., p. 76 (1906); Batey, Emu, VII., p. 14 (1907); Mathews, Handl. B. Austral., p. 8 (1908).

Pedionomus microurus Gould, P.Z.S., p. 20 (1842).

Turnicigralla gouldiana Des Murs, Rev. Zool., p. 276 (1845).

Turnicigralla macroura, *id.*, *ib.*

Phaps micrurus Giebel, Thes. Orn., III., p. 90 (1877).

DISTRIBUTION. New South Wales; Victoria; South Australia.

Adult female. General colour above sandy-rufous, everywhere barred and vermiculated with narrow lines of black, including the head, back, scapulars, upper tail-coverts, tail and wings; primary-coverts blackish with buff tips; primary-quills sandy-buff at the base, becoming brown or vermiculated with brown towards the ends, the secondaries similar but more broadly tipped with buff; a patch on the fore-neck and nuchal collar bright chestnut; an entire collar of black and white feathers; sides of the face and upper throat white, minutely dotted with black, former more or less washed with sandy-rufous; chin and middle of abdomen white, breast and sides of body buff, barred or spotted with black like the under tail-coverts; under wing-coverts white, washed with buff and more or less dotted with black; under-surface of quills brown, dusted with sandy-rufous; "Bill yellow shading into black at the point; iris, straw-yellow; feet, greenish-yellow" (J. Gould). Total length, 170 mm.; culmen, 16; wing, 100; tail, 30; tarsus, 24.

Adult male. Distinguished from the female by the chestnut patch on the breast, as well as the nuchal band being very much paler. The collar is only indicated by buff and white, instead of black and white. Total length, 152 mm.; culmen, 13; wing, 83; tail, 30; tarsus, 24.

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Immature male. Differs from the adult in the absence of the chestnut patch on the breast.

Nest. "Constructed of dried grasses, and is placed in a slight depression in the ground underneath the shelter of some convenient shrub or tuft of grass" (North).

Eggs. "Four in number for a sitting, in shape pyriform, of a stone white ground colour, thickly freckled and blotched, and a few smudges here and there of different shades of umber-brown and slaty-grey, a few nearly obsolete blotches of the latter colour appearing as if beneath the surface of the shell. Average specimen, 1.35 by .95 inches" (North).

Breeding season. September to February (Ramsay).

GREY* says:—"They never fly if they can avoid so doing, and are often caught by dogs; when disturbed, they crouch down and endeavour to hide themselves in a tuft of grass. While running about they are in the habit of raising themselves in a nearly perpendicular position on the extremities of their toes, so that the hinder part of the foot does not touch the ground, and of taking a wide survey around them."

Colonel V. Legge† writes:—"It was in the vicinity of the Keilor Plains [Victoria] that I met last January with this singular bird; and as the locality I found it in was a field of short English grass, I had, fortunately, ample opportunity of observing minutely for some time its actions and deportment. In these it has every resemblance to a grallatorial, and, as far as can be seen from short observations, very little to a rasorial bird. It runs at a medium pace hither and thither, checking itself and pausing at times, at the same time twisting about its high-carried head like a member of the Plover family. When in a state of quiescence, it holds itself erect with its head raised. Its mode of flight, however, is entirely peculiar to the bird itself; it rises suddenly, and for a little space proceeds with a dipping Finch-like motion, and then settles down into a steady fluttering flight, reminding one somewhat of a young Lark. A very peculiar feature was exemplified in a second individual (the mate of the bird, the actions of which I have just described) which after I had flushed it several times, flew off and perched on the lower rail of a 'post and rail' fence; it remained in this position for a couple of minutes and then again took flight."

Mr. Keartland‡ gives his experience of this bird:—"Furnished with a pair of rather long legs, bare for some distance above the joint, the Wanderer can run very fast for a long distance, and only takes flight when suddenly startled or hard pressed. They will often crouch before a dog and permit themselves to be caught instead of retaining liberty by the aid of their wings. They are solitary in their habits, seldom more than one or two birds being found in a field. Whilst Quail-shooting on April 9th, 1892, our dog made a decided 'set' but before either of us got within shot he started off for about twenty yards, and again 'set.' This

* Grey in Gould's *Handb. B. Austr.*, II., p. 188 (1865).

† Legge, *P.Z.S.*, p. 237 (1869).

‡ *Vict. Nat.*, XVII., p. 167 (1901).

PLAIN WANDERER.

was repeated again and again until we had traversed the greater part of a 50 acre paddock in a zig-zag fashion. At last we saw a Wanderer running like a rat through the grass. On several other occasions I have known them to 'lie close' when 'set' by the dog, and continue in that position until caught."

"Early in March of this year (1900) Mr. Dixon caught an adult male and a half-grown young one. In June Mr. Coles took an egg from a bird he was skinning, but a clutch of eggs in the possession of a friend was taken in November."

Of the birds figured and described, the female was given me by Mr. Edwin Ashby, of Adelaide, who collected it at Dry Creek, South Australia, on May 2nd, 1904. The immature bird was collected in April, 1898, in Victoria.

ORDER IV.—C O L U M B I F O R M E S .

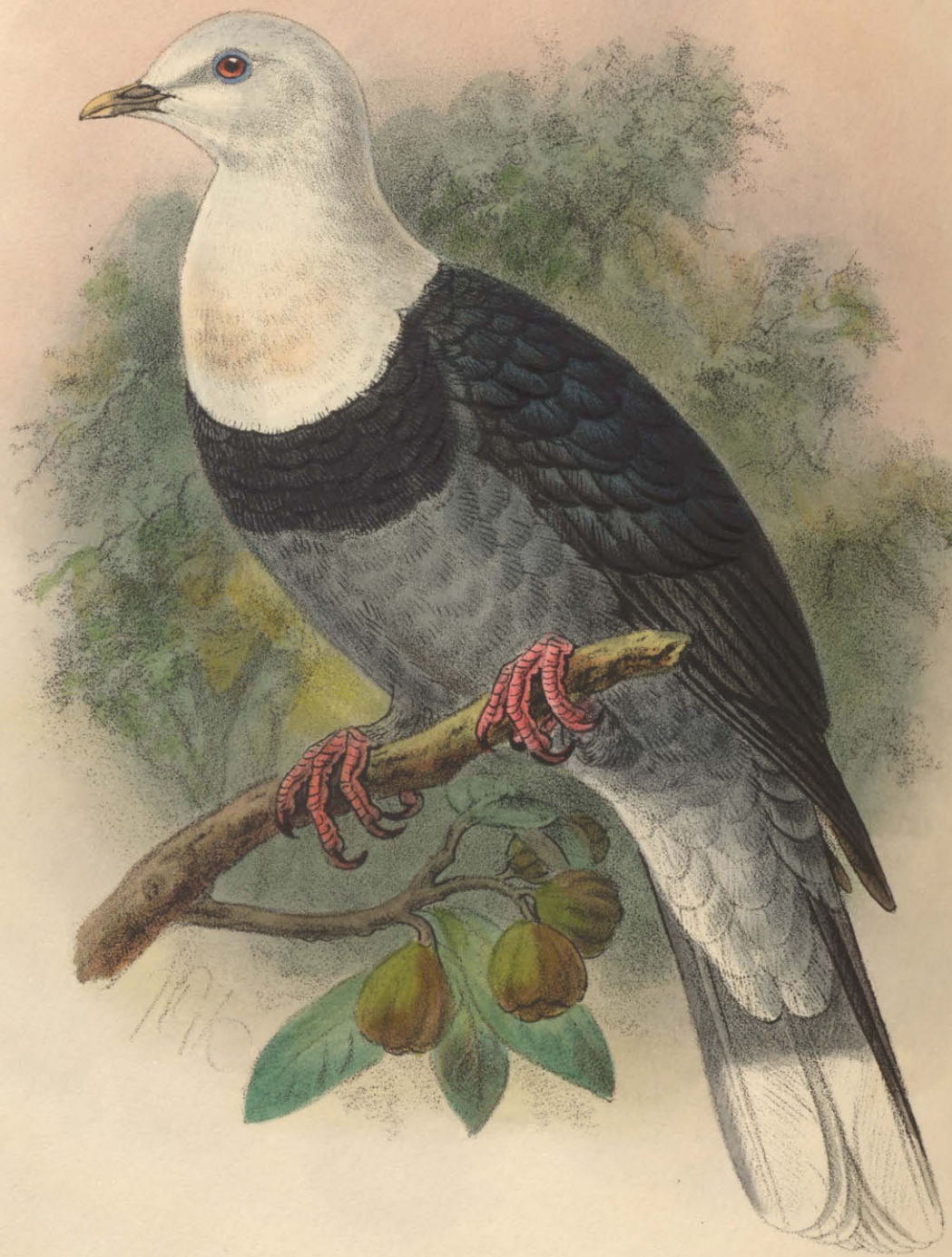
FAMILY—T R E R O N I D Æ .

GENUS—LEUCOTRERON.

| | | |
|---|---------|------------------------|
| LEUCOTRERON Bonaparte, Compt. Rend., XXXIX., p. 876 (1854) .. .. . | .. .. . | <i>L. cinctus.</i> |
| <i>Ramphiculus, id., ib., p. 878..</i> | .. .. . | <i>L. occipitalis.</i> |
| <i>Omeotreron, id., ib., p. 878 ..</i> | .. .. . | <i>L. occipitalis.</i> |
| <i>Jambotreron, id., 1854 (cf. Gray, Cat. Gen. and Sub-gen. B., p. 97 (1855)) .. .. .</i> | .. .. . | <i>L. jambu.</i> |
| <i>Trerolæma, id., Compt. Rend., XLI., p. 247 (1855) ..</i> | .. .. . | <i>L. gularis.</i> |
| <i>Rhamphiculus</i> Reichenbach, Tauben, p. 98 (1862) | | |
| <i>Laryngogramma, id., ib., p. 102 .. .. .</i> | .. .. . | <i>L. gularis.</i> |
| <i>Xenotreron</i> Tweeddale, P.Z.S., p. 832 (1877) .. .. . | .. .. . | <i>L. occipitalis.</i> |
| <i>Phassa</i> Heine, Nomencl. Mus. Hein. Orn., p. 281 (1886) | | |

THIS genus has been separated from *Ptilinopus* proper, because its members have the pectoral feathers normal and not bifurcated. The tail is generally rather long, and the under tail-coverts not quite so long as in *Ptilinopus*. Otherwise there are no differences of generic value, and one might just as well unite *Leucotreron* with *Ptilinopus*.

DISTRIBUTION. Indo-Malayan and Western Austro-Malayan Archipelago.



J.G. Keulemans, del.

Witherby & Co

$\frac{2}{3}$

LEUCOTRERON ALLIGATOR.
(BLACK-BANDED FRUIT-PIGEON).

LEUCOTRERON CINCTA ALLIGATOR.

BLACK-BANDED FRUIT-PIGEON.

(PLATE 21.)

PTILOPUS (LEUCOTRERON) ALLIGATOR Collett, P.Z.S., p. 354 (1898), Arnhem Land, Northern Territory.

Ptilopus (*Leucotreron*) *alligator* Collett, P.Z.S., p. 354, Pl. XXIX. (1898); Hall, Key B. Austr., p. 69 (1906).

Ptilopus alligator Campbell, Nests and Eggs Austr. B., p. 663 (1901).

Ptilinopus cincta alligator Hartert, Nov. Zool., XII., p. 195 (1905).

Leucotreron alligator Sharpe, Handl. Birds, I., p. 56 (1899); Mathews, Handl. B. Austral., p. 8 (1908).

DISTRIBUTION. South Alligator River; Arnhem Land, Northern Territory.

Adult female. Head and neck all round, including the upper-breast, white, with a wash of buff on the latter, as also on the hind-neck, a narrow white line dividing these parts from the greenish-black band on the breast and the black of the upper-back; lesser wing-coverts like the upper-back; median and greater coverts slate-grey, with black margins; primary-coverts and primary-quills greenish-black, as also the secondaries; lower-back dark ashy-grey, becoming paler on the upper tail-coverts; the long upper tail-coverts showing dark shaft-streaks; tail black, broadly tipped with white; abdomen, sides of body, under wing-coverts, axillaries, and under tail-coverts bluish-grey, becoming almost white on the long under tail-coverts; "Bill (in skin), light coloured, tip yellowish; feet reddish" (R. Collett). Total length, 345 mm.; culmen, 23; wing, 184; tail, 140; tarsus, 21.

Adult male. Similar to female.

Nest and eggs. Undescribed.

THIS species was originally discovered by Dr. Knut Dahl, a young Norwegian naturalist, on the 15th June, 1895. Both sexes were obtained.

"The two specimens of this bird were shot while with a flock which was seated feeding in a Bonjon tree (a sort of *Ficus*). They were never seen except in the region near the sources of the South Alligator River in Arnhem Land. Their flight was very noisy. Their food consists mainly, according to native report, of the fruit of the said Bonjon tree, the figs of which are not bigger than the berries of the mountain ash."*

* Collett, *l.c.*

THE BIRDS OF AUSTRALIA.

The above is all that seems to be known of the life-history of this pigeon.

The bird figured and described is a female collected near the head of the west branch of the South Alligator River, Northern Territory, by Mr. J. T. Tunney on May 22nd, 1903. The specimen was kindly lent me by the Hon. Walter Rothschild.

GENUS—PTILINOPUS.

- PTILINOPUS Swainson, Zool. Journ., I., p. 473 (1825) .. *P. regina*.
- Ptilinopus*, *id.*, Classif. B., II., p. 347 (1837)
- Ptilopus* Strickland, Ann. & Mag. Nat. Hist., VII., p. 36 (1841).
- Lamprotreron* Bonaparte, Compt. Rend., XXXIX., p. 876 (1854) *P. superbus*.
- Kurukuru* Prévost and Des Murs, Voy. "Vénus," Zool., p. 220 (1849) *P. purpuratus*.
- Thouarsitreron* Bonaparte, Compt. Rend., XXXIX., p. 876 (1854) *P. dupetit-thouarsi*.
- Kurutreron*, *id.*, *ib.*, p. 878 *P. purpuratus*.
- Ptilotreron*, *id.*, 1854 (*cf.* Gray, Cat. Gen. and Sub-gen. B., p. 97 (1855)) *P. purpuratus*.
- Curotreron* Heine, Nomencl. Mus. Hein. Orn., p. 280 (1886)
- Terenotreron*, *id.*, *ib.*

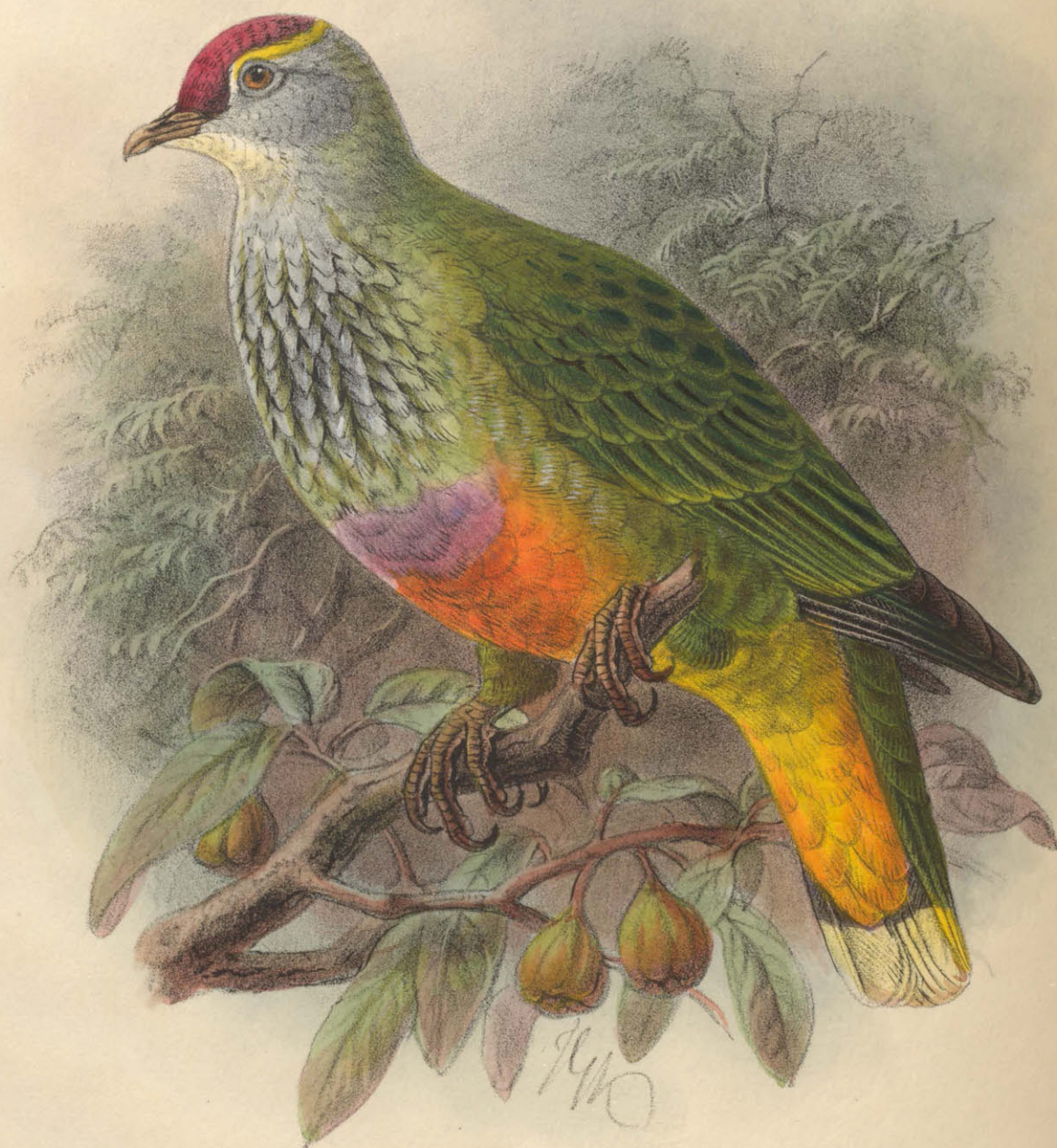
PLUMAGE full and dense ; feathers very soft and downy at the base. Pectoral feathers more or less bifurcated. First primary abruptly attenuated at the apical portion in adult birds and much shorter than the following ones, the third and fourth generally longest. Tail square or rounded, containing fourteen rectrices ; metatarsus more or less thickly and completely feathered, toes bare, each toe with the skin expanded laterally. Bill shorter than the head, less distensible at the base than in *Myristicivora*, *Carpophaga* and *Lopholaimus*. Nostrils bare. Size medium, less than in the three last-named genera.

I see no reason for the separation of *Lamprotreron* from *Ptilinopus*.

DISTRIBUTION. Australia, New Guinea, Moluccas, the eastern portions of the Malay Archipelago and Polynesia.

Key to the Species.

- A. No orange-red patch on mantle.
- a'*. Forehead and crown magenta ; no orange band on breast in front of rose-lilac patch on abdomen .. *P. regina*, p. 105.
 - b'*. Forehead and crown rose-lilac ; a distinct orange band on the breast dividing the grey of the chest from the rose-pink patch on the abdomen .. *P. ewingi*, p. 107.
- B. A large orange-red patch on mantle ; crown of head dark purple ; band on breast blue-black *P. superbus*, p. 109.



J.G. Keulemans, del.

Witherby & Co.

†
PTILOPUS SWAINSONI.
(RED-CROWNED FRUIT-PIGEON).

PTILINOPUS REGINA REGINA.

RED-CROWNED FRUIT-PIGEON.

(PLATE 22.)*

PTILINOPUS PURPURATUS (var. *regina*) Swainson, Zool. Journ., I., p. 474 (1825), Australia.

Ptilinopus purpuratus (var. *regina*) Swainson, Zool. Journ., I., p. 474 (1825)

Columba purpurata (not auth.) Jardine and Selby, Ill. Orn., II., Pl. 70 (1829).

Ptilinopus swainsonii Gould, P.Z.S., p. 18 (1842); *id.*, B. Austr., V., Pl. 55 (1848); *id.*, Handb. B. Austr., II., p. 106 (1865); Ramsay, P.L.S., N.S.W., I., p. 182 (1876); *id.*, Tab. List Austr. B., p. 17 (1888).

Ptilonopus swainsoni Gray, Gen. B., II., p. 466 (1849).

Ptilopus swainsoni Bonaparte, Consp. Av., II., p. 19 (1854); Salvadori, Cat. B. Brit. Mus., XXI., p. 95 (1893); Campbell, Vict. Nat., XIV., p. 5 (1897); North, B. County Cumberland, p. 104 (1898); Campbell, Nests and Eggs Austr. B., p. 661 (1901); Oates, Cat. Birds' Eggs Brit. Mus., I., p. 83 (1901); Hall, Key B. Austr., p. 69 (1906); Mathews, Handl. B. Austral., p. 8 (1908).

Kurukuru swainsonii Des Murs and Prévost, Voy. "Vénus," Zool., pp. 256, 269 (1849).

Ptilopus regina Elliott, P.Z.S., p. 531 (1878).

Ptilinopus regina Robinson and Laverock, Ibis, p. 646 (1900).

DISTRIBUTION. Queensland and New South Wales.

Adult male. General colour above green, the scapulars dark blue subterminally and margined with golden yellow; lesser wing-coverts like the back; median and greater coverts darker green, edged with yellow; bastard-wing and primary-coverts dark green with brown on the inner webs; primary-quills dark brown on the inner webs, outer webs and tips green, narrowly edged with whitish on the outer quills, becoming yellow on the inner ones; secondary-quills more green and more broadly margined with yellow; middle tail-feathers green, tipped with yellow, the outer feathers dark brown on the inner webs; forehead and crown magenta, bordered by a white line in front of the eye, followed by a yellow one, which skirts the magenta in a circular line on the hinder-crown; occiput and hind-neck green, with a hoary wash; chin white; sides of face, sides of neck and throat pale grey; the feathers of the chest bifurcated, green at the base and tipped with greyish, imparting a streaked appearance; a small patch of magenta on the middle of the abdomen, which separates the orange-red of the lower abdomen from the green of the chest; feathers of the vent yellow; sides of body, flanks and thighs green, the feathers of the lower flanks tipped with yellow, forming a yellow tuft on each of the thighs;

* The Plate is lettered *Ptilopus swainsoni*.

THE BIRDS OF AUSTRALIA.

under aspect of tail grey, tipped with yellow; under wing-coverts and axillaries grey; "Bill greenish-black, tip horn-colour; iris reddish-orange, eye-lid yellowish-green; feet olive-brown" (J. Gould). Total length 225 mm.; culmen, 19; wing, 135; tail, 67; tarsus, 18.

Adult female. Very similar to the male, but not so brightly coloured and with the under tail-coverts yellow, instead of orange. Total length, 215 mm.; culmen, 17; wing, 122; tail, 63; tarsus, 18.

Nest. Placed about 50 feet from the ground. "A very slight platform, 5 or 6 inches across and about 2 inches in thickness, composed of dry twigs placed in a slender horizontal fork. The contents may be easily seen through the nest from beneath" (Campbell).

Eggs. "Clutch, one; an ellipse in form; texture of shell fine; surface glossy; colour white. Dimensions in inches, 1.16 by .81. A smaller and narrower example measures 1.08 by .73" (Campbell).

Breeding season. October to February (Ramsay).

MR. BROADBENT* says: "The Red-crowned Fruit Pigeon is to be found in all the Cardwell Scrubs in September, while on its summer migratory journey southward. The time of its return to the Cape York district is March, and it is most abundant there during the winter months following, being quite absent in summer. The bird does not breed at Cardwell, its passage through this part being merely a stage of its journey to South Queensland, which it reaches in October. Being a true fruit eater, it is to be found in the scrubs which clothe the ranges and border the rivers all the way from Clarence River to Cape York, and is not procurable in inland scrubs, such as Chinchilla and Barcaldine. It lives to a large degree on the figs, etc., in the scrubs, the little yellow fig seeming to be most favoured. In this district the Pigeon feeds in company with *Myristicivora assimilis*, a congener, and the Yellow Fig Bird (*Sphecotheres*) on a wild fig which attains perfection in May. Occasionally, so loth are they to retire from the ripe berries, that I have been enabled to confine my shooting operations to one comparatively small fig tree for the day. The bird is most prolific. An idea of its abundance at this place may be obtained when I mention that I have obtained nine brace, besides numbers of other birds, before an early breakfast."

I can confirm the above remarks from my own experience gained between the Johnson River and Cardwell in the nineties.

Mr. A. J. Campbell† says, "The call of the Red-crowned Fruit Pigeon is remarkably loud for so small a bird, being a single 'coo' repeated twelve or thirteen times, . . . the first few 'coos' being slow and measured, then uttered more rapidly each time till the last notes almost run into each other; at the same time the tones become softer and almost inaudible, as if the bird were some distance away."

The bird figured and described is a male collected at Cape York in June, 1890.

* In Campbell's *Nests and Eggs Austr. B.*, p. 662 (1901).

† *Nests and Eggs Austr. B.*, p. 662 (1901).



J.G. Keulemans, del.

Witherby & Co

†
PTILOPUS EWINGI.
(ROSE-CROWNED FRUIT-PIGEON).

PTILINOPUS REGINA EWINGII.

ROSE-CROWNED FRUIT-PIGEON.

(PLATE 23.)

PTILINOPUS EWINGII Gould, P.Z.S., p. 19 (1842), Port Essington, Northern Territory.

Ptilinopus ewingii Gould, P.Z.S., p. 19 (1842); *id.*, B. Austr., V., Pl. 56 (1848); *id.*, Handb. B. Austr., II., p. 107 (1865); Ramsay, P.L.S., N.S.W., I., p. 182 (1876); *id.*, Tab. List Austr. B., p. 17 (1888).

Ptilonopus ewingii Gray, Gen. B., II., p. 466 (1849).

Kurukuru roseicapilla (part) Des Murs and Prévost, Voy. "Vénus," Zool., p. 259 (1849).

Kurukuru roseicapillus, *id.*, *ib.*, p. 269.

Ptilopus ewingii Bonaparte, Consp. Av., II., p. 20 (1854); Salvadori, Cat. B. Brit. Mus., XXI., p. 96 (1893); Campbell, Nests and Eggs Austr. B., p. 663 (1901); Oates, Cat. Birds' Eggs Brit. Mus., I., p. 84 (1901); Le Souëf, Emu, II., p. 153 (1903); Mathews, Handl. B. Austral., p. 8 (1908).

Ptilonopus swainsoni (not Gould) Elsey, P.Z.S., p. 27 (1857).

Ptilinopus ewingi Le Souëf, Ibis, p. 394 (1897).

Ptilopus ewingi Hall, Key B. Austr., p. 69 (1899).

Ptilinopus swainsoni ewingi Hartert, Nov. Zool., XII., p. 196 (1905).

DISTRIBUTION. Cape York; Northern Territory; Savu Island.

Adult male. Upper-surface, including the wings and entire back, green; scapular feathers darker green with blue-black subterminal spots and broad yellow margins; primary-coverts and quills green on the outer webs, slate-grey on the inner ones, very slightly edged on the outer webs of the outer primaries with white, which becomes yellow on the innermost secondaries; middle tail-feathers with an indication of yellowish-white at the tips, outer feathers grey on the inner webs, darker subterminally and tipped with yellowish-white, outer webs green; crown of head pale rose-lilac, encircled posteriorly by a narrow line of yellow of the same colour as the chin and throat; occiput and hind-neck green, strongly washed with grey, becoming paler on the sides of the face and neck; the feathers of the chest bifurcated, green, tipped with pale grey, followed by reddish-orange on the abdomen, which is divided by an ill-defined band of lilac; under tail-coverts like the abdomen; vent and tufts on the lower flanks yellow; sides of body, flanks and thighs green; lower aspect of tail grey, darker subterminally and tipped with yellowish-white; under wing-coverts and axillaries grey, darker on the quill lining; "Iris orange; bill and feet greenish" (J. T. Tunney). Total length, 212 mm.; culmen, 18; wing, 125; tail, 72; tarsus, 20.

THE BIRDS OF AUSTRALIA.

Adult female. Similar to the male. Total length, 206 mm. ; culmen, 18 ; wing, 115 ; tail, 68 ; tarsus, 18.

*Nest.** " A slightly-built platform, about $2\frac{1}{2}$ inches in diameter, composed of small sticks " (Campbell).

Eggs. " Clutch, one ; elliptically inclined, with occasionally one end peculiarly pointed ; texture of shell fine, except at the smaller end, which is somewhat granular ; surface slightly glossy ; colour, pure white. Dimensions in inches, 1.2 to 1.18 by .86 to .85 " (Campbell).

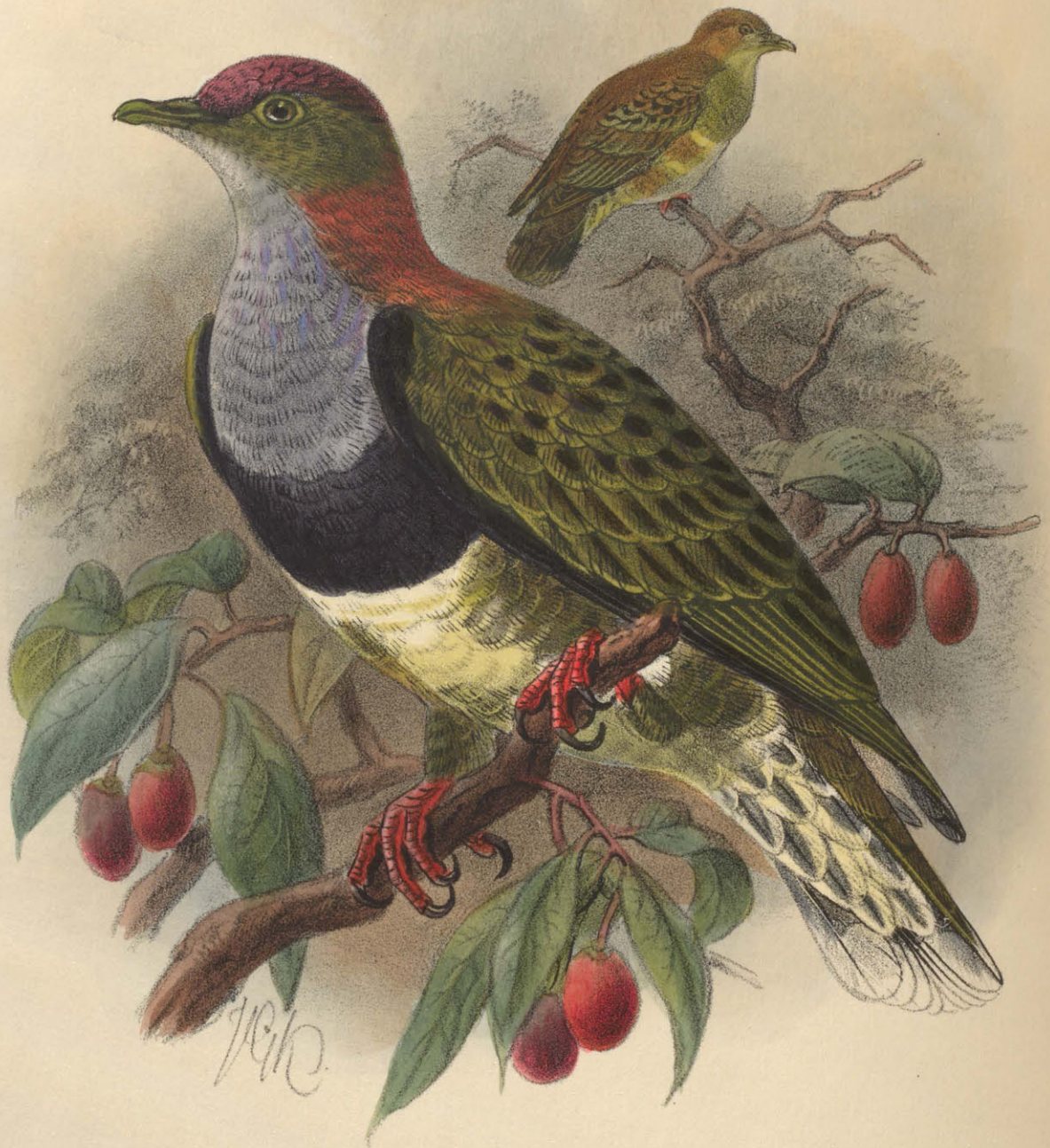
Breeding season. October to February (Ramsay).

I CAN find no account of the life-history of this sub-species.

Specimens in my collection from Savu Island, near Timor, do not differ from those from the Northern Territory.

The bird figured and described is from the latter locality, and was collected in the jungle at Koparlgoo, near the South Alligator River, Northern Territory, by Mr. J. T. Tunney on October 10th, 1903.

* Mr. Le Souëf says the nest is placed about 8 feet from the ground.



J. G. Keulemans, del.

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†
LAMPROTHERON SUPERBA.
(PURPLE-CROWNED FRUIT-PIGEON).

PTILINOPUS SUPERBUS.

PURPLE-CROWNED FRUIT-PIGEON.

(PLATE 24.)

- COLUMBA SUPERBA Temminck et Knip, Les Pigeons, p. 75, Pl. XXXI. (1811). Otaheti.*
- Columba superba* Temminck et Knip, Les Pigeons, p. 75, Pl. XXXI. (1811); Temminck, Fig. et Gall., I., p. 277 (1813).
- Columba cyanovirens* Lesson, Voy. Coq., Zool., Pl. 42, f. 1 (1826), Vol. I., p. 713 (1830).
- Ptilinopus superbus* Stephens in Shaw's Gen. Zool., XIV., p. 279 (1826); Gould, B. Austr., V., Pl. 57 (1848); Ramsay, P.L.S., N.S.W., I., p. 182 (1876); *id.*, Tab. List Austr. B., pp. 17, 30 (1888); Robinson and Laverock, Ibis, p. 646 (1900).
- Ptilinopus cyanovirens* Selby, Nat. Libr., Pigeons, p. 109, Pl. 5 (1835).
- Ptilinopus leucogaster* Swainson, Classif. B., II., p. 347 (1837).
- Ptilinopus cyanovirens* Gray, Gen. B., II., p. 467 (1844).
- Ptilinopus superbus*, *id.*, *ib.*, p. 467; Diggles, Handb. B. Austr., Pl. 87 (1877).
- Lamprotreron superba* Bonaparte, Compt. Rend., XL., p. 216 (1855); Oates, Cat. Birds' Eggs Brit. Mus., I., p. 84 (1901); Mathews, Handl. B. Austral., p. 9 (1908).
- Lamprotreron superbus* Gould, Handb. B. Austr., II., p. 108 (1865); Ramsay, P.Z.S., p. 114 (1876); North, Austr. Mus. Cat., No. 12, p. 269 (1889); *id.*, Vict. Nat., XXIII., p. 53 (1906).
- Cyanotreron cyanovirens* Bonaparte, Consp. Av., II., p. 23 (1855).
- Kurukuru superbus* Des Murs and Prévost, Voy. "Vénus," Zool., pp. 231, 268 (1849).
- Ptilopus superba* Rosenberg, Reis. naar Zuidoostereil, p. 81 (1867).
- Lamprotreron porphyrostictus* Gould, Ann. & Mag. N.H. (4), XIII., p. 137 (1874) (Cape York).
- Ptilopus superbus* Sclater, P.Z.S., p. 109 (1877); Forbes, P.Z.S., p. 126 (1878); Elliott, P.Z.S., p. 542 (1878); Salvadori, P.Z.S., p. 62 (1879); Ramsay, P.L.S., N.S.W., IV., p. 74 (1879); *id.*, *ib.*, VIII., p. 28 (1883); *id.*, *ib.*, (2), I., p. 1151 (1887); Salvadori, Cat. B. Brit. Mus., XXI., p. 112 (1893); North, B. County Cumberland, p. 105 (1898); Campbell, Nest and Eggs Austr. B., p. 664 (1901); Hall, Key B. Austr., p. 69 (1906); Le Souëf, Wild Life in Austr., p. 361 (1907); Littler, Handb. B. Tasmania, p. 101 (1910).

* This is not the correct locality; probably Halmahera is the correct one.

THE BIRDS OF AUSTRALIA.

Ptilinopus (Lamprotreron) porphyrostictus Ramsay, P.L.S., N.S.W., II., p. 208 (1877).

Ptilopus porphyrostictus Giebel, Thes. Orn., III., p. 367 (1877).

Ptilopus minutus Campbell, Emu, V., pp. 155, 198 (1906).

DISTRIBUTION. Queensland; New South Wales; Tasmania (accidental); the Papuan and Moluccan Islands.

Adult male. Crown of head dark purple; lores, sides of face and band round the occiput green, as also the entire back and wings; the scapulars and some of the inner median-coverts showing subterminal black spots; lesser wing-coverts purplish-blue, forming a shoulder-patch; remainder of the lesser and outer median coverts green, edged with yellow; greater coverts green on the outer webs and margined with yellow, inner webs black; bastard-wing, primary-coverts and quills black, some of the inner primary-quills edged with yellow, more broadly on the secondaries; innermost secondaries with a certain amount of green on the outer webs; the two middle tail-feathers green, with pale tips; remainder of the tail-feathers black on the inner webs, green on the outer ones, and tipped with white; a large patch of orange-red on the hind-neck and mantle; throat whitish-grey; fore-neck and chest lavender-grey, the feathers on the fore-neck and sides of neck barred with magenta; a blue-black band across the breast, followed by three irregular white bands with two, more or less, complete green ones, the feathers of which are fringed with white; under tail-coverts white, with green on the inner webs; under-surface of tail lead-grey, with white tips; under wing-coverts and axillaries grey, tipped with white—some of the outer ones being more or less green; "Bill green; iris yellow; feet red" (E. Olive). Total length, 213 mm.; culmen, 18; wing, 130; tail, 67; tarsus, 19.

Adult female. Differs from the male in the absence of the lavender-grey and the purple band on the breast, which is green like the throat; the orange-red patch on the hind-neck and mantle, which is like the back; the magenta of the head is replaced by a purplish-black spot on the occiput; and the blue shoulder-patch of the male is absent; "Bill dark indigo blue; iris light yellow; feet scarlet" (W. Stalker). Total length, 212 mm.; culmen, 17; wing, 128; tail, 59; tarsus, 17.

Young female of the year. Like the adult female, but the occipital spot is represented only by a patch of darker green.

Young female (in the British Museum, from Port Molle, Queensland) is green above, including the head, with a certain amount of coppery reflections, and with pale narrow margins to the feathers on the lower back, rump and upper tail-coverts, as also the scapulars and lesser wing-coverts; median and greater coverts more broadly margined with yellow, like the innermost secondaries; bastard-wing, primary-coverts and quills blackish, the latter narrowly edged with white on the outer webs; middle tail-feathers golden-brown, the outer feathers being darker with whitish tips; throat grey; fore-neck and chest, as also the sides of neck and sides of body, green, with pale edges to the feathers; abdomen and under tail-coverts white, more or less, washed with yellow; under wing-coverts dark green, with pale yellowish margins; under aspect of quills lead-grey.

"The young resemble those of *P. swainsoni*, particularly in having narrow yellow margins to the primaries and secondaries, and to the tips of the feathers on the chest and breast; they do not show the forked or split feathers on those parts before the end of the second year, although the green bands on the flanks are conspicuous in the nestling" (Ramsay, *P.Z.S.*, p. 115 (1876).

Nest. "A platform, about three inches in diameter, composed of a few twigs. Usually situated in scrub or in a small tree at a height of two to ten feet from the ground" (Campbell).

PURPLE-CROWNED FRUIT-PIGEON.

Eggs. "Clutch, one usually [sometimes two]; elliptical in form; texture of shell, somewhat fine, excepting the smaller end, which is slightly granular; surface glossy; colour, white; slightly toned or of a faint creamy tint. Dimensions in inches, 1.22 to 1.15 by .88 to .85" (Campbell).

Breeding season. October to February (Ramsay).

MR. BROADBENT* says: "The Superb Fruit-Pigeon unlike *Ptilinopus regina* does not travel far south of Cardwell, but remains there in large numbers, from September to March. During the rest of the year is comparatively scarce. At the Cape it is tolerably abundant for a short period—a month or so about March—and then disappears altogether, for none winter at Cape York. The note is very gruff, resembling the sound 'whoot' uttered at short intervals, and may be heard at a considerable distance from the spot of its emission. The bird is arboreal, like the Red-crowned Fruit-Pigeon, whose fruit-eating habits it also follows. Being very shy, it is rarely found outside the scrubs. The nest is made in a small bush, and constructed loosely of a few sticks, which just serve to retain the eggs when laid. The usual clutch consists of two eggs, which are generally visible to an observer from the ground."

Dr. Ramsay† observes: "I found this, one of our most beautiful species, tolerably abundant in all the scrub-lands of the Herbert River and coast range. Its note is a broken 'coo,' prolonged into a rolling guttural sound at the end, and may be heard at least half-a-mile off. But, owing to the dense nature of the scrubs, the birds are at all times difficult to obtain, although not rare."

Mr. Le Souëf‡ remarks: "When camped on the banks of the Annan River, in the ranges, we found the beautiful Purple-crowned Fruit-Pigeon nesting. It is a wonder that the egg does not fall out of the nest, composed as it is of so few sticks. When a bird flew off the nest, I always half expected the egg to fall, but it did not. If I wished to procure an egg in a nest at the end of a thin bough, a native would climb up the tree with a long light stick. He then carefully pushed one egg at a time out of the nest and I caught them safely in my hat as they fell. None were broken by this means, although the height was sometimes considerable. Their nests were always situated in some thick-leaved tree. They were built near the ends of the branches, nearly hidden in the foliage. In every case it was the male bird that was sitting on the nest."

If the Australian bird should be separable from the one inhabiting the islands to the north of Australia, on account of the different colour of the band on the breast and the lighter red on the mantle, the Australian form must be called *Ptilinopus poryphyrostictus* (Gould).

The male bird figured and described was collected at Cairns and the female at Cape York.

* In Campbell's *Nests and Eggs Austr. B.*, p. 665 (1901).

† *P.Z.S.*, p. 114 (1876).

‡ *Wild Life in Austr.*, pp. 281, 361 (1907).

GENUS—MEGALOPREPIA.

MEGALOPREPIA Reichenbach, Av. Syst. Nat., p. xxvi (1852) .. *M. magnifica*.

DIFFERS from the genus *Ptilinopus* by the shape of the first primary, which is not abruptly attenuated at the apical portion. The tail is rather elongated and more rounded, and the metatarsus, which is partly feathered, is bare on the lower half.

Some of the species are smaller, but *M. magnifica* is as large as even the larger members of the genera *Myristicivora* and *Carpophaga*.

DISTRIBUTION. North and East Australia, the Papuan Islands and the Northern Moluccas.

Key to the Species.

- | | | | | | | |
|-----------------------|----|----|----|----|----|-------------------------------|
| Larger, wing 237 mm. | .. | .. | .. | .. | .. | <i>M. magnifica</i> , p. 114. |
| Smaller, wing 206 mm. | .. | .. | .. | .. | .. | <i>M. assimilis</i> , p. 116. |

MEGALOPREPIA MAGNIFICA MAGNIFICA.

PURPLE-BREASTED FRUIT-PIGEON.

(PLATE 25.)

COLUMBA MAGNIFICA Temminck, Trans. Linn. Soc., XIII., p. 125 (1821); New South Wales (Red Point, south of Wollongong).

Columba magnifica Temminck, Trans. Linn. Soc., XIII., p. 125 (1821); *id.*, Pl. Col., Pl. 163 (1822).

Carpophaga magnifica Selby, Nat. Libr., Pigeons, p. 115, Pl. 6 (1835); Gould, B. Austr., V., Pl. 58 (1848); Diggles, Handb. B. Austr., Pl. 88 (1877).

Ptilonopus magnificus Swainson, Classif. B., II., p. 347 (1837).

Ptilinopus magnificus Hartlaub, Syst. Verz., p. 97 (1844); Le Souëf, Ibis, p. 393 (1897).

Megaloprepia magnifica Reichenbach, Syst. Av., p. xxvi. (1852); Bonaparte, Consp. Av., II., p. 39 (1854); Gould, Handb. B. Austr., II., p. 110 (1865); Ramsay, P.L.S., N.S.W., I., p. 182 (1876); Lumholtz, Among Cann., p. 214 (1889); Salvadori, Cat. B. Brit. Mus., XXI., p. 167 (1893); North, Rec. Austr. Mus., III., p. 16 (1897); Campbell, Vict. Nat., XIV., p. 5 (1897); North, B. County Cumberland, p. 105 (1898); Campbell, Nests and Eggs Austr. B., p. 666 (1901); Mathews, Handl. B. Austral., p. 9 (1908).

Ptilopus magnificus Schlegel, De Dierent., p. 211 (1864); Elliott, P.Z.S., p. 575 (1878); Salvadori, P.Z.S., p. 66 (1879);

Ptilinopus (Megaloprepia) magnificus Ramsay, Tab. List Austr. B., p. 17 (1888).

Ptilopus magnifica Hall, Key B. Austr., p. 69 (1906).

DISTRIBUTION. Queensland; New South Wales.

Adult male. General colour above golden-green, including the sides of breast and sides of body; an irregular band of yellow or yellowish-white across the wing, which is composed of yellow or white spots on the outer webs of the median coverts and inner greater coverts; primary-quills blackish, green on the outer webs and cinnamon-brown on the inner ones towards the base; tail-feathers green, with black shafts; head and neck all round, including the throat, lavender-grey; feathers of the breast dusky black at base, with a bar of green, and tipped with rich purple, this latter colour extends in a narrow line up the middle of the neck to the chin; abdomen dull orange-yellow, like the axillaries; under wing-coverts bright orange-yellow; lower aspect of tail grey, quills below somewhat darker, with a patch of cinnamon at the base; "Bill red, yellow at tip; iris red, bare skin round eye green; feet green" (E. Olive). Total length, 485 mm.; culmen, 33; wing, 237; tail, 188; tarsus, 35.

Adult female. Similar to the male, but slightly smaller. Total length, 460 mm.; culmen, 32; wing, 230; tail, 172; tarsus, 30.



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$\frac{1}{2}$
MEGALOPREPIA MAGNIFICA.
(PURPLE-BREASTED FRUIT-PIGEON).

PURPLE-BREASTED FRUIT-PIGEON.

Nest. "Substantial for a pigeon, slightly concave, and almost entirely composed of wire-like tendrils of climbing plants, placed upon a foundation of a few coarse twigs. Dimensions about 6 inches across by $2\frac{1}{2}$ inches in depth" (Campbell).

Eggs. "Clutch, one; elongated in form, considerably pointed towards the smaller end; texture of shell somewhat granular; surface slightly glossy and irregular. Dimensions in inches, 1.77 by 1.05" (Campbell).

Breeding season. October to February (Ramsay).

VERY little has been written on the life-history of this species. Mr. Campbell* says: "At certain seasons these birds are very fat, especially in June and July, when the figs are ripest."

"Although we could hear the hoarse, deep call of 'wallock-a-woo' in the thick leafy bowers of the scrub, we rarely saw the birds, except in the tamarind trees, where they were detected by the sparkling orange colour of the under parts of their wings, which they flapped in order to balance themselves while feasting upon the bunches of agreeable acid fruit."

The bird figured and described is a male, and was collected on the Richmond River, New South Wales, in December, 1888.

* *Nests and Eggs Austr. B.*, p. 666 (1901).

MEGALOPREPIA MAGNIFICA ASSIMILIS.

ALLIED FRUIT-PIGEON.

(PLATE 26.)

CARPOPHAGA ASSIMILIS Gould, P.Z.S., p. 201 (1850), Cape York, North Queensland.*Carpophaga assimilis* Gould, P.Z.S., p. 201 (1850); *id.*, B. Austr., Suppl., p. 67 (1869); Forbes, P.Z.S., p. 126 (1878).*Megaloprepia puella* (part) Bonaparte, Consp. Av., II., p. 40 (1854).*Carpophaga puella* Cassin (not Lesson), Pr. Ac. Nat. Sc. Philad., p. 231 (1854).*Megaloprepia assimilis* Bonaparte, Compt. Rend., XL., p. 217 (1855).*Megaloprepia assimilis* Gould, Handb. B. Austr., II., p. 111 (1865); Ramsay, P.Z.S., p. 115 (1876); North, P.L.S., N.S.W. (2), II., p. 410 (1887); *id.*, Austr. Mus. Cat., No. 12, p. 270 (1889); Salvadori, Cat. B. Brit. Mus., XXI., p. 168 (1893); North, Rec. Aust. Mus., III., p. 17 (1897); Robinson and Laverock, Ibis, p. 646 (1900); Campbell, Nests and Eggs Austr. B., p. 667 (1901); Oates, Cat. Birds' Eggs Brit. Mus., I., p. 84 (1901); Mathews, Handl. B. Austral., p. 9 (1908).*Ptilopus assimilis* Schlegel, Mus. P. B. Columbæ, p. 38 (1873); Elliott, P.Z.S., p. 574 (1878); Hall, Key B. Austr., p. 69 (1906); Le Souëf, Wild Life in Austr., p. 281 (1907).*Megaloprepia magnifica* var. *assimilis* Ramsay, P.L.S., N.S.W., I., p. 182 (1876).*Ptilinopus (Megaloprepia) assimilis* Ramsay, Tab. List Austr. B., p. 18 (1888).

DISTRIBUTION. North Queensland.

Adult male. Like *M. magnifica* in every respect and differing only by its smaller size; "Bill red, tip yellow; iris red; feet green" (E. Olive). Total length, 377 mm.; culmen, 30; wing, 206; tail, 160; tarsus, 29.*Adult female.* The same as the male, but smaller. Total length, 370 mm.; culmen, 27; wing, 203; tail, 159; tarsus, 27.*Nest.* "A platform of small twigs, about four inches in diameter; usually placed at a height of from ten to fifteen feet from the ground, in a small tree, frequently overhanging a stream, in thick scrub" (Campbell).*Eggs.* Clutch, one; pure white, smooth and glossy. Axis, 37 mm.; diameter, 25 mm.

MR. LE SOUËF* says: "The Allied Fruit-Pigeon was often heard uttering its curious guttural double note in the leafy tops of the trees, but, although often heard, it was seldom seen. Their frail nests were usually built in thin boughs overhanging the streams."

The bird figured was obtained at Bellenden Ker in Queensland, by Mr. Olive, on November 16th, 1899.

* *Wild Life in Austr.*, p. 281 (1907).



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$\frac{1}{2}$
MEGALOPREPIA ASSIMILIS.
(ALLIED FRUIT-PIGEON).

GENUS—MYRISTICIVORA.

MYRISTICIVORA Reichenbach, Av. Syst. Nat., p. xxvi. (1852) .. *M. bicolor*.

TAIL-FEATHERS fourteen, much shorter than in *Megaloprepia* and *Lopholaimus*. Metatarsus feathered on its basal half. Head not crested. Pure white, with the exception of the wings, tail, sometimes some of the under tail-coverts and some spots on the flanks, which are black.

DISTRIBUTION. From the Andamans, Nicobars and coasts of the Malay Peninsula throughout the Malayan, Moluccan and Papuan Islands to Australia.

MYRISTICIVORA SPILORRHOA.

NUTMEG PIGEON.

(PLATE 27.)

CARPOPHAGA SPILORRHOA Gray, P.Z.S., p. 186 (1858), Aru Islands.

Carpophaga luctuosa Gould (not Temm.), B. Austr., V., Pl. 60 (1848); Diggles, Handb. B. Austr., Pl. 89 (1877); Jardine, Emu, III., p. 181 (1904).*Myristicivora luctuosa* Bonaparte, Consp. Av., II., p. 37 (1855).*Carpophaga spilorrhoea* Gray, P.Z.S., p. 186 (1858); Ramsay, P.L.S., N.S.W., I., p. 372 (1876); *id.*, Tab. List Austr. B., p. 18 (1888).*Myristicivora spilochroa* Reichenbach, Tauben, p. 183 (1862).*Myristicivora spilorrhoea* Gould, Handb. B. Austr., II., p. 114 (1865); Ramsay, P.Z.S., p. 115 (1876); *id.*, P.L.S., N.S.W., I., p. 182 (1876); North, Austr. Mus. Cat., No. 12, p. 269 (1898); Robinson and Laverock, Ibis, p. 647 (1900); North, Rec. Austr. Mus., I., p. 116 (1891); *id.*, P.L.S., N.S.W. (2), V., p. 880 (1891); Salvadori, Cat. B. Brit. Mus., XXI., p. 231 (1893); Campbell, Nests and Eggs Austr. B., p. 668 (1901); Rothschild and Hartert, Nov. Zool., 1901, p. 117 (see also p. 116); Oates, Cat. Birds' Eggs Brit. Mus., I., p. 86 (1901); Hartert, Nov. Zool., XII., p. 196 (1905); Hall, Key B. Austr., p. 69 (1906); Le Souëf, Wild Life Austr., pp. 248, 338 (1907); Cornwall, Emu, VI., p. 138 (1907); Mathews, Handl. B. Austral., p. 9 (1908).*Myristicivora spilorrhoea* Macleay, P.L.S., N.S.W., I., p. 37 (1876).*Myristicivora bicolor* Salvadori and D'Albertis (not Scopoli), Ann. Mus. Civ. Gen., VII., p. 832 (1875).

DISTRIBUTION. Northern Territory; Queensland; also New Guinea.

Adult male. General colour white; bastard-wing and primary-coverts black; primary- and secondary-quills black, everywhere dusted with grey; tail white, broadly tipped with black, more narrowly on the outer feathers, the outermost margined with black down to the base; the feathers of the lower abdomen, flanks and under tail-coverts with submarginal black spots; quills below lead-grey; "Bill yellow, black at the base; iris brown, feet slate-colour" (E. Olive). Total length, 345 mm.; culmen, 26; wing, 225; tail, 120; tarsus, 27.*Adult female.* Similar to the male.*Nest.* "Flat, straight, being merely a few sticks or twigs placed crosswise—some are more substantial, being built of green branchlets; usually situated on a horizontal branch of any tree, not unfrequently in mangroves overhanging water, and occasionally near the ground or on rocks. Sometimes three or four nests are situated in one tree" (Campbell).



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MYRISTICIVORA SPILORRHOA.
(NUTMEG PIGEON).

NUTMEG PIGEON.

Eggs. Clutch, one ; an egg from the North Barnard Islands, collected on November 20th, 1891, is smooth and glossy ; pure white in colour. Measurements of two eggs, axis 44-46 mm. ; diameter 30 mm.

Breeding season. November to January (Ramsay).

MR. RAMSAY* writes : "During the months from October until the end of April, when they leave, this species is very numerous all over the Rockingham Bay district. Early in the morning, as soon as it is light enough, they leave their roosting places in large flocks, and betake themselves to their feeding grounds, dispersing over the scrubs and among the various species of *Acmena* and *Jambosa* which line the margins of the Herbert River. Towards evening they assemble, and leaving the feeding-grounds, return to roost on the mangrove islands in Hinchbrook Channel, and around the coast and mouths of the rivers, often flying a distance of 40 miles night and morning. The tops of the mangroves on which they roost are literally white with birds ; and notwithstanding the disturbance and havoc committed among them by shooting-parties, they continue to arrive until dark. They breed on these islands, building little or no nest, a few sticks placed so as to prevent the eggs from rolling away being considered sufficient. Young, almost fledged, were brought to me in January ; but many at this time were laying their eggs. When freshly killed the concealed portions of the feathers on the body are of a beautiful delicate rosy salmon hue, which fades soon after death."

Mr. Macleay† observes : "We found that it [*M. spilorrhoea*] commenced its migration southwards [from New Guinea] in the month of July ; at that time the low islands of Torres Straits were covered with them, their favourite fruit—the date plum—being then ripe and abundant."

From Mr. Jardine's notes‡ I gather the following : "These birds arrive at Cape York from New Guinea in August, a few coming in July. The early arrivals do not stay at Cape York, but continue their flight further southward to the mangrove-covered islands along the coast. They commence nesting at once, the earlier arrivals bringing up perhaps four broods during their eight months' sojourn in Australia. During the term of incubation the male birds carry food for the females in their crops from the mainland. Immediately after daylight, when the birds commence to leave for their feeding-grounds, and again at dusk when they return, the sound made by their cooings is one deep unbroken, monotonous boom, which when approaching an island may be heard for some distance. The fruits and berries which these birds live on are very plentiful during their stay."

The bird figured and described is a male collected at Bellenden Ker, Queensland, by Mr. Olive on November 28th, 1899, the tree being the nut-meg tree.

* *P.Z.S.*, p. 115 (1876).

† *P.L.S.*, *N.S.W. I.*, p. 37, (1876).

‡ *Emu*, III., p. 181 (1904).

GENUS — LOPHOLAIMUS.

- LOPHOLAIMUS Gray, App. List. Gen. B., p. 12 (1842) (also spelt
Lopholæmus and *Lopholæmus*) *L. antarctica*.
Lophorhynchus Swainson (not Vieillot, 1816), Classif. B., II., p. 348
(1837) (also spelt *Lophorhynchus*) *L. antarctica*.

THIS monotypic genus differs from the allied genera in having a full, soft occipital crest. The soft basal portion of the bill is rather swollen as far as the beginning of the hard anterior part of the beak, and covered with elongate narrow soft feathers. Feathers of hind-neck and chest with double incisions at the tip, so that they resemble a trident. Metatarsus thickly covered with feathers, toes bare. Tail of fourteen rectrices. First primary not abruptly attenuated.

DISTRIBUTION. Australia only.



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LOPHOLÆMUS ANTARCTICUS.
(TOPKNOT PIGEON).

LOPHOLAIMUS ANTARCTICUS.

TOP-KNOT PIGEON.

(PLATE 28.)

COLUMBA ANTARCTICA Shaw, Zool. of New Holland, Pl. 5 (1793), New Holland.

Columba antarctica Shaw, Zool. of New Holland, Pl. 5 (1793).

Columba dilopha Temminck, Trans. Linn. Soc., XIII., p. 124 (1821); *id.*, Pl. Col. pl. 162 (Oct., 1822); Selby, Nat. Libr., Pigeons, V., p. 129, Pl. 10 (1835).

Lophorynchus dilophus Swainson, Classif. B., II., p. 348 (1837).

Lophorhynchus antarcticus Gray, List. Gen. B., p. 58 (1840).

Lopholaimus antarcticus Gould, B. Austr., V., Pl. 61 (1841); *id.*, Handb. B. Austr., II., p. 116 (1865); Ramsay, P.Z.S., p. 115 (1876); Masters, P.L.S., N.S.W., I., p. 58 (1876); Ramsay, *ib.*, p. 183; *id.*, Tab. List Austr. B., p. 18 (1888); North, Austr. Mus. Cat., No. 12, p. 271 (1889); *id.*, Rec. Austr. Mus., I., p. 117 (1891); *id.*, P.L.S., N.S.W. (2), V., p. 881 (1891).

Lopholæmus antarctica Bonaparte, Compt. Rend., XXXIX., p. 1103 (1854).

Lopholæmus antarcticus Bonaparte, Compt. Rend., XL., p. 218 (1855).

Muscadivora antarctica Schlegel, De Dierent., p. 210 (1864).

Stictænas antarctica Schlegel, Mus. P.-B. IV., Columbæ, p. 74 (1873).

Lopholæmus antarcticus Salvadori, Cat. B. Brit. Mus., XXI., p. 235 (1893); North, B. County Cumberland, p. 105 (1898); Campbell, Nests and Eggs Austr. B., p. 671 (1901); Hall, Key B. Austr., p. 70 (1906); Mathews, Handl. B. Austral., p. 9 (1908); Littler, Handb. B. Tasmania, p. 102 (1910).

DISTRIBUTION. Cape York to Tasmania; accidental in the latter island.

Adult male. General colour both above and below grey, being much paler on the latter; all the feathers with silky white down-like bases; wings and back pale slate-grey, somewhat lighter on the lower-back, rump and upper tail-coverts; bastard-wing, primary-coverts and quills black, the innermost secondaries like the back, somewhat darker on the inner webs; tail black, grey at the base and crossed by a buff band near the tip; frontal crest grey, occipital portion chestnut, some of the lateral feathers black; feathers of the breast, hind-neck and upper-mantle trifurcated, showing black on the middle portion, more particularly on the upper-mantle, where it imparts a more or less streaked appearance; remainder of under-surface, including the under wing-coverts and axillaries pale ashy-grey; "Bill rose-red, inclining to lilac at the tip, fleshy part covering the nostrils and base of lower mandible greenish-lead colour; iris fiery orange, bare space round the eyes red; feet purplish-red, back of tarsus and soles of feet greyish-brown" (J. Gould). Total length, 460 mm.; culmen, exposed portion, 14; wing, 283; tail, 172; tarsus 29.

THE BIRDS OF AUSTRALIA.

Adult female. Scarcely different from the male. "Bill vermilion, base slate-colour; iris clear yellowish, with brownish stains round the pupil surrounded by orange; feet pinkish-purple" (Dr. Clelland). Total length, 407 mm.; culmen, 14; wing, 265; tail, 170; tarsus, 25.

Nest. "A platform of fairly stout twigs placed in a tall tree. Dimensions, 8 to 10 inches across by about 3 inches in thickness" (Campbell).

Eggs. Clutch, one; elliptical in form, sometimes with the ends peculiarly pointed, especially the smaller; texture of shell somewhat granular; surface glossy; colour, pearly white. Dimension in inches, 1.76 to 1.64 by 1.21 to 1.16" (Campbell).

Breeding season. October to December (Littler).

GOULD* says: "So entirely arboreal are its habits that I never once saw it descend to the ground, or even to the low shrub-like trees. It is strictly gregarious, often traversing the forests in flocks of many hundreds in search of those trees most laden with its favourite fruit; upon discovering which, the entire flock alight simultaneously, often bearing down the smaller twigs and branches with their weight."

Mr. North† writes: "Common from April to September in palm scrubs about the Hawkesbury River, Clifton and Bulli. In some seasons the 'Flock Pigeon,' as it is locally called, is unusually abundant. Feeds upon the seeds of the Bungalow Palm and the Lilli-pilly. It has been obtained as far inland as Penrith. Not known to breed in the county."

The bird figured and described is a male from the Richmond River, New South Wales, collected in December of 1889. The female was given me by Dr. Clelland, who obtained it on the Hawkesbury River in November, 1909.

LOPHOLAIMUS ANTARCTICUS MINOR, subsp. nov.

DIFFERS from typical *L. antarcticus*, in having the band on the tail much narrower than it is on birds from South Queensland and New South Wales; and the wing-measurement much less, viz., 252 mm. Habitat Cape York to Mackay, Queensland. Type No. 6116 in my own collection.

At the last moment I have included this new subspecies which I received in a collection from North Queensland, two days before going to press. The synonymy of this bird will be taken from the previous species that refer to birds collected in the above locality.

* *Handb. B. Austr.*, II., p. 117 (1865).

† *B. County Cumberland*, p. 105 (1898).

FAMILY—COLUMBIDÆ.

GENUS—COLUMBA.

- COLUMBA Linné, Syst. Nat., Ed. X., I., p. 162 (1758) .. *C. livia*.
Palumbis Forster, Syn. Cat. Brit. B., p. 55 (1817) .. *C. palumbus*.
Palumbus Kaup., Natürl. Syst., p. 107 (1829) *C. palumbus*.
Alsocomus (Tickell) Blyth, J.A.S.B., XI., p. 461 (1842) .. *C. punicea*.
Dendrotreron Hodgson, in Gray's Zool. Misc., p. 85 (1844) *C. hodgsoni*.
Patagiænas Reichenbach, Av. Syst. Nat., p. XXV. (1852)
 (also spelt *Patagiænas*) *C. leucocephala*.
Lepidænas, *id.*, *ib.* (also spelt *Lepidænas*) *C. speciosa*.
Lithænas, *id.*, *ib.* *C. livia*.
Tæniænas, *id.*, *ib.* (also spelt *Tæniænas*) *C. albitorques*.
Chlorænas, *id.*, *ib.* (also spelt *Chlorænas*) *C. fasciata*.
Stictænas, *id.*, *ib.* (also spelt *Strictænas* and *Stictænas*) .. *C. arquatrix*.
Janthænas, *id.*, *ib.* (also spelt *Janthænas*) *C. ianthina*.
Picazurus (Chenu and Des Murs, 1853), *cf.* Chenu, Enc.
 d'Hist. Nat. Ois., VI., p. 39 (1854) *C. picazuro*.
Leucomelæna Bonaparte, Compt. Rend., XXXIX., p. 1104
 (1854) (also spelt *Leucomelæna* and *Leucomelaina*) .. *C. norfolciensis*.
Trocaza, *id.*, *ib.*, p. 1104 *C. trocaz*.
Palumbæna, *id.*, *ib.*, p. 1106 *C. ænas*.
Crossophthalmus, *id.*, *ib.*, p. 1110 *C. gymnophthalma*.
Leucotænia Reichenbach, Tauben, II., p. 167 (1862) .. *C. uncinata*.
Dendrophaps (Bonaparte 1854), *cf.* Gray, Handl. B., II.,
 p. 233 (1870).
Rupicola Bogdanow, Consp. Av. Imp. Ross., p. 1 (1884) *C. livia*.
Sylvicola, *id.* (not Eyton), *ib.*, p. 3.
Cælotreron Heine, Nomencl. Mus. Hein. Orn., p. 275 (1886).

THE hind-toe is the only one which has the skin of the sole somewhat expanded on the sides. The nostrils are linear and quite or nearly parallel to the edges of the tomia or upper mandible. The bill is straight at the base, somewhat compressed, the point deflexed, but not hooked. Metatarsus rather short, feathered only on its uppermost part. Wings long and pointed, the first primary not abruptly attenuated and longer than the sixth, the second generally longest, but sometimes the second and third, or the first and second. Tail not longer than the wing, with twelve rectrices, nearly even, or rounded, but not graduated.

This genus, as limited by Count Salvadori (*Cat. B. Brit. Mus.*, Vol. XXI.), and generally accepted, contains more than seventy forms, some of which are, however, only slightly differentiated geographical races.

The genus is distributed over nearly the whole surface of the earth, but only one species occurs in Australia.

COLUMBA NORFOLCIENSIS.

WHITE-HEADED FRUIT-PIGEON.

(PLATE 29.)*

- COLUMBA NORFOLCIENSIS, Latham, Ind. Orn. Suppl., p. LX. (1801), Norfolk Island.
 (This locality is probably wrong. We may accept the mainland as the correct locality.)
- Norfolk Pigeon Latham, Gen. Syn. Suppl., II., p. 374 (1801); *id.*, Gen. Hist. B., VIII., p. 30 (1823).
- Columba norfolciensis* Latham, Ind. Orn. Suppl., p. LX. (1801); Robinson and Laverock, Ibis, p. 647 (1900); Thienemann, Fortpflanz. ges. Vögel, p. 66 (1846), egg.
- Columba leucomela* Temminck, Trans. Linn. Soc., XIII., London, p. 126 (1821); *id.*, Pl. col. 186 (1823). Salvadori, Cat. B. Brit. Mus., XXI., p. 320 (1893); North, B. County Cumberland, p. 105 (1898); Campbell, Nests and Eggs Austr. B., p. 672 (1901); Hall, Key B. Austr., p. 70 (1906); Mathews, Handl. B. Austral., p. 9 (1908).
- Columba leucomelana* Wagler, Syst. Av. Columba, sp. 56 (1827).
- Carpophaga leucomela* Gould, B. Austr. V., Pl. 59 (1848); Diggles, Handb. B. Austr., Pl. 89 (1877).
- Carpophaga norfolciensis* Gray, List Spec. Birds in Brit. Mus., Part iii., p. 5 (1844); Ramsay, Tab. List Austr. B., p. 18 (1888); Le Souëf, Vict. Nat., XIV., p. 100 (1897)
- Alscomus (alscomus) leucomelas* Blyth, Cat. B. Mus. A.S.B., p. 233 (1849).
- Leucomelæna norfolciensis* Bonaparte, Compt. Rend., XXXIX., p. 1104 (1854); Gould, Handb. B. Austr., II., p. 112 (1865); Masters, P.L.S., N.S.W., I., p. 58 (1876); Ramsay, P.L.S., N.S.W., I., p. 182 (1876).
- Leucomelæna norfolciensis*, *id.*, Compt. Rend., XXXIX., p. 1104 (1854).
- Leucomelaina norfolciensis* Reichenbach, Tauben, p. 53 (1862).
- Myristicivora norfolciensis*, *id.*, *ib.*, p. 200.
- Muscadivora leucomelana* Schlegel, De Dierent., p. 210 (1864).

DISTRIBUTION. Queensland; New South Wales.

Adult male. Head and neck all round, as well as the greater portion of the under-parts, cream-colour with a pinkish-metallic gloss; throat and cheeks pure white; lower flanks dark slate-colour; entire back and wings black with coppery-green margins which have purple reflections; bastard-wing, primary-coverts, and quills black like the tail; under wing-coverts blackish, as also the under tail-coverts, the latter with coppery reflections; "Bill and feet red; iris yellowish; bare space round the eye red" (E. Olive). Total length, 406 mm.; culmen, 22; wing, 240; tail, 140; tarsus, 26.

Adult female. Similar to the male.

* The Plate is lettered *Columba leucomela*.



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$\frac{1}{2}$
COLUMBA LEUCOMELA.
(WHITE-HEADED FRUIT-PIGEON).

WHITE-HEADED FRUIT-PIGEON.

Immature female. Differs from the adult in being darker, with fine dusky vermiculations on the head, neck and under-surface, but with the same coppery reflections on the upper-surface.

Nest. "The usual flat and frail structure of twigs, three or four inches across" (Campbell).

Eggs. "Clutch, one to two, but mostly one; elliptical in shape, sharply nipped off at one end; texture comparatively fine; surface glossy; colour, white. Dimensions in inches 1.4 to 1.39 by .94 to .96" (Campbell).

Breeding season. October to February (Ramsay).

WHEN writing of the way in which this bird obtains its food from the fruit-bearing trees, Gould* says: "The slender branches are often borne down by its weight, particularly when it clings to the extreme end of the spray to obtain the best and ripest fruit; in this mode of clinging and in many of its actions it far more resembles the larger Honey-eaters and Parrots than the pigeons; the structure of its foot is beautifully adapted for the duties it is intended to perform.

"The powers of flight of this species are very great, its voluminous wings enabling it to pass from one part of the forest to another in a comparatively short space of time; hence flocks may frequently be observed passing over the tops of the trees, forsaking a locality they have exhausted of its supplies, and in search of another where food is more abundant."

Mr. Campbell† writes: "Their call is 'booh-booh,' the second 'booh' being scarcely audible except when the bird is near at hand."

The bird figured and described is a male from New South Wales, collected in January, 1890.

* *Handb. B. Austr.*, II., p. 113.

† *Nests and Eggs Austr. B.*, p. 673.

GENUS—MACROPYGIA.

MACROPYGIA Swainson, *Classif. B.*, II., p. 348 (1837) *M. phasianella*.

Coccyzura Hodgson, *J. As. Soc. Beng.*, XII., p. 937 (1843) (also
spelt *Coccyxura* and *Coccyzurus*) *M. tusalia*.

Tusalia, *id.*, *ib.*

DIFFERS at a glance from *Columba* in having a strongly graduated tail, the outer feathers of which are only half the length of the middle ones. The rectrices are rounded at the tip, and the tail is sometimes longer than the wing. The wings are long and the third primary is, as a rule, the longest. The first primary is not abruptly attenuated. Metatarsus very short, feathered on the uppermost portion only. The general colour is rufous-chestnut and cinnamon. About thirty species are generally recognized.

DISTRIBUTION. Australia eastwards to the New Hebrides, and westwards to the Himalaya Mountains.



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$\frac{1}{2}$
MACROPYGIA PHASIANELLA.
(*LARGE-TAILED PIGEON*).

MACROPYGIA PHASIANELLA.

PHEASANT PIGEON.

(PLATE 30.)

COLUMBA PHASIANELLA Temminck, Trans. Linn. Soc., London, XIII., p. 129 (1821), The interior, towards Port Jackson.

Columba phasianella Temminck, Trans. Linn. Soc., London, XIII., p. 129 (1821).

Macropygia phasianella Swainson, Classif. B., II., p. 349 (1837); Gould, B. Austr., V., Pl. 75 (1848); Bonaparte, Consp. Av., II., p. 56 (1854); Gould, Handb. B. Austr., II., p. 148 (1865); Ramsay, P.L.S., N.S.W., I., p. 184 (1876); *id.*, Tab. List Austr., B., p. 18 (1888); North, Rec. Austr. Mus., I., p. 117 (1891); Diggles, Handb. B. Austr., Pl. 93 (1877); Wardlaw-Ramsay, Ibis, p. 220 (1890); Salvadori, Cat. B. Brit. Mus., XXI., p. 349 (1893); North, B. County Cumberland, p. 106 (1898); Robinson and Laverock, Ibis, p. 647 (1900); Campbell, Nests and Eggs Austr. B., p. 674 (1901); Hall, Key B. Austr., p. 70 (1906); Mathews, Handl. B. Austral., p. 10 (1908); Ingram, Ibis, p. 461 (1908).

Turtur phasianellus Schlegel, De Dierent., p. 206 (1864).

DISTRIBUTION. Northern Territory; Queensland; New South Wales.

Adult male. General colour above and below rufous-chestnut, paler on the under-surface, with purple and green reflections on the hinder-neck and mantle; bastard-wing, primary-coverts and quills blackish-brown, the latter with rufous edgings; tail chestnut with indications of a blackish bar towards the tip on the three outer feathers, middle feathers with obsolete dark bars, scarcely visible; forehead paler rufous than the crown; chin buff; throat, sides of face, and chest dark cinnamon, becoming paler on the breast and rufous-chestnut on the flanks and under tail-coverts; under wing-coverts much darker chestnut; under-surface of tail pale rufous, some of the outer feathers marked with slate-grey. "Iris blue with an outer circle of scarlet, orbital skin bluish-lilac, feet pink-red" (J. Gould). "Iris deep yellow" (Ashby). Total length, 382 mm.; culmen, 24; wing, 197; tail, 187; tarsus, 22.

Adult female. Differs from the adult male, in its smaller size and paler coloration, the head chestnut, the lower hind-neck and upper back brown, minutely barred or dusted with rufous, the feathers of the wings and scapulars dark brown, everywhere margined with bright chestnut, the bastard-wing, primary-coverts and quills dark brown, edged with rufous; rump and upper tail-coverts bright chestnut; the tail similar but duller; chin and middle of upper throat buff; sides of face and sides of neck pale chestnut with narrow black bars, becoming deeper chestnut colour on the fore-neck and chest, and with the dark bars wider apart, the abdomen

THE BIRDS OF AUSTRALIA.

paler chestnut and the dark bars less defined. "Bill black; iris white; feet red" (E. Olive). Total length, 393 mm.; culmen, 23; wing, 173; tail, 180; tarsus, 22.

Immature male. Differs from the adult male in having the crown of the head bright chestnut; the feathers of the wings margined with bright rufous-chestnut; hind-neck, mantle, fore-neck and chest narrowly barred with rufous and black, more broadly on the breast; a buff streak below the eye; "Bill very dark slate-colour; iris chestnut; tarsus and feet dark magenta" (Schrader). Wing, 184 mm.

Immature female. Similar to the immature male described above. "Bill black; iris white; feet red" (E. Olive). Wing, 182 mm.

Nest. "A very primitive structure being simply a few sticks placed crosswise, without any cavity, and barely sufficient to retain the egg in position" (North).

Egg. Clutch, one. "A true ellipse in form, pure white, the texture of the shell being fine and slightly glossy; length, 1.35 by 0.97 inch" (North).

Breeding season. October to December (Ramsay), February (Meston).

GOULD* says: "It is a fine showy bird in a state of nature, and exhibits itself to great advantage when it rises from the ground to the trees. While traversing the brushes I frequently saw this bird busily engaged searching on the ground for fallen seeds and berries. Rarely were more than four or five seen at one time, and most frequently it occurred singly or in pairs. . . . it spends much of its time on the ground; and when flushed in the depths of the forest it merely flies to the branch of some low tree, and there remains with little appearance of fear. It spreads out its broad tail at the moment of alighting. Its note is loud, mournful and monotonous."

The bird figured is a male from Cairns, collected in December, 1889.

* *Handb. B. Austr.*, II., p. 148.

GENUS—GEOPELIA.

- GEOPELIA Swainson, *Classif. B.*, II., p. 348 (1837) (also spelt
Geopeleia) *G. striata*.
- Tomopeleia* Reichenbach, *Av. Syst. Nat.*, p. XXV. (1852) (also
 spelt *Tomopelia*).. .. . *G. maugei*.
- Stictopeleia*, *id.*, *ib.* (also spelt *Stictopelia*) *G. cuneata*.
- Erythauchæna* Bonaparte, *Compt. Rend.*, XL., p. 221 (1855)
 (also spelt *Erythrauchæna*) *G. humeralis*.
- Chrysauchæna*, *id.*, *Compt. Rend.*, XL., p. 210 (1855) *G. humeralis*.

BILL and feet essentially as in *Columba* and *Macropygia*, the metatarsus about as long as the middle toe and quite bare of feathers. The first primary is strongly attenuated at the tip and considerably shorter than the second and third. The tail is long and very strongly graduated. There are five species in this genus, of which three occur in Australia.

DISTRIBUTION. Australia to Burma.

Key to the Species.

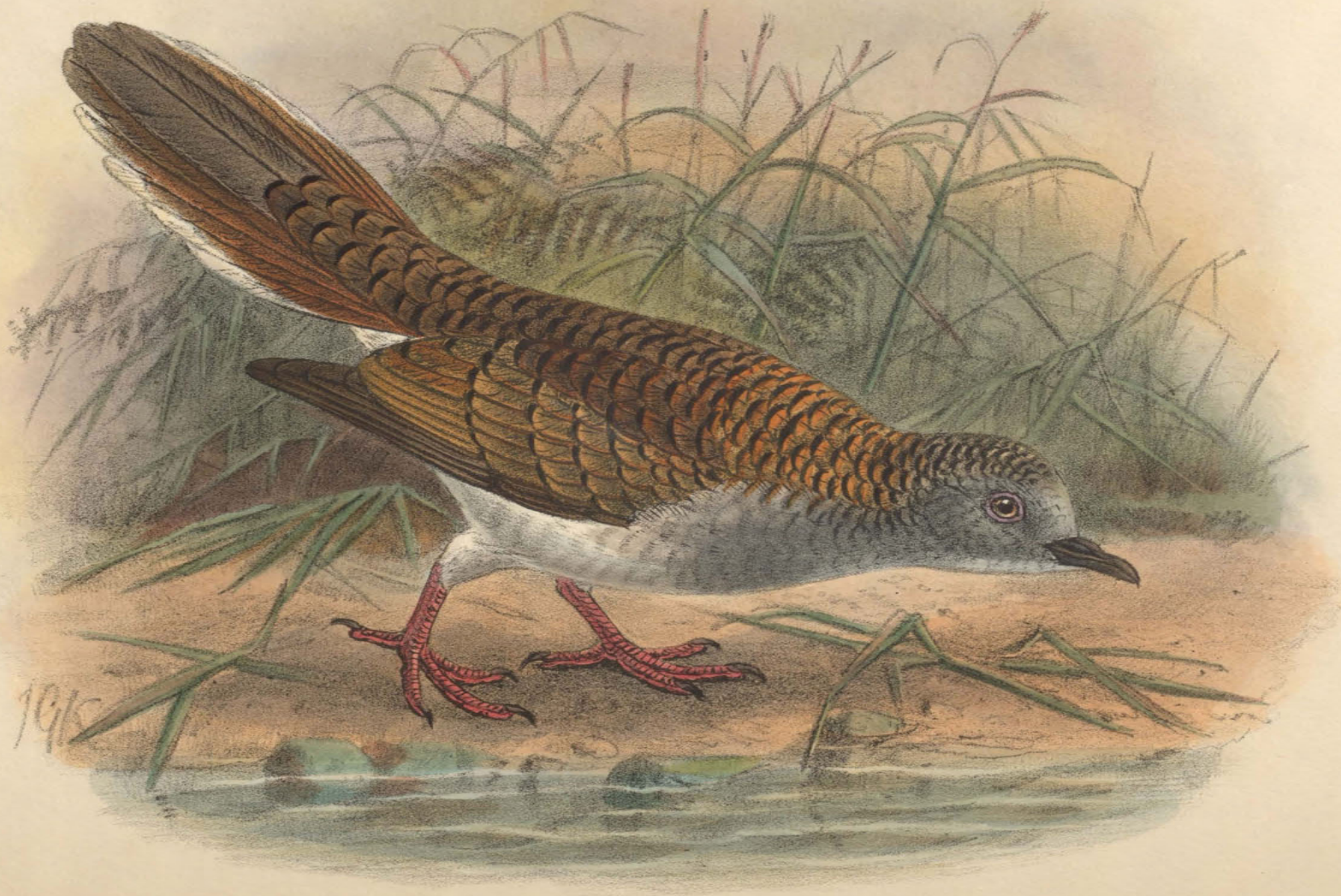
A. Upper-parts banded.

a'. Larger; fore-neck blue-grey without any bands.. *G. humeralis*, p. 131.

b'. Smaller; neck all round narrowly barred with
black and white *G. placida*, p. 133.

B. Upper-surface uniform without bands.

c'. Upper wing-coverts with small white spots .. *G. cuneata*, p. 135.



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3
GEOPELIA HUMERALIS.
(BARRED-SHOULDERED DOVE).

GEOPELIA HUMERALIS.

BARRED-SHOULDERED DOVE.

(PLATE 31.)

COLUMBA HUMERALIS Temminck, Trans. Linn. Soc., XIII., p. 128 (1821), Broad Sound, Queensland.

Columba humeralis Temminck, Trans. Linn. Soc., XIII., p. 128 (1821); *id.*, Pl. col. 191 (1823).

Columba erythrauchen Wagler, Syst. Av. Columba, sp. 98 (1827).

Peristera humeralis Boie, Isis, p. 327 (1828).

Geopelia humeralis Gray, Gen. B., II., p. 471 (1844); Gould, B. Austr., V., Pl. 72 (1848); Ramsay, P.L.S., N.S.W., I., p. 184 (1876); Forbes, P.Z.S., p. 126 (1878); Ramsay, Tab. List Austr. B., p. 18 (1888); Salvadori, Cat. B. Brit. Mus., XXI., p. 455 (1893); Campbell, Nests and Eggs Austr. B., p. 675 (1901); Oates, Cat. Birds' Eggs Brit. Mus., I., p. 100 (1901); Milligan, Rep. Kimb. Exp., p. 57 (1902); Le Souëf, Emu, II., p. 154 (1903); Hall, Emu, III., p. 42 (1903); Hartert, Nov. Zool., XII., p. 196 (1905); Hall, Key B. Austr., p. 70 (1906); Mathews, Handl. B. Austral., p. 10 (1908); Ingram, Ibis, p. 461 (1908); Mathews, Emu, IX., pp. 2, 53 (1909).

Erythrauchæna humeralis Bonaparte, Consp. Av., II., p. 93 (1855); Gould, Handb. B. Austr., II., p. 142 (1865); North, Austr. Mus. Cat., No. 12, p. 277 (1889).

Erythrauchæna humeralis Bonaparte, Compt. Rend., XL., p. 221 (1855).

Chrysauchæna humeralis Bonaparte, Compt. Rend., XL., p. 210 (1855).

Turtur humeralis Schlegel, De Dierent., p. 206 (1864).

Erythrauchæna humeralis Gray, Handl. B., II., p. 236 (1870).

Geopelia humilis (misprint) Garrod, P.Z.S., p. 256 (1874).

Erythrauchæna humeralis Campbell, Viet. Nat., IV., p. 185 (1888).

DISTRIBUTION. North-west Australia; Northern Territory; Queensland; New South Wales (South New Guinea).

Adult male. General colour above earth-brown, the feathers everywhere margined with black; occiput and hind-neck barred with grey and black; feathers of the lower hind-neck and mantle very pale cinnamon, edged with black; entire back and wings earth-brown, margined with black, being somewhat paler on the outer wing-coverts; bastard-wing almost entirely earth-grey, with scarcely any black margins; primary-coverts blackish, with chestnut on the inner webs; quills blackish on the outer webs and at the tips, inner webs chestnut; innermost secondaries like the back, with chestnut on the inner webs at the base; middle tail-feathers grey, next

THE BIRDS OF AUSTRALIA.

pair reddish-brown, the outer ones chestnut-brown, tipped with white; forehead, line behind the eye, and throat pale blue-grey, becoming darker on the lower throat, sides of neck and upper breast; lower breast, abdomen and under tail-coverts white, more or less tinged with pink, especially on the breast; under wing-coverts cinnamon-rufous, including the quill lining, the latter tipped with brown. "Bill dull blue, iris pale yellow, bare skin round the eyes dull purple; tarsus pinkish red, feet darker" (J. P. Rogers). Total length, 300 mm.; culmen, 22; wing, 142; tail, 132; tarsus, 23.

Adult female. Similar to the adult male with respect to the plumage, but smaller. Total length, 295 mm.; culmen, 18; wing, 131; tail, 122; tarsus, 21.

Immature female. Differs from the adult female in being much more barred on the upper-surface; crown of head almost entirely covered with narrow barrings; the median and greater coverts tipped with white, forming a more or less double wing-bar; innermost secondaries narrowly tipped with white; the blue-grey feathers of the chest more or less tinged with pink.

I notice that this species varies more or less in the colour of the plumage, for two adult birds also from North-western Australia are somewhat paler than the specimen described.

Nest. "A loose, light structure or platform, three to four inches in diameter, composed of twigs, portions of climbing plants, and sometimes grass. Usually situated in a low tree or thick bush in scrub" (Campbell).

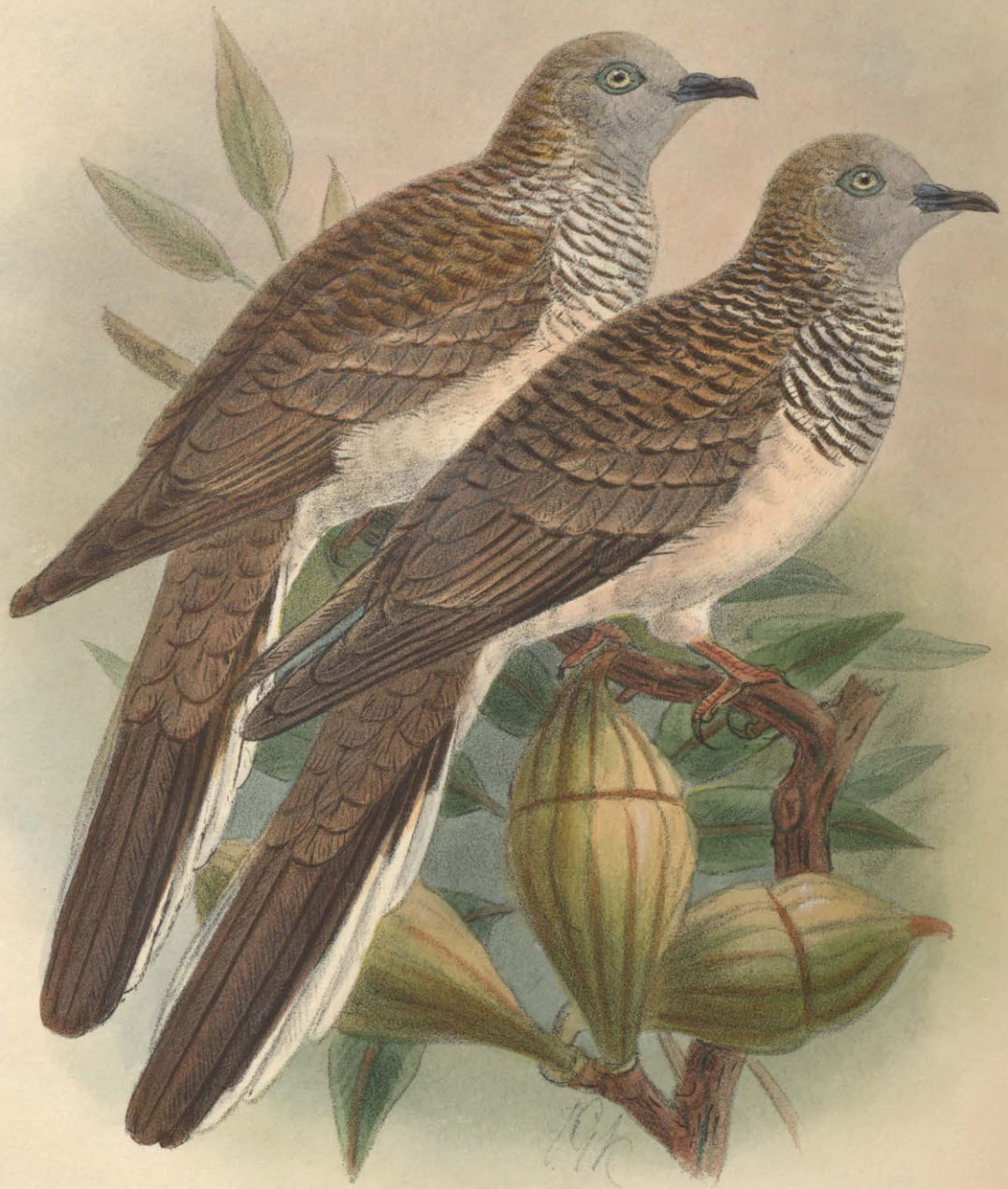
Eggs. Clutch, two: a clutch collected on the Dawson River, North Queensland, are pure white, smooth and glossy. Axis, 26-28 mm.; diameter, 21.

Breeding season. August to March (Campbell).

GILBERT* says: "This Dove is extremely abundant, inhabiting thickets, swampy grounds, and the banks of running streams. It mostly feeds on the seeds of various kinds of grasses, but when the country becomes burnt it finds an abundant supply of berries in the thickets. It may often be seen among the mangroves in flocks of several hundreds, and hence its colonial name of Mangrove Dove. It was equally numerous during the whole period of my stay in that part of the country. [Port Essington, Northern Territory.] Any number of specimens may be readily procured, for when disturbed the bird merely flits from branch to branch, or, if in an open part of the country, to the nearest tree. I did not observe it take anything approaching a sustained flight. Its most common note is a rather loud *coo-coo*, occasionally uttered at long intervals; during the pairing season the note becomes of a softer tone, and is more rapidly repeated, and its actions very much resemble those of the Common Dove of Europe. It breeds in August."

The bird figured and described is a male, collected by Mr. J. P. Rogers at Parry's Creek, Wyndham, North-west Australia, in September of 1908.

* Gould's *Handb. B. Austr.*, II., p. 142.



J. G. Keulemans, del.

Witherby & Co.

†
GEOPELIA PLACIDA.
(PEACEFUL DOVE).

GEOPELIA PLACIDA.

GROUND DOVE.

(PLATE 32.)

GEOPELIA PLACIDA Gould, P.Z.S., p. 55 (1844), Port Essington, Northern Territory.

Geopelia placida Gould, P.Z.S., p. 55 (1844); Bonaparte, Consp. Av., II., p. 95 (1854); Gould, Handb. B. Austr., II., p. 145 (1865); Ramsay, P.L.S., N.S.W., I., p. 184 (1876); *id.*, Tab. List Austr. B., p. 18 (1888); Hartert, Nov. Zool., XII., p. 196 (1905); Mathews, Handl. B. Austral., p. 10 (1908).

Geopelia tranquilla Gould, P.Z.S., p. 56 (1844) (Liverpool Plains, New South Wales); *id.*, B. Austr., V., Pl. 73 (1848); Sturt, Narr. Exp. Centr. Austr., App., p. 45 (1849); Bonaparte, Consp. Av., p. 94 (1854); Gould, Handb. B. Austr., II., p. 144 (1865); Ramsay, P.Z.S., p. 387 (1868); Diggles, Handb. B. Austr., Pl. 92 (1877); Forbes, P.Z.S., p. 126 (1878); Ramsay, P.L.S., N.S.W., VII., p. 54 (1882); *id.*, Tab. List Austr. B., p. 18 (1888); North, Austr. Mus. Cat., No. 12, p. 278 (1889); Salvadori, Cat. B. Brit. Mus., XXI., p. 456 (1893); North, B. County Cumberland, p. 106 (1898); Campbell, Nests and Eggs Austr. B., p. 676 (1901); Hall, Emu, II., p. 61 (1902); Le Souëf, Emu, II., p. 154 (1903); Hall, Key B. Austr., p. 71 (1906); Berney, Emu, VI., p. 46 (1906); Ingram, Ibis, p. 390 (1907).

DISTRIBUTION. Australia generally.

Adult male (New South Wales). Upper-surface barred everywhere with black, white and grey; forehead and throat pale blue-grey; hinder crown and nape earth-brown, narrowly barred with blackish; neck all round narrowly barred with black and white, each feather having two black bars and three white ones; the hind-neck darker and more like the back; entire back and wings earth-brown, barred with black, paler on the outer coverts; bastard-wing and primary-coverts blackish; quills brown, paler on the outer edges and on the inner webs towards the base; innermost secondaries like the back; middle tail-feathers grey, the next two pairs blackish-brown; the outer feathers for the most part black, tipped with white; the outermost black, margined on the outer web, and broadly tipped with white; breast and sides of body with a pinkish tinge; abdomen and under tail-coverts white; axillaries and under wing-coverts deep chestnut; a patch of white at the base of the secondary-quills below; quills below, brown, inner webs inclining to rufous. Bill black, base bluish-black; iris white; bare space round the eyes bluish-green; tarsi and feet flesh-colour. Total length, 210 mm.; culmen, 15; wing, 104; tail, 88; tarsus, 17.

Adult female. Similar in every respect to the adult male both in the colour of its plumage and in measurements.

THE BIRDS OF AUSTRALIA.

Two specimens from the Coongan River, North-west Australia, are everywhere paler, but the measurements are the same. I do not, however, attach much importance to this, as an example collected at Alexandria in the Northern Territory, by the late W. Stalker, is identical in coloration with others from New South Wales.

Nest. "A small, slight platform, about two or three inches in diameter, composed of twigs and rootlets, or just sufficient materials to ensure the safety of the contents. Usually placed on a horizontal limb of a tree, where branches or suckers shoot, often overhanging a stream" (Campbell).

Eggs. Clutch, two: a clutch from the Dawson River, North Queensland, is pure white, smooth and glossy. Axis, 21-22 mm.; diameter, 15.

Breeding season. August to January, but practically all the year round.

STURT* says: "This bird also frequents the banks of the Darling and the Murray. . . . I first heard it on the marshes of the Macquarie, but could not see it. The fact is that it has the power of throwing its voice to a distance, and I mistook it for some time for the note of a large bird on the plains, and sent a man more than once with a gun to shoot it, without success."

Mr. H. L. White, writing from Scone, says: "I have lately noticed a peculiarity about the nesting habits of this Dove, of which two pairs have built in Peach trees in the orchard here. The orchard is surrounded by a very high hedge of *Schinus malle* (Pepper-tree): the birds have constructed their nests almost entirely of bunches of the bright red berries from this tree, and, as similar bunches have blown into many other fruit trees the two nests are very hard to distinguish. In both cases the bird sat on the nest for more than ten days before an egg was laid; the two eggs were laid on consecutive days, the birds then sitting very closely, and allowing one to approach quite near. The dates of laying were the 10th and 13th of October. One nest was 6 feet from ground; the other 7 ft. 6 in."

Mr. Charles Belcher tells me that this Dove very seldom comes south of the dividing range in Victoria, but in 1904 a pair were seen near the coast. He has observed small flocks of seven or eight individuals on the banks of the Goulburn River, near Wyuna.

Mr. Tom Carter says the species occurred sparingly in the dense scrub bordering the Gascoyne River in North-west Australia. He shot a specimen in January, 1901.

The birds figured were both females; the figure in the foreground is from New South Wales; the other, from the Coongan River, in North-west Australia, was shot in November, 1908.

* *Narr. Exp. Cent. Austr.*, II., App., p. 45.



J.G. Keulemans. del.

Witherby & Co

†
GEOPELIA CUNEATA.
(LITTLE DOVE).

GEOPELIA CUNEATA.

LITTLE DOVE.

(PLATE 33.)

COLUMBA CUNEATA Latham, Ind. Orn. Suppl., p. LXI. (1801), New South Wales.

Grey-necked Pigeon Latham, Gen. Syn. Suppl., II., p. 375 (1801).

Columba cuneata Latham, Ind. Orn. Suppl., p. LXI. (1801).

Columba macquarie Quoy et Gaimard, Voy. de l'Uranie et la Phys., p. 122, Pl. 31 (1824).

Columba spiloptera Vigors, Zool. Journ., V., p. 275 (1830).

Geopelia cuneata Gray, List Spec. Birds in Brit. Mus., p. 11 (1844); Gould, B. Austr., V., Pl. 74 (1848); Sturt, Narr. Exp. Centr. Austr., App., p. 44 (1849); Ramsay, P.L.S., N.S.W., I., p. 184 (1876); Diggles, Handb. B. Austr., Pl. 92 (1877); Ramsay, P.L.S., N.S.W., VII., p. 54 (1882); Salvadori, Cat. B. Brit. Mus., XXI., p. 462 (1893); North, Horn Sc. Exp., II., p. 101 (1896); *id.*, B. County Cumberland, p. 106 (1898); Campbell, Nests and Eggs Austr. B., p. 678 (1901); Le Souëf, Emu, II., p. 154 (1903); Carter, Emu, III., p. 172 (1904); Hartert, Nov. Zool., XII., p. 196 (1905); Hall, Key B. Austr., p. 71 (1906); Ingram, Ibis, p. 390 (1907); Mathews, Handl. B. Austral., p. 10 (1908); *id.*, Emu, IX., p. 2 (1909).

Stictopelia cuneata Reichenbach, Syst. Av., p. XXV. (1852).

Stictopelia cuneata Bonaparte, Compt. Rend., XL., p. 221 (1855); Gould, Handb. B. Austr., II., p. 146 (1865); Ramsay, P.L.S., N.S.W. (2), I., p. 1095 (1887); North, Austr. Mus. Cat., No. 12, p. 279 (1889).

Turtur cuneatus Schlegel, De Dierent., p. 207 (1864).

Geopelia (Stictopelia) cuneata Ramsay, P.L.S., N.S.W., II., p. 194 (1876).

DISTRIBUTION. Australia generally.

Adult male. General colour above including the entire back and wings, pale brown, with small rounded spots of white on the wing-coverts and scapulars; bastard-wing brown; primary-coverts, and quills brown on the outer webs and tips, inner webs chestnut; secondaries grey, without any chestnut; middle tail-feathers grey, becoming blackish towards the tips and showing obsolete dark cross-bars for the entire length, the next pair blackish; the four outer pairs black at base, with long white tips; forehead and crown pale blue-grey like the chin and throat, becoming darker on the breast and under wing-coverts; axillaries and sides of body of the same colour, but paler; abdomen and under tail-coverts white; quill lining pale chestnut. Bill black; iris red; feet reddish-cream colour. Total length, 200 mm.; culmen, 15; wing, 95; tail, 101; tarsus, 15.

THE BIRDS OF AUSTRALIA.

Adult female. Differs from the male in having the sides of neck, fore-neck and chest pale brown, somewhat like the hind-neck. "Bill brown; iris light red; bare skin round the eye also red; tarsi flesh-white, feet white" (J. P. Rogers).

Nest. "A small, frail structure, usually composed of dry grass, including the flowering portions, and placed in the fork of a low or bushy tree" (Campbell).

Eggs. "Clutch, two; roundish in shape; texture of shell fine; surface glossy; pure white. Dimensions in inches of proper clutches .78 to .72 by .6 to .59" (Campbell).

Breeding season. Practically all the year round. May to September (Carter); January to March (Keartland).

Incubation-period. Length of incubation in captivity twelve days (Butler).

GOULD* says: "The Little Turtle-Dove is more frequently observed on the ground than among the grass; I sometimes met with it in small flocks, but more often in pairs. It runs over the ground with a short bobbing motion of the tail, and while feeding is so remarkably tame as almost to admit of its being taken by the hand, and if forced to take wing it merely flies to the nearest tree, and there remains motionless among the branches."

Gilbert† observes: "It utters a rather singular note, which at times very much resembles the distant crowing of a cock. The term *Men-na brun-ka* is applied to it by the natives [of Western Australia] from a traditionary idea that the bird originally introduced the *Men-na*, a kind of gum which exudes from a species of *Acacia*, and which is one of the favourite articles of food of the natives."

Mr. Keartland‡ remarks that: "These lovely little Doves were found all along the Fink River, and were particularly plentiful at Deering Creek, Darwent Creek, Reedy Hole and Heavitree Gap. During warm days they were fond of sheltering themselves beneath any shady bush, but in cool weather and in the morning and evening were seen in large numbers feeding on the ground or drinking at the water-holes. The sites selected for breeding were generally in *débris* in the low shrubs near water, where the birds either hollowed the surface slightly or added a few pieces of grass to keep the eggs from rolling off."

Mr. Rogers, writing from Wyndham, North-west Australia, says: "On the night of August the 21st about 9 o'clock I flushed this bird from the grass. I saw by the light which I was carrying that it belonged to this species. Again on September the 29th, at very early dawn, I flushed another example from the ground, where it had apparently roosted all night. There were several trees close by."

* *Handb. B. Austr.*, II., p. 146.

† In Gould's *Handb. B. Austr.*, II., p. 147.

‡ *Horn Sc. Exp.*, II., p. 102.

LITTLE DOVE.

Mr. Tom Carter says this species is common about the Gascoyne district, in North-west Australia, and northwards. Great numbers congregate round the water-holes in the summer months. The nest is usually placed in a bush three or four feet from the ground.

Of the birds figured and described the male was collected by Mr. F. Lawson Whitlock at Poondon Soak, in North-west Australia, and was given to me by Mr. H. L. White* of Scone, and the female by Mr. J. P. Rogers at Parry's Creek.

* Mr. White also gave me the *G. placida* figured in the background on Plate 32.

“GEOPELIA SHORTRIDGEI.”

GEOPELIA SHORTRIDGEI Ogilvie-Grant, Bull. B.O.C., XXIII., p. 73 (1909), Carnarvon, Western Australia.

Geopelia shortridgei Ogilvie-Grant, Bull. B.O.C., XXIII., p. 73 (1909); Mathews, Emu, IX., p. 92 (1909); Ogilvie-Grant, Ibis, p. 189 (1910).

THE following are Mr. Ogilvie-Grant's remarks on this supposed species, which I believe to be a hybrid:—

“*Adult male.* Most nearly allied to *G. tranquilla*, Gould, but smaller. It resembles that species in the general coloration of the under-parts and in having the fore-neck and chest narrowly barred with black. The forehead and crown are grey, the occiput rufous, the feathers of the back and wings largely washed with the same rufous colour; most of the inner wing-coverts and scapulars have a more or less irregular whitish or buff spot near the extremity of either web, and the upper tail-coverts are brownish-grey, without dusky terminal bars. From *G. cuneata* (Lath.), which the present species resembles in its smaller size, it may be at once distinguished by the transverse blackish lines on the fore-neck and chest and by the pinkish wash on the breast. It further somewhat resembles that species in the light spotting on the wing-coverts and scapulars.

“The under wing-coverts as well as the inner webs of the quills are mostly rufous-chestnut, the former being characteristic of *G. tranquilla*; the latter of *G. cuneata*, which has the under wing-coverts grey. Iris pale yellow; orbital skin dull orange; bill dark slate tinged with magenta; legs flesh-colour, feet pink, claws light slate-colour. Total length 8.0 inches; wing (imperfect) ca. 4.0; tail 4.1, tarsus 0.6.

“Hab. Carnarvon, W. Australia.

“Obs. As will be seen from reading the description, this bird is intermediate in many respects between *G. tranquilla* and *G. cuneata*, and may prove to be a hybrid between those two species.”

GENUS—CHALCOPHAPS.

- CHALCOPHAPS Gould, B. Austr., V., Pl. 62 (1843) (also spelt
Calcophaps) *C. chrysochlora*.
Peristera (not Swainson) Lesson, Tr. d'Orn., p. 471 (1831). .. *C. indica*.
Monornis Hodgson, in Gray's Zool. Misc., p. 85 (1844) .. *C. indica*.

THIS genus, together with the genera *Phaps*, *Histriophaps*, *Petrophassa*, *Geophaps*, *Lophophaps*, and *Ocyphaps*, belongs to the subfamily *Phabinae*, the members of which have metallic blue or green spots on the wings, or the upper wing-coverts entirely metallic golden-green, as in *Chalcophaps*. The nostrils and feet resemble those of *Columba*, the metatarsus being quite bare and slightly longer than the middle toe. The first primary is normal, not attenuated at the tip, and only a little shorter than the second and third, which are about equal and longest. The tail is short, considerably shorter than the wings, and very slightly rounded. Number of rectrices, 12.

DISTRIBUTION. Australia to India; also Lord Howe Island and the New Hebrides.

Key to the Species.

- A. Head and hind-neck vinous ; wings green with slight
coppery reflections.
- a'*. Shoulder-patch with only a line of white feathers ;
upper tail-coverts black *C. chrysochlora* ♂ p. 141.
 - b'*. Pale line on shoulder-patch grey ; upper tail-
coverts brown *C. chrysochlora* ♀ p. 141.
- B. Head and hind-neck lilac ; wings green with very
strong coppery reflections.
- c'*. A large white shoulder-patch ; upper tail-coverts
slate-colour *C. longirostris* ♂ p. 143.
 - d'*. Pale line on shoulder-patch white ; upper tail-
coverts brown *C. longirostris* ♀ p. 143.



J G Keulemans, del

Witherby & Co

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CHALCOPHAPS CHRYSOCHLORA.
(LITTLE GREEN PIGEON).

CHALCOPHAPS CHRYSOCHLORA CHRYSOCHLORA.

LITTLE GREEN PIGEON.

(PLATE 34.)

COLUMBA CHRYSOCHLORA Wagler, Syst. Av., sp. 79 (1827), Australia.*Columba jaranica* (misprint) Temminck et Knip, (not Gm.), Fig. fam. 2, Pl. 26 (1808).*Columba chrysochlora* Wagler, Syst. Av., sp. 79 (1827), excl. syn.*Chalcophaps chrysochlora* Gould, B. Austr., V., Pl. 62 (1843); Bonaparte, Consp. Av., II., p. 92 (1855); Gould, Handb. B. Austr., II., p. 118 (1865); Ramsay, P.L.S., N.S.W., I., p. 183 (1876); Diggles, Handb. B. Austr., Pl. 90 (1877); Ramsay, Tab. List Austr. B., p. 18 (1888); Campbell, Vict. Nat., IV., p. 185 (1888); Etheridge, Lord Howe Island, p. 10 (1889); North, Austr. Mus. Cat., No. 12, pp. 271, 373 (1889); Salvadori, Cat. B. Brit. Mus., XXI., p. 511 (1893); North, B. County Cumberland, p. 105 (1898); Robinson and Laverock, Ibis, p. 648 (1900); Campbell, Nests and Eggs Austr. B., p. 679 (1901); Oates, Cat. Birds' Eggs Brit. Mus., I., p. 103 (1901); Hall, Key B. Austr., p. 71 (1906); Mathews, Handl. B. Austral., p. 10 (1908).*Peristera chrysochlora* Finsch, Neu-Guinea, p. 179 (1865).

DISTRIBUTION. Victoria; New South Wales; Queensland; Lord Howe Island.

Adult male. Head, hind-neck, sides of the neck, and mantle dark vinous somewhat darker on the nape and hind-neck; wings and inter-scapular region green, with coppery reflections; some of the lesser wing-coverts edged with white, forming a band; bastard-wing and primary-coverts black; quills dark brown, with chestnut on the inner webs; back, rump, and upper tail-coverts greenish-black, with indistinct metallic bars, in certain lights, and grey bands across the rump, the long upper tail-coverts paler towards the base; outer tail-feathers grey, with a subapical black band, remainder of the tail bronzy-brown; sides of the face, chin, throat, and fore-neck vinous, becoming paler on the abdomen and sides of the body; vent and under tail-coverts slate-grey, longer ones blackish; under wing-coverts and the greater part of the quill lining chestnut; "Bill red, base greyish blue; iris brown, orbits grey; feet dull red" (E. Olive). Total length, 240 mm.; culmen, 22; wing, 153; tail, 89; tarsus, 27.*Adult female.* Differs from the adult male in having the head and hind-neck paler vinous; wing-bar grey, instead of white; upper tail-coverts brown, with dark edges to the feathers; chin, throat and under-surface rust-brown; under tail-coverts reddish-brown, with dark edges. Total length, 233 mm.; culmen, 22; wing, 147; tail, 79; tarsus, 22.

THE BIRDS OF AUSTRALIA.

Young male. Distinguished from the adult by having a paler forehead, darker hind-neck, and the feathers of the head blackish, tipped with rufous; only median wing-coverts green, primary-coverts chestnut, most of the quills tipped with the same colour, feathers on the sides of the neck and breast blackish, margined with chestnut, giving a barred appearance, which is much less pronounced on the abdomen.

Nest. "A frail, flat structure of twigs; placed in a low tree" (Campbell).

Eggs. Clutch, two. A clutch from the Dawson River, North Queensland, are smooth and slightly glossy. Pale cream colour. Axis, 25-26 mm.; diameter, 29.

Breeding season. October to January (Ramsay).

AFTER comparing a series of skins of *Chalcophaps* from the islands north of Australia, I find that the Australian bird is distinct.

Gould* says: "When flushed, it flies very quickly through the scrub, but to no great distance, and readily eludes pursuit by pitching suddenly to the ground, and remaining so quiet that it can rarely be discovered."

Of the birds figured and described the male was collected near Cairns, North Queensland, in July, 1889, and the female in about the same place on May 27th, 1905.

* *Handb. B. Aust.*, II., p. 118.

CHALCOPHAPS CHRYSOCHLORA LONGIROSTRIS.

LONG-BILLED GREEN PIGEON.

CHALCOPHAPS LONGIROSTRIS Gould, B. Austr., Intr., p. LXIX., sp. 424 (1848), Port Essington.

Chalcophaps longirostris Gould, B. Austr., Intr., p. LXIX., sp. 424 (1848); Bonaparte, Consp. Av., II., p. 92 (1855); Gould, Handb. B. Austr., II., p. 119 (1865); Ramsay, P.L.S., N.S.W., I., p. 183 (1876); Diggles, Handb. B. Austr., p. opp. Pl. 90 (1877); Masters, P.L.S., N.S.W., II., p. 275 (1877); Ramsay, Tab. List Austr. B., p. 18 (Note) (1888).

Chalcophaps chrysochlora chrysochlora (not Wagler) Hartert, Nov. Zool., XII., p. 196 (1905).
Chalcophaps occidentalis North, Vict. Nat., XXIV., p. 135 (1907).

DISTRIBUTION. Northern Territory.

Adult male. Head, hind-neck, sides of the neck and mantle lilac, somewhat darker on the hinder part of the head; wings and inter-scapular region green, with very strong coppery reflections; a large white patch on the shoulder, which occupies the greater portion of the lesser wing-coverts; bastard-wing and primary-coverts black; quills dark brown on the margins of the outer webs, chestnut on the inner ones, the latter colour encroaching on both webs at the base of the inner primaries and secondary quills; lower back blackish, with minute bronze bars on some of the feathers and crossed by a grey band; tail for the most part black, the two outer pairs of feathers on each side grey, with a wide subterminal black band; chin and throat vinous, becoming paler on the breast and abdomen; vent and short under tail-coverts slate-colour, the longer ones black; lower aspect of the tail-feathers black, with pale tips; under wing-coverts and quill lining pale chestnut. "Bill red; iris brown; tarsi and feet pink" (J. T. Tunney). Total length, 260 mm.; culmen, 26; wing, 158; tail, 86; tarsus, 23.

Adult female. Distinguished from the male by the darker lilac-colour of the head and hind-neck, much smaller white shoulder-patch, and brown upper tail-coverts. Total length, 260 mm.; culmen, 25; wing, 156; tail, 84.

THE type of *Chalcophaps occidentalis* was given to me by Mr. Edwin Ashby, and I find it to be identical with Gould's *Chalcophaps longirostris*. Both types are from the Northern Territory.

The birds described are Mr. North's types of *C. occidentalis*.

GENUS—PHAPS.

PHAPS Selby, Nat. Libr., Pigeons, p. 194 (1835) *P. chalcoptera*.

Peristera (not Boie) Swainson, Class B., II., p. 349 (1837).

Cosmopelia Sundevall, Methodi Naturales Avium Disponendarum
Tentamen, p. 100 (1873) *P. elegans*.

STRUCTURALLY hardly different from *Chalcophaps*, except as regards the tail, which has *sixteen* rectrices, and is much more rounded. The metatarsus is comparatively a little shorter. In the pattern of coloration the members of this genus differ from *Chalcophaps* in having some shining bright metallic spots on the wings, and in the absence of the dark bands across the rump.

DISTRIBUTION. Australia and Tasmania. (Two species only.)

Key to the Species.

A. Throat chestnut; breast grey; under wing-coverts and axillaries chestnut.

a'. Hind-neck and mantle chestnut, in contrast with the back

P. elegans ♂ p. 149.

b'. Hind-neck and mantle olive-brown like the back..

P. elegans ♀ p. 149.

B. Throat white; breast vinous; under wing-coverts and axillaries cinnamon.

c'. Sides of neck blue-grey, in contrast to the back..

P. chalcoptera ♂ p. 146.

d'. Sides of neck olive-grey, like the back

P. chalcoptera ♀ p. 146.

PHAPS CHALCOPTERA.

BRONZE-WINGED PIGEON.

(PLATE 35.)

COLUMBA CHALCOPTERA Latham, Ind. Orn., II., p. 604 (1790), Norfolk Island.

(This locality is no doubt wrong. We may accept the mainland of Australia as correct.)

Bronze-winged Pigeon Phillip, Voy. Bot. Bay, p. 162, Pl. 26 (1789); Latham, Gen. Syn. Suppl. II., p. 266 (1801).

Golden-winged Pigeon White, Voy. N.S. Wales, Pl. 8 (1790).

Columba chalcoptera Latham, Ind. Orn., II., p. 604 (1790); Temminck et Knip, Fig. fam. 2, Pl. 8 (1811); *id.*, Fig. et Gall., I., p. 103 (1813); Field, Geogr. Mem. N.S.W., p. 503 (1825).*Phaps chalcoptera* Selby, Nat. Libr., Pigeons, p. 195, Pl. 21 (1835); Sturt, Narr. Exp. Centr. Austr., App., p. 41 (1849); Bonaparte, Consp. Av., II., p. 90 (1855); Gould, Handb. B. Austr., II., p. 122 (1865); Ramsay, P.L.S., N.S.W., I., p. 183 (1876); Diggles, Handb. B. Austr., Pl. 91 (1877); Ramsay, Tab. List Austr. B., p. 18 (1888); North, Austr. Mus. Cat., No. 12, p. 273 (1889); Salvadori, Cat. B. Brit. Mus., XXI., p. 526 (1893); North, Rep. Horn Sc. Exp., II., p. 98 (1896); *id.*, B. County Cumberland, p. 106 (1898); Keartland, B. Melbourne District, p. 112 (1900); Campbell, Nests and Eggs Austr. B., p. 680 (1901); Oates, Cat. Birds' Eggs Brit. Mus., I., p. 103 (1901); Hartert, Nov. Zool., XII., p. 197 (1905); Berney, Emu, VI., p. 47 (1906); Hall, Key B. Austr., p. 71 (1906); Austin, Emu, VII., p. 75 (1907); Ingram, Ibis, p. 390 (1907); Mathews, Handl. B. Austral., p. 10 (1908); *id.*, Emu, IX., p. 2 (1909); Littler, Handb. B. Tasmania, p. 103 (1910).*Peristera calcoptera* Swainson, Classif. B., II., p. 349 (1837); Gould, B. Austr., V., p. 64 (1848).*Goura chalcoptera* Schlegel, De Dierent., p. 209 (1864).

DISTRIBUTION. Australia generally; Tasmania.

Adult male. Forehead to the middle of the crown white, tinged with fulvous; sides of the crown, and a band across the head adjoining the white, maroon-chestnut; hinder part of head washed with grey, like the hind-neck; ear-coverts and sides of the neck lead-grey; back and scapulars, as also the rump and upper tail-coverts dark brown, with paler brown margins to the feathers, some of the scapulars and feathers of the lower back blackish-brown; wing-coverts pale grey, with whitish edgings, the outer webs of the lesser and median coverts have metallic coppery reflections, those of the greater coverts are for the most part green, and those on the inner secondaries



J.G. Keulemans, del.

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2
PHAPS CHALCOPTERA.
(BRONZE-WINGED PIGEON).

BRONZE-WINGED PIGEON.

purple and dark green ; bastard-wing, primary-coverts and quills greyish-brown, the latter edged with white on the outer webs and pale rufous on the inner ones ; tail-feathers grey, with a blackish subterminal band ; eyebrow and a line of feathers from the gape below the eye and skirting the maroon-chestnut on the side of the crown, white ; chin and throat white ; fore-neck and upper breast pale vinous ; abdomen pale grey, becoming darker on the thighs and under tail-coverts ; sides of the body, axillaries, and under wing-coverts cinnamon, like the quill lining. " Bill brownish black ; iris dark brown ; tarsi and feet pinky red " (J. P. Rogers). Total length, 360 mm. ; culmen, 28 ; wing, 194 ; tail, 106 ; tarsus, 27.

In what appears to be a very old male bird, the hinder part of the head is entirely maroon-chestnut, the metallic colour on the wings very bright, inclining to fiery red, instead of green, on the greater coverts, and the purple green of the secondaries is extended over a greater number of feathers.

Adult female. Differs from the male in having the fore-part of the head grey, the hinder crown earth-brown, like the hind-neck and upper back, the absence of grey on the ear-coverts and sides of neck, the much paler vinous on the breast, and the paler grey on the abdomen. Total length, 330 mm. ; culmen, 26 ; wing, 182 ; tail, 103 ; tarsus, 28.

Young male. Distinguished from the adult male by the almost entire absence of metallic spots on the wing-coverts, which are dark grey, edged with white ; hinder part of head earth-brown, with a few maroon-chestnut feathers appearing, and the fore-part of the head white.

Nest. " A slight structure or platform of twigs, slightly concave and about five inches in diameter. Usually placed in the fork of a horizontal limb of a low tree, sometimes on a bushy branch or even on a stump in the forest, rarely on the ground " (Campbell).

Eggs. Clutch, two. A clutch from the Dawson River, North Queensland, are smooth and glossy. Pure white. Axis, 32-36 mm. ; diameter, 23-24.

Breeding season. Usually from October to November ; but eggs have been taken from April to September. Two broods are reared in the year.

WRITING to me from Northern Victoria, Mr. E. J. Christian says : " This is the only species of Pigeon I have ever seen here. I think they live on the hard seed of the Saffron-thistle, as in one particular spot where these thistles grow very thickly I always flushed one. On the 27th March 1907, I found a dead one in the garden that had died from eating some poisoned wheat.

Mr. F. Howe says this species is occasionally met with at Ringwood (Victoria). A nest containing two eggs was found in a Eucalyptus at a height of 35 feet, on the 7th November, 1908 ; and young have been seen in the nest at Ferntree Gully as late as 27th January, 1907.

Mr. Tom Carter writes : " These birds were not seen very frequently in the North-west, but are fairly common about Broome Hill, where they feed mostly on the seeds of the Jam Trees (*Acacia acuminata*) as well as on seeds of the native poison plant. They often sit very closely on the ground, relying on their protective colouring to escape observation. Their first flight, after being disturbed, is usually a short but rapid one, to the limb of a neighbouring tree. They drink mostly about sundown."

THE BIRDS OF AUSTRALIA.

Mr. P. T. Sandland, writing from Burra, in South Australia, says: "I have taken eggs in April, June, July, August, and September. The birds come in to drink either the last thing in the evening, or at dawn. They always settle some little distance from the water and walk in."

Sturt* says that the habits of this Pigeon are peculiar, insomuch that they go to water at so late an hour that it is almost impossible to see them. Although he often sat at the edge of some pond and watched with noiseless anxiety, they would get to the water unobserved, and the sharp flap of their wings in rising, alone told him that he had missed his game. The natives of the Murray set nets across the gully down which they fly to water on the bank of that river, and catch them in great numbers.

Mr. Keartland† observes that at all permanent water these birds came to drink at sunset, and continued arriving until it was quite dark. The first-comers were generally young birds, the old ones coming later. They arrived singly, and could be heard to drop on the ground with a heavy thud about fifty yards from the water. They would then wait preening their feathers until joined by several others, when they marched in single file to the water, and, having quenched their thirst, rose singly and quickly disappeared.

Mr. Tom Carter tells me he has found this bird breeding in hollow spouts of trees at Broome Hill, West Australia.

The male bird figured and described was collected by Mr. J. P. Rogers at Parry's Creek in September, 1908.

* *Narr. Exp. Centr. Austr.*, II., App., p. 41.

Rep. Horn. Sc. Exp., p. 98.



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$\frac{2}{3}$
PHAPS ELEGANS.
(BRUSH BRONZE-WINGED PIGEON).

PHAPS ELEGANS.

BRUSH BRONZE-WINGED PIGEON.

(PLATE 36.)

COLUMBA ELEGANS Temminck et Knip, Fig. fam. 2, Pl. 22 (1811), Tasmania.

Columba elegans Temminck et Knip, Fig. fam. 2, Pl. 22 (1811); Temminck, Fig. et Gall., I., p. 240 (1813).

Phaps elegans Selby, Nat. Libr., Pigeons, p. 194 (1835); Sturt, Narr. Exp. Centr. Austr., II., App., p. 42 (1849); Bonaparte, Consp. Av., II., p. 90 (1855); Gould, Handb. B. Austr., II., p. 125 (1865); Ramsay, P.L.S., N.S.W., I., p. 183 (1876); *id.*, Tab. List Austr. B., p. 18 (1888); North, Austr. Mus. Cat., No. 12, p. 274 (1889); Salvadori, Cat. B. Brit. Mus., XXI., p. 527 (1893); North, B. County Cumberland, p. 106 (1898); Keartland, B. Melbourne District, p. 112 (1900); Campbell, Nests and Eggs Austr. B., p. 683 (1901); Oates, Cat. Birds' Eggs Brit. Mus., I., p. 104 (1901); Hall, Key B. Austr., p. 71 (1906); Mathews, Handl. B. Austral., p. 11 (1908); Ogilvie-Grant, Ibis, p. 188 (1910); Littler, Handb. B. Tasmania, p. 104 (1910).

Peristera elegans Gould, B. Austr., V., Pl. 65 (1848).

Goura elegans Schlegel, De Dierent., p. 209 (1864).

Cosmopelia elegans Sundevall, Methodi Naturales Avium Disp. Tentamen, p. 100 (1873); Heine and Reichenow, Nomencl. Mus. Hein. Orn., p. 286 (1886).

DISTRIBUTION. Australia generally.

Adult male. General colour above olive- or rufous-brown, including the back, wings, and tail; throat, a line from behind the eye, hind-neck, and sides of the neck rich chestnut; wings more rufous than the back; wing-speculum metallic-bronze, copper, green and purple: some of the median and greater wing-coverts tipped with grey; bastard-wing, primary-coverts, and quills brown, edged, more or less, with rufous, increasing in extent on the quills, which are rufous on both webs for the greater part of their length; the outer primaries have white margins towards the tips; middle tail-feathers like the back, the outer ones slate-grey, with a blackish subterminal band and tipped with rufous-brown; fore-part of the head and chin white, slightly tinged with chestnut; hinder crown slate-grey; sides of face and entire under-surface pale slate-grey; axillaries and under wing-coverts chestnut, like the quill lining. Iris hazel-brown. Total length, 335 mm.; culmen, 26; wing, 167; tail, 88; tarsus, 27.

Adult female. Differs from the adult male chiefly, in having much less rufous or chestnut on the plumage of the upper-parts, and the under-surface darker grey. There

THE BIRDS OF AUSTRALIA.

is no white on the forehead, as in the male, and the chestnut colour is indicated only by a small patch on the sides of the nape and a wash on the sides of the neck; the hind-neck and mantle are like the back. "Bill black; iris reddish; tarsi and feet deep coral pink" (T. Carter). Total length, 298 mm.; culmen, 25; wing, 165; tail, 84; tarsus, 27.

Immature. Distinguished from the adult, more particularly by the rufous forehead, very slight indication of the chestnut throat-patch, and the entire absence of chestnut on the hind-neck.

A male example, from the Dandenong ranges, Victoria, obtained by Mr. Leach in 1862, which I imagine to be a very old bird, has the general colour much darker and more intensified, the most conspicuous feature being the chestnut-colour on the forepart of the head.

Nest. "A flat structure or platform of twigs; usually placed in a thick bush, on a fallen tree, or even on the ground, in secluded scrubby localities" (Campbell).

Eggs. "Clutch, two; elliptical in shape; texture of shell fine, except the smaller end, which is slightly granular; surface glossy; pure white. Dimensions in inches of a clutch:—1.32 to 1.24 by .98 to .97" (Campbell).

Breeding season. October to January (Littler); March (Carter).

Incubation-period. Fifteen to eighteen days (Butler).

THE type of this bird was secured by Baudin in D'Entrecasteaux Channel, South Tasmania, in 1802, and is now in the Paris Museum.

Mr. Tom Carter, writing from Western Australia, remarks: "This species seems to take the place of the *Phaps chalcoptera* along the coast. I have observed it on the coastal scrubs at Margaret River, Denmark, and Albany, where a female was shot while nesting, on the 7th of March, 1905."

Gould* says: "It affects the most scrubby localities, giving preference to such as are low and swampy; and I have never seen it perch on the branches of trees. When flushed it rises very quickly with a loud burring noise similar to that made by the rising of a Partridge. The shortness of its wings and tail, and the extreme depth of its pectoral muscle, render its appearance more plump and round than that of the generality of Pigeons. It is a very difficult bird to shoot, from its inhabiting the denser parts of the scrub, from which it is not easily driven. It flies but little, rarely for a greater distance than to cross a gully or top a ridge before it again abruptly descends into the scrub.

"Its note, more lengthened than that of the common Bronze-wing, is a low and mournful strain, and is more often repeated towards the close of the evening than at any other time."

The female figured and described was collected at Albany by Mr. Tom Carter in March, 1905, and is the bird mentioned in his note.

* *Handb. B. Austr.*, II., p. 125.

GENUS—HISTRIOPHAPS.

HISTRIOPHAPS Salvadori, Cat. B. Brit. Mus., XXI., pp. 500, 529

(1893) *H. histrionica.*

IN structure like *Phaps*, except that the tail consists of fourteen rectrices only, and is somewhat shorter, less rounded, almost straight; the tail-coverts above and below reach almost to the end of the tail. The wing is long and pointed. The coloration is remarkable.

DISTRIBUTION. Australia. (Only one species.)

HISTRIOPHAPS HISTRIONICA.

FLOCK-PIGEON.

(PLATE 37.)

COLUMBA (PERISTERA) HISTRIONICA Gould, P.Z.S., p. 114 (1840), Interior of Australia.

Columba (Peristera) histrionica Gould, P.Z.S., p. 114 (1840).

Peristera histrionica Gould, B. Austr., V., Pl. 66 (1841); Leichhardt, Journ. Overl. Exp. Austr., p. 296 (1847).

Columba histrionica Prévost et Knip, Fig., II., pp. 83, 97, Pls. 45, 51 (1838-43).

Phaps histrionica Gray, List Spec. B. Brit. Mus., p. 17 (1844); Sturt, Narr. Exp. Centr. Austr., App., p. 42 (1849); Bonaparte, Consp. Av., II., p. 90 (1855); Gould, Handb. B. Austr., II., p. 127 (1865); Ramsay, P.L.S., N.S.W., I., p. 183 (1876); Diggles, Handb. B. Austr., Pl. 91 (1877); Ramsay, P.L.S., N.S.W., VII., p. 409 (1882); *id.*, Tab. List Austr. B., p. 18 (1888); North, P.L.S., N.S.W. (2), III., p. 148 (1888); *id.*, Austr. Mus. Cat., No. 12, p. 274 (1889).

Goura histrionica Schlegel, De Dierent., p. 209 (1864).

Histriophaps histrionica Salvadori, Cat. B. Brit. Mus., XXI., p. 529 (1893); Campbell, Nests and Eggs Austr. B., p. 684 (1901); Oates, Cat. Birds' Eggs Brit. Mus., p. 104 (1901); Carter, Emu, III., p. 173 (1904); Berney, Emu, VI., p. 47 (1906); Hall, Key B. Austr., p. 71 (1906); Ingram, Ibis, p. 391 (1907); Mathews, Handl. B. Austral., p. 11 (1908); *id.*, Emu, IX., p. 2 (1909).

DISTRIBUTION. North-western Australia; Northern Territory; Queensland; New South Wales; North of South Australia.

Adul male. General colour above, including the entire back, wings, and tail sandy-brown; marginal coverts round the bend of the wing, bastard-wing, and primary-coverts blue-grey, more or less margined with white on the outer webs; primary-quills pale grey with sandy edges and white tips to all but the outer two, inner webs rufous with the exception of the first quill, outer secondary quills grey, darker towards the tips, inner ones sandy on the outer webs with a metallic-purple and green gloss followed by grey and an ovate spot of white; middle tail-feathers like the back, the outer feathers grey, with a dark, subterminal band and tipped with white, sometimes in the form of a spot, some of the lateral ones sandy on the outer webs; sides of face, ear-coverts and crown of head black; forehead, lores, a line behind the eye, almost enclosing the ear-coverts, and a patch on the lower throat pure white; fore-neck, breast, and abdomen blue-grey, like the axillaries and under wing-coverts; lower



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HISTRIOPHAPS HISTRIONICA.
(FLOCK - PIGEON).

FLOCK-PIGEON.

flanks sandy-brown, becoming paler on the shorter under tail-coverts, the long ones grey, with sandy-white tips ; quills pale brown, with a patch of chestnut towards the base ; " Bill brown ; iris dark brown ; tarsi and feet in front leaden-blue, back of tarsi flesh-red " (J. P. Rogers). Total length, about 317 mm. ; culmen, 24 ; wing, 193 ; tail, 83 ; tarsus, 26.

Adult female. Differs from the adult male in having the entire upper-parts, including the head, darker sandy-brown, as also a wide greyish-brown band on the fore-neck and breast, the black on the chin and throat only faintly indicated, and the forehead inclining to whitish ; wing-speculum very faintly indicated and the white tips to the primaries absent. Total length, about 303 mm. ; culmen, 24 ; wing, 190 ; tail, 83 ; tarsus, 26.

Immature male. Similar to the adult female, but with the fore-part of the head white, as in the male, and with the white spots and white tips to the primaries.

Immature female. Differs from the adult in having the wing-coverts and tips of quills margined with whitish, as also the feathers of the fore-neck ; the black throat-patch scarcely indicated ; a certain amount of chestnut on the under wing-coverts like that of the quill lining.

Nest. " The bare ground, under any convenient low covert—tussock or bush—on the plains " (Campbell).

Eggs. " Clutch two : elliptical in form ; texture of shell fine but strong ; surface glossy ; white, with a slight creamy tone. Dimensions in inches 1.32 to 1.24 by .98 " (Campbell).

Breeding season. November to February (Ramsay) ; July and August (North) ; April to July (Berney) ; February and September (Berney) ; December to March (Campbell).

STURT* says that in the end of March and the beginning of April, these Pigeons collect in large flocks and live on the seed of the rice-grass. During the short period this harvest lasts, their flavour is most delicious, but at other times it is indifferent.

Writing to me from Western Australia, Mr. Tom Carter, says : " Several years may pass without a bird being observed ; when that district is blessed with good rains, great flocks are to be seen as long as grass-seeds are plentiful. Small numbers were noted on the Minilga River plains in 1887, and a few on the coast at Point Cloates early in 1890 and again in 1893. I do not recollect seeing any more until 1900, which was a record wet year throughout the North-west. Old birds were continually seen throughout that year. In December, bush-fires burnt out the country from Lyndon River to Minilga River, an area 100 miles square. The following January, on the Lower Lyndon River, the Pigeons were watering in countless myriads, flock succeeding flock, and the roar of their wings was like the noise of a heavy surf on a reef. I noticed that the birds alighted all over the surface of the water to drink, and all seemed to be in a frantic hurry, flying off after what must have been a very short drink. On the open plain, just where the fire had ceased, flocks were greedily feeding in such numbers as to hide the ground."

* *Narr. Exped. Centr. Austr.*, App., p. 42 (1849).

THE BIRDS OF AUSTRALIA.

Mr. F. L. Berney,* writing from the Richmond District, North Queensland, says that the presence of Flock-Pigeons depends largely on the season; in some years there are hardly any, while in others there are large numbers of them. In 1906 they were plentiful, and many were nesting in the months from April to July—more particularly in May and June; in previous years eggs were found in February and September. They afford excellent shooting, if waited for at their watering-places, which they visit morning and evening, and are wonderfully plump birds, adult males weighing as much as twelve ounces, while in a mixed bag of fifty or sixty they average over nine ounces. The squab in the nest is covered with cinnamon-brown down.

I found this bird very plentiful on the Saxby and Flinders River, in Queensland, in December of 1890; this was an exceedingly dry year, and the birds came to drink every evening about sundown, in a similar way to that described by Mr. Carter.

The birds figured and described are from Parry's Creek, North-west Australia, and were collected by Mr. J. P. Rogers on the 5th October, 1908.

* *Emu*, VI., p. 47 (1906).

GENUS—PETROPHASSA.

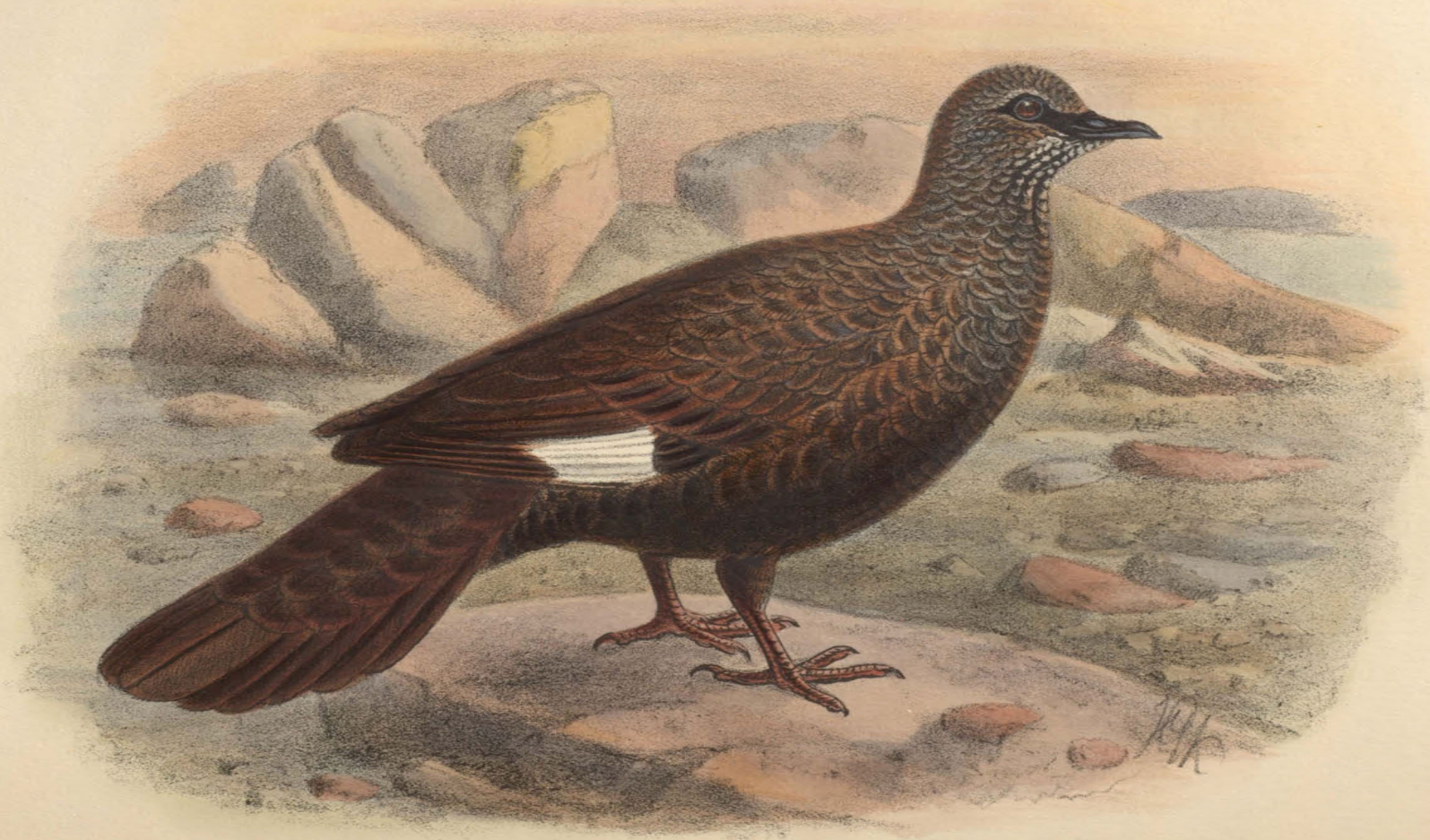
PETROPHASSA Gould, P.Z.S., p. 173 (1840) *P. albipennis*.

THIS genus agrees with *Histriophaps* in the number of rectrices, which are fourteen, but the tail is much longer and distinctly rounded, being almost graduated. The wings are much shorter and very round, the distance from the end of the primaries to the tip of the secondaries being about 20 mm. The edges of the body-feathers are peculiarly soft and fluffy. The space round the eyes and most of the lores bare. The metallic colour on the wings is hidden, being generally restricted to one of the long coverts of one of the innermost secondaries, but sometimes indicated on the secondary in front of that covert.

DISTRIBUTION. Australia. (Only two species.)

Key to the Species.

- A. Larger; wing, 151 mm.; tail, 131; primary quills
chestnut, tipped with black.. .. *P. rufipennis*, p. 159.
- B. Smaller; wing, 135 mm.; tail, 120; primary quills
white, tipped with black *P. albipennis*, p. 157.



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$\frac{2}{3}$
PETROPHASSA ALBIPENNIS.
(ROCK PIGEON).

PETROPHASSA ALBIPENNIS.

ROCK-PIGEON.

(PLATE 38.)

PETROPHASSA ALBIPENNIS Gould, P.Z.S., p. 173 (1840), Western Australia.

Petrophassa albipennis Gould, P.Z.S., p. 173 (1840); Gould, B. Austr., V., Pl. 71 (1843); Bonaparte, Consp. Av., II., p. 87 (1855); Gould, Handb. B. Austr., II., p. 141 (1865); Ramsay, P.L.S., N.S.W., I., p. 184 (1876); *id.*, Tab. List Austr. B., p. 18 (1888); Salvadori, Cat. B. Brit. Mus., XXI., p. 530 (1893); Collett, P.Z.S., p. 353 (1898); Campbell, Nests and Eggs Austr. B., p. 688 (1901); Gibson and North, Rec. Austr. Mus., V., p. 269 (1904); Hall, Key B. Austr., p. 71 (1906); Mathews, Handl. B. Austral., p. 11 (1908); Hill, Emu, X., p. 263 (1911).

Peristera albipennis Finsch, Neu-Guinea, p. 179 (1865).

Phaps albipennis, Giebel, Thes. Orn., III., p. 88 (1877).

DISTRIBUTION. North-western Australia; Northern Territory.

Adult female. General colour of the upper-surface rufous-brown, with pale edges to the feathers; crown of the head blackish-brown, with whitish margins to the feathers; neck all round, breast and sides of the face grey, with rufous-brown edges to the feathers; lores and a narrow line at the base of the forehead velvety-black; the feathers of the chin and throat black, with white pear-shaped tips; bastard-wing and primary-coverts blackish, the latter dusted with white towards the tips; primary quills white at the base, becoming darker towards the tips, the inner ones dusted with brown and shaded with rufous; secondary quills entirely brown, somewhat darker on the inner webs; the innermost secondaries like the back; some dark metallic-purple spots are indicated on one or two of the inner major-coverts and long scapular feathers; tail rufous-brown, the outer feathers inclining to blackish; abdomen, sides of the body, under tail-coverts, axillaries and under wing-coverts blackish, with pale margins to the feathers; tail and quills below blackish, the latter with white bases; "Bill black; iris dark brown; tarsi and feet blackish-brown" (J. P. Rogers). Total length, about 310 mm.; culmen, 20; wing, 135; tail, 120; tarsus, 20.

Nest. "A slight hollow about two inches in depth scooped in the ground near a small tuft of spinifex, or stone, and lined with soft dead grass" (Gibson).

Eggs. "Clutch two; oval in form, the shell being close-grained, smooth, and lustrous, cream-colour or creamy-white. Dimensions in inches 1.16 to 1.07 by .86 to .83" (North).

Breeding season. July (Gibson); September (?); October (Hill).

THE BIRDS OF AUSTRALIA.

MR. GIBSON*, who found the nest and eggs above described, says, these birds "were invariably restricted to the sandstone region, and although fairly numerous, they were never anywhere abundant. As a rule they were rather shy birds, and hard to flush, relying on their protective colour to hide them. When flushed they would rise with a loud whirr, and fly for a short distance, usually alighting on bare rocks. Over these they would run rapidly for a few yards, finally crouching down on a rock harmonising so well with their own colour, that it was difficult to detect them. During the month of July, 1901, while in about Lat. 16° 17' S. and Long. 125° 21' E., I found two nests of this Pigeon, one on the 3rd July, the other on the 4th, each containing two fresh eggs, but unfortunately broke one egg of the last set taken."

Professor Collett† says few examples of this species were observed, and as a rule singly. They inhabited the broken sandstone ranges which are met with at the mouth of Victoria River (a little to the south of Arnhem Land). The specimen preserved was shot at Blunder Bay, near the outlet of the river in Queen's Channel.

The specimen figured and described is a female collected by Mr. J. P. Rogers at Parry's Creek, in North-western Australia, on the 2nd of April, 1909.

* *Rec. Austr. Mus.*, V., p. 269 (1904).

† *P.Z.S.*, p. 354 (1898).



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PETROPHASSA RUFIPENNIS.
(CHESTNUT-QUILLED ROCK-PIGEON).

PETROPHASSA RUFIPENNIS.

CHESTNUT-QUILLED ROCK-PIGEON.

(PLATE 39.)

PETROPHASSA RUFIPENNIS Collett, P.Z.S., p. 354 (1898), Head of the South Alligator River, Northern Territory.

Petrophassa sp. Leichhardt, Journ. Overl. Exp. in Austr., p. 476 (1847).

Petrophassa rufipennis Collett, P.Z.S., p. 354, Pl. XXVIII. (1898) ; Campbell, Nests and Eggs Austr. B., p. 688 (1901) ; Hartert, Nov. Zool., XII., p. 197 (1905) ; Hall, Key B. Austr., p. 72 (1906) ; Mathews, Handl. B. Austral., p. 11 (1908) ; *id.*, Emu, IX., p. 98 (1909).

DISTRIBUTION. Arnhem Land ; Northern Territory.

Adult male. The feathers of the upper-surface, as well as those of the breast, grey, margined with brown ; throat and a narrow line above and below the eye white ; sides of face also inclining to white ; bastard-wing blackish ; primary-coverts chestnut, blackish at the tips ; primary-quills chestnut, margins of the outer webs towards the ends, and the tips blackish ; secondaries dark brown ; tail blackish, as also the axillaries and lesser under wing-coverts ; quills below, greater, and a few of the lesser, wing-coverts chestnut ; "Bill black ; iris brown ; feet black" (J. T. Tunney). Total length, 345 mm. ; culmen, 21 ; wing, 151 ; tail, 145 ; tarsus, 22.

Adult female. Differs from the adult male only in having metallic spots on a few of the scapular feathers. Total length, 310 mm. ; culmen, 22 ; wing, 152 ; tail, 131 ; tarsus, 22.

Nest and Eggs undescribed.

LEICHHARDT on his overland journey to Port Essington saw this bird near the head of the South Alligator River, on the 11th November, 1845, but no specimen was brought before the scientific world till Professor Collett described one from the same locality in 1898.

Leichhardt* says : " A new species of rock pigeon (*Petrophassa*, Gould) with a dark brown body, primaries light brown without any white, and the tail feathers rather worn, lived in pairs and small flocks like *Geophaps*, and flew out of the shade of overhanging rocks, or from the moist wells which the natives had dug in the bed of the creek, around which they clustered like flies round a drop of syrup."

* *Journ. Overl. Exp. Austr.*, p. 476 (1847).

THE BIRDS OF AUSTRALIA.

Professor Collett,* who described this bird, says: "This Pigeon was met with in flocks in the central portions of Arnhem Land about the sources of the South Alligator River. It inhabits the stony parts of the sandstone hills; it lies close amongst the stones, and knows well how to conceal itself amongst them when wounded."

The bird figured is a male collected on South Alligator River by Mr. J. T. Tunney on the 10th August, 1903.

* *P.Z.S.*, p. 354 (1898).

GENUS—GEOPHAPS.

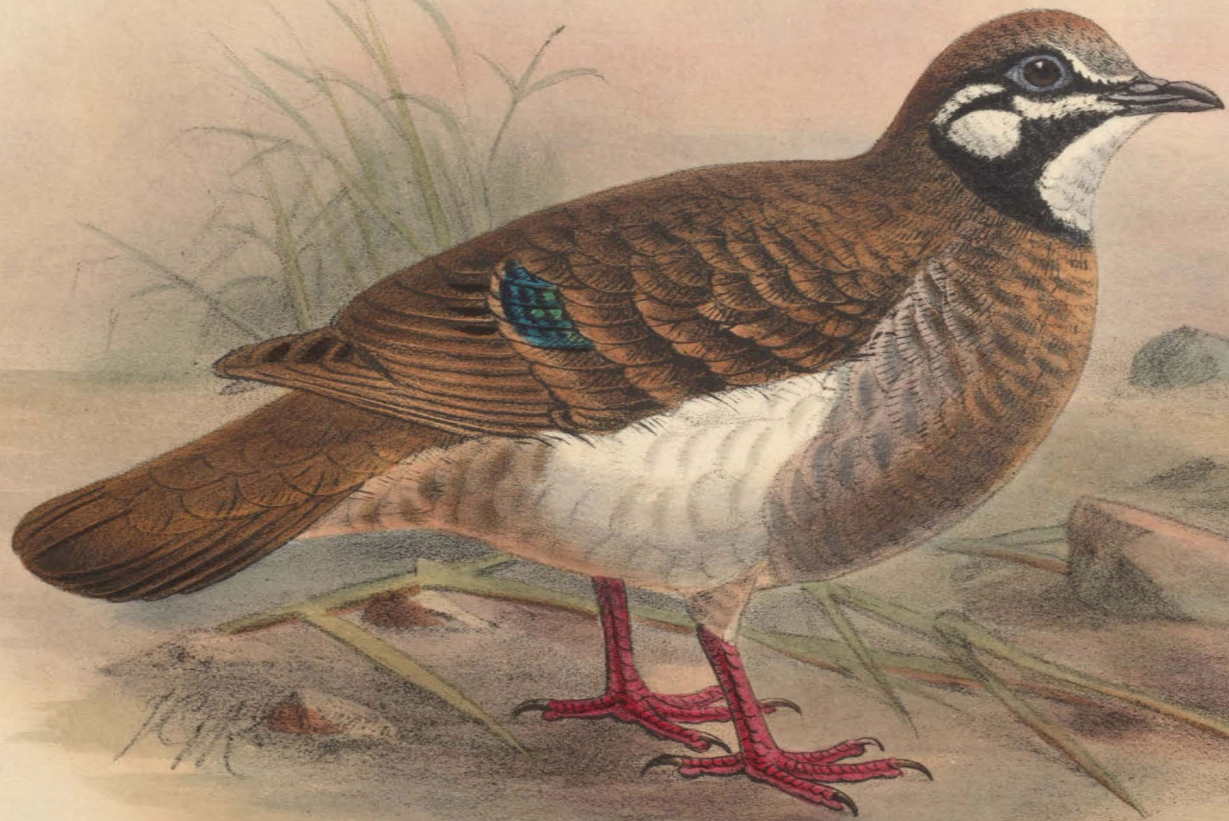
GEOPHAPS (Gould), Gray, App. List Gen. B., p. 12 (1842), .. *G. scripta*.
Gould, B. Austr., V., Pls. 67, 68 (1842).

DIFFERS from the genus *Petrophassa* in having a stronger bill and thick-set feet. The wing is somewhat short and broad. The tail slightly rounded and composed of fourteen rectrices.

DISTRIBUTION. Australia. (Two species only.)

Key to the Species.

- A. Larger; wing, 148 mm.; tail, 110; breast blue-grey; throat white, encircled with black *G. scripta*, p. 163.
- B. Smaller; wing, 136 mm.; tail, 101; breast vinous-grey with a patch of grey feathers on the upper portion; throat not encircled with black *G. smithii*, p. 166.



J. G. Keulemans, del.

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♂
GEOPHAPS SCRIPTA.
(PARTRIDGE PIGEON).

GEOPHAPS SCRIPTA.

PARTRIDGE-PIGEON.

(PLATE 40.)

COLUMBA SCRIPTA Temminck, Trans. Linn. Soc., XIII., p. 127 (1821); Shoalwater Bay, Queensland.

Columba scripta Temminck, Trans. Linn. Soc., XIII., p. 127 (1821); *id.*, Pl. Col., ii., pl. 187 (1823).

Columba inscripta Wagler, Syst. Av. Columbæ, sp. 59 (1827).

Peristera scripta Swainson, Classif. B., II., p. 349 (1837).

Geophaps scripta Gould, B. Austr., V., Pl. 67 (1842); Leichhardt, Journ. Overl. Exp. in Austr., p. 155 (1847); Bonaparte, Consp. Av., II., p. 87 (1855); Gould, Handb., II., p. 130 (1865); Ramsay, P.L.S., N.S.W., I., p. 183 (1876); *id.*, Tab. List Austr. B., p. 18 (1888); North, Austr. Mus. Cat., No. 12, p. 275 (1889); Selater, P.Z.S., p. 76 (1892); Salvadori, Cat. B. Brit. Mus., XXI., p. 531 (1893); Hartert, Nov. Zool., VI., p. 428 (1899); Campbell, Nests and Eggs Austr. B., p. 689 (1901); Oates, Cat. Birds' Eggs Brit. Mus., I., p. 104 (1901); Hall, Key B. Austr., p. 72 (1906); Mathews, Handl. B. Austral., p. 11 (1908); Newman, Avicult. Mag., VI., p. 337 (1908).

Goura scripta Schlegel, De Dierent., p. 209 (1864).

Phaps scripta Schlegel, Mus. P.-B., IV., Columbæ, p. 155 (1873).

DISTRIBUTION. Queensland; New South Wales; Central Australia; North-west Australia.

Adult. General colour of the upper-surface earth-brown, including the head, entire back, and middle tail-feathers; wings darker than the back, with broad pale margins to the feathers; wing-speculum wavy green, with coppery reflections; bastard-wing, primary-coverts, and quills pale brown, with whitish edges to the outer webs of the latter; margins of the secondary-quills rufous; outer tail-feathers rufous-grey, with black tips; a white line on the lores, which surmounts the narrow black band round the eye; chin and throat white, as also a line along the cheeks, which includes the ear-coverts; a line of black feathers which encircles the white throat and extends on to the sides of the neck behind the ear-coverts; fore-neck and sides of the neck like the back; breast and middle of the abdomen blue-grey; sides of the body and under wing-coverts white; small marginal coverts on the under-edge of the wing similar in colour to the upper-surface; axillaries white at base, and dusted with grey towards the ends; lower abdomen, thighs, and under tail-coverts sandy-buff, the

THE BIRDS OF AUSTRALIA.

long under tail-coverts blackish, paler on the outer webs; "Bill black; iris black; naked skin surrounding the eyes bluish-lead-colour, the corner immediately before and behind the eye mealy vinous red; feet and frontal scales dark purplish-vinous-red" (J. Gould). Total length, 325 mm.; culmen, 22; wing, 148; tail, 110; tarsus, 25.

Nest. "A little hollow, scooped in the ground, about an inch deep, and lined more or less with dead, soft grass, sometimes sheltered by herbage" (Campbell).

Eggs. Clutch, two. A clutch from the Dawson River, North Queensland, are creamy-white, smooth and glossy. Axis, 30-31 mm.; diameter, 21-22.

Breeding season. September to January, but breeds at almost any period of the year (Campbell).

Incubation-period. In captivity seventeen days (Newman).

THIS Pigeon is fairly plentiful on the Basalt River, in North Queensland, and I have often killed one with my stock-whip, as it crouched down endeavouring to hide itself. The excellence of its flesh makes it much sought after by stockmen and others. It moves about in small flocks, and when disturbed the individuals scatter and endeavour to hide, being then very hard to flush.

Gould* says: "When it does rise, it flies with extreme rapidity, making a loud burring noise with the wings and generally spinning off to another part of the plain, or to the horizontal branch of a tree, on which it immediately squats in the same line with the limb, from which it is not easily distinguished or driven off."

When in the Isaac River, in Queensland, in 1844, Leichhardt† mentions that coming upon some native wells in the bed of the river he noticed that "Pigeons (*Geophaps scripta*) had formed a beaten track‡ to its edge; and the next morning, whilst enjoying our breakfast under the shade of a gigantic flooded-gum tree, we were highly amused to see a flight of fifty or more Partridge-Pigeons tripping along the sandy bed of the river, and descending to the water's edge, and returning after quenching their thirst, quite unconscious of the dangerous proximity of hungry ornithophagi."

Correcting a statement of Gould's that "The young both run and fly strongly when they are only as large as a quail," Mr. Charles Barnard§ says: "I have seen them fly when only the size of a *large* Quail, but any person could see it was the weak, uncertain flight of a young bird, and when they alight they will allow themselves to be picked up without attempting to escape. I do not think they leave the nest, until they are able to fly."

* *Handb. B. Austr.*, II., p. 131 (1865).

Journ. Overl. Exp. in Austr., p. 155 (1847).

‡ This track may have been formed by Bush Rats.

§ In Campbell's *Nests and Eggs Austr. B.*, p. 690 (1901).

PARTRIDGE-PIGEON.

From Mr. Newman's* notes made on this species in captivity I gather the following: "It would be hard to find another case amongst birds of one group approaching another so closely in superficial details as the genus *Geophaps* does the Partridges. Yet in no point do they really differ from the more typical Pigeons. I have noticed these Pigeons have a Partridge-like habit of roosting in a group, their heads pointing in different directions, their tails coming closely together in the centre. They never dust, like gallinaceous birds, and I have never seen them bathe, but during a shower they will lie on their side with one wing raised like other pigeons.

"The chicks have an egg tooth on both mandibles. When between six and seven weeks old, a general moult took place, and at two months old they were fully grown."

The bird figured is a female and was collected in Queensland in November, 1888.

* *Avicultural Mag.*, October, 1908.

GEOPHAPS SMITHII.

NAKED-EYED PARTRIDGE-PIGEON.

(PLATE 41.)

COLUMBA SMITHII Jardine and Selby, Ill. Orn., II., Pl. 104 (1830), New Holland.

Columba smithii Jardine and Selby, Ill. Orn., II., Pl. 104 (1830).

Columba (Geophaps) smithii Thienemann, Fortpflanz. ges. Vögel, p. 56 (1846).

Geophaps smithii Gould, B. Austr., V., p. 68 (1842); *id.*, Handb. B. Austr., II., p. 133 (1865); Ramsay, P.L.S., N.S.W., I., p. 183 (1875); *id.*, Tab. List Austr. B., p. 18 (1888); North, Austr. Mus. Cat., No. 12, p. 276 (1889); Hartert, Nov. Zool., XII., p. 197 (1905).

Geophaps smithii Bonaparte, Consp. Av., II., p. 87 (1855); Salvadori, Cat. B. Brit. Mus., XXI., p. 532 (1893); Campbell, Nests and Eggs Austr. B., p. 691 (1901); Le Souëf, Emu, II., p. 94 (1902); Hall, Key B. Austr., p. 72 (1906); Mathews, Handl. B. Austral., p. 11 (1908); Hall and Rogers, Emu, VII., p. 141 (1908).

Peristera smithii Finsch, Neu-Guinea, p. 179 (1865).

Phaps smithii Schlegel, Mus. P.-B., IV., Columbæ, p. 155 (1873).

DISTRIBUTION. North-west Australia; Northern Territory.

Adult. General colour above earth-brown, including the head, back, wings and middle tail-feathers; wing-speculum, which is formed by the metallic spots on the outer webs of some of the greater coverts and innermost secondaries, wavy purple and green; outer tail-feathers brown, with broad black tips; a narrow white and black line on the lores, encircling the eye; the white of the throat extending on to the sides of the neck to behind the ear-coverts; cheeks grey, like the narrow line which fringes the white patch on the throat; fore-neck and breast vinous-grey, on the middle of the latter, a few grey feathers narrowly barred with black; sides of body, axillaries and under wing-coverts white; lower flanks like the breast; abdomen and vent whitish-buff; thighs buff; under tail-coverts brown, margined with white; "Bill blackish; iris white, feet dull pink" (J. T. Tunney). Total length, 290 mm.; culmen, 20; wing, 136; tail, 101; tarsus, 23.

Nest. "Eggs are laid on the ground in a slight nest made of grass, or sometimes on a tussock of grass" (Le Souëf).

Eggs. "Clutch, two; somewhat oval, slightly glossy; colour, very pale cream. Dimensions in inches, 1.13 to 1.08 by .84 to .8" (Le Souëf).

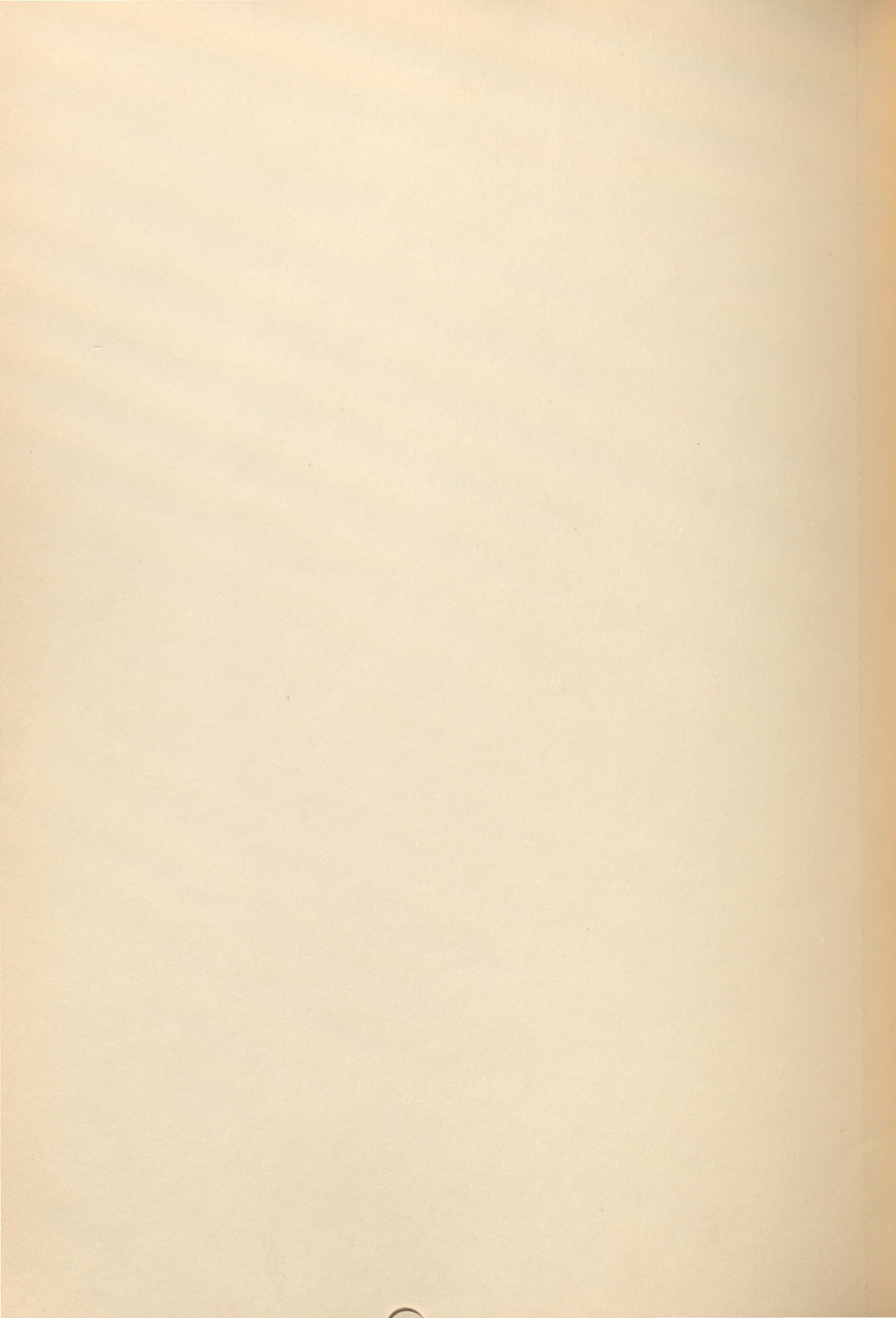
Breeding season. August to October (Gilbert); December and July (Le Souëf).



J.G. Keulemans. del.

Witherby & Co.

[♂]
GEOPHAPS SMITHI.
(NAKED-EYED PARTRIDGE PIGEON).



NAKED-EYED PARTRIDGE-PIGEON.

THE best description I can find of the life-history of this bird is given by Gilbert,* who says : " Like *G. scripta* this bird, which at Port Essington is termed the Partridge, differs considerably from its congeners in its general habits, flight, voice, mode of incubation, and the character of its newly hatched young. It is rather abundant in all parts of the Peninsula, is mostly seen in small families and always on the ground, unless disturbed or alarmed ; it then usually flies into the nearest tree, generally choosing the largest part of a horizontal branch to perch upon. When it rises from the ground its flight is accompanied with a louder flapping or burring noise than I have observed in any other pigeon.

" Its note is a coo, so rolled out that it greatly resembles the note of the quail, and, like that bird, it scarcely ever utters it except when on the ground, where it frequently remains stationary, allowing itself to be almost trodden upon before rising. Its favourite haunts are meadows covered with short grass near water, or the edges of newly burnt brush. It would seem that this species migrates occasionally from one part of the country to another ; for during the months of September and October not a single individual was to be seen, while at the time of my arrival and for a month after they were so abundant that it was a common and daily occurrence for persons to leave the settlement for an hour or two and return with several brace ; in the latter part of November they again appeared, but were not so numerous as before ; and in the January and February following they were rarely to be met with, and then mostly in pairs inhabiting the long grasses clothing the moister parts of the meadows.

" The young bird on emerging from the egg is clothed with down like the young of the quail."

The bird figured and described is a female and was collected in the South Alligator River, Northern Territory, by Mr. J. T. Tunney on August 20th, 1903.

* Gould's *Handb. B. Austr.*, II., p. 133 (1865).

GENUS—LOPHOPHAPS.

LOPHOPHAPS Reichenbach, Av. Syst. Nat., p. xxv. (1852) .. *L. plumifera*.

SIZE about that of a Quail, head with a crest of long and narrow feathers. Loes and space all round and behind the eyes naked. Bill very strong, slightly shorter than the head. Tail short and slightly rounded, consisting of fourteen rectrices, tail-coverts nearly as long as tail. Primaries somewhat narrow, but not abruptly attenuated; second, third, and fourth nearly equal in length and longest.

DISTRIBUTION. Australia. (Only three species.)

Key to the Species.

- A. Abdomen fawn-colour; no white band across the
breast *L. ferruginea*, p. 170
- B. Abdomen and band across the breast white
- a*. Smaller; wing, 105 mm.; upper-surface sandy-
 buff *L. plumifera*, p. 172
- b*'. Larger; wing, 122 mm.; upper-surface rich
 fawn-colour *L. leucogaster*, p. 174

LOPHOPHAPS FERRUGINEA.

RED PLUMED PIGEON.

(PLATE 42.)

LOPHOPHAPS FERRUGINEA Gould, Handb. B. Austr., II., p. 137 (1865), Shark's Bay, Western Australia.

Lophophaps ferruginea Gould, Handb. B. Austr., II., p. 137 (1865); *id.*, B. Austr. Suppl., Pl. 68 (1867); Ramsay, P.L.S., N.S.W., I., p. 183 (1876); North, P.L.S., N.S.W., XXIII., p. 382 (1898); Campbell, Nests and Eggs Austr. B., p. 692 (1901); Hall, Emu, II., p. 60 (1902); Carter, Emu, III., p. 173 (1904); Hartert, Nov. Zool., XII., p. 198 (1905); Hall, Key B. Austr., p. 72 (1906); Mathews, Handl. B. Austral., p. 11 (1908).

Peristera plumifera Finsch, Neu-Guinea, p. 179 (1865).

Phaps ferruginea Giebel, Thes. Orn., III., p. 89 (1877).

Lophophaps plumifera Salvadori, Cat. B. Brit. Mus., XXI., p. 533 (1893) (not Syn.).

DISTRIBUTION. Western Australia, from Shark's Bay northward.

Adult male. General appearance of the upper-parts rich fawn-colour, with indistinct dark bars on the back; sides of neck and wings more distinctly barred with grey and black; primary-coverts and quills bright chestnut, the latter margined on the outer webs, and tipped with brown; the secondaries brown, with pale margins, the innermost ones with purple metallic spots on the outer webs, which forms the wing-speculum; middle tail-feathers like the back, the outer ones black; fore-part of the head and ear-coverts blue-grey; a narrow line of black at the base of the forehead encircling the eye and meeting its fellow on the chin, followed by a white band, which crosses the throat from the ear-coverts; this is joined by a black collar on the lower throat; remainder of the under-surface fawn-colour, including the under wing-coverts; a narrow pectoral band crosses the breast, the feathers of which are grey, banded with black and tipped with fawn-colour; forehead blue-grey; hinder crown and crest fawn-colour, the elongated feathers buff; long under tail-coverts grey, fringed with white; lower aspect of the tail black; "Bill black; iris Indian-red, orbits vermilion; tarsi and feet grey-black" (F. L. Whitlock). Total length, 205 mm; culmen, 20; wing, 104; tail, 64; tarsus, 22.

Adult female. Similar to the adult male, both in colour of plumage and measurements.

Nest. "A slight grass-lined depression beneath the shelter of a spinifex tussock" (North).

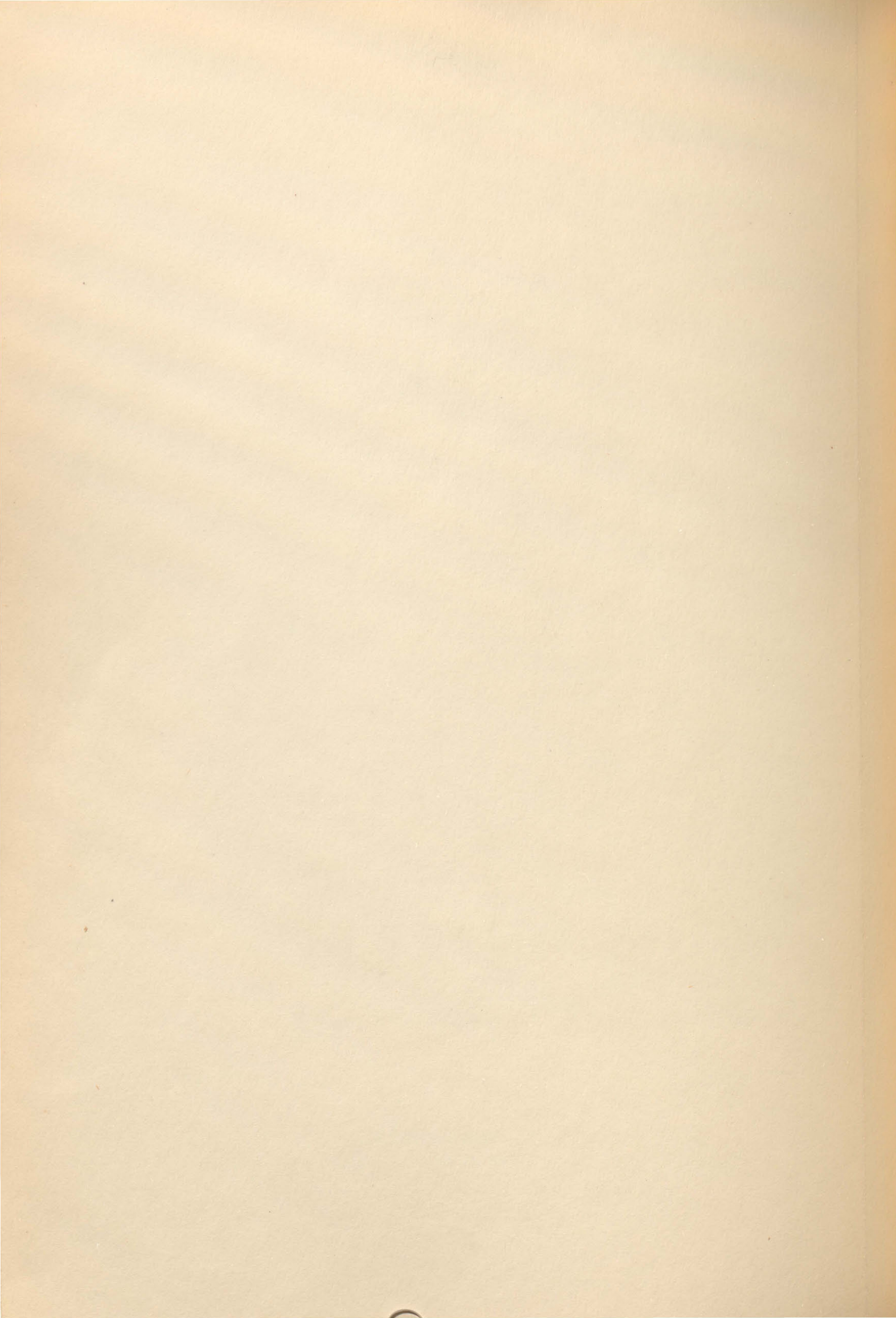
Eggs. "Clutch, two; a swollen ellipse, and are more globular in shape than the generality of pigeons' eggs, the grain of the shell being very fine, and its surface slightly glossy. They are of a uniform pale cream colour. Dimensions in inches .9 to .94 by .77" (North).



J.G.Keulemans, del.

Witherby & C^o

†
LOPHOPHAPS FERRUGINEA.
(RED PLUMED PIGEON).



RED PLUMED PIGEON.

Breeding season. March (North); May (Carter); July to September (Ramsay); October (Carter). Two broods are reared (Carter).

THE following note is by T. F. Gregory,* who procured the type of this species: "I found this species in large numbers on the Gascoigne River. It almost invariably frequents rocky ground near water, and in such situations I have occasionally seen more than five hundred come down to drink in less than half-an-hour. On the wing it exactly resembles the common Partridge, but is not quite so plump in the body, and does not ever appear to fly in coveys."

Mr. Tom Carter writes: "These birds are found throughout the North-west of Australia, wherever rocky ground occurs in the vicinity of water. They are extremely tame when coming to drink, approaching fearlessly to within a few feet of one, and perch about on the great boulders, with their crests erect. The male (apparently) struts about, cooing lustily. In habits they much resemble Partridges, going about in small flocks of four or six, and rising with a sudden loud whirr."

The bird figured and described is a male, procured on the Coongan River, North-western Australia, on July 8th, 1908, by Mr. F. Lawson Whitlock, and was given to me by Mr. H. L. White, of Scone, New South Wales.

* Gould's *Hand. B. Austr.*, II., p. 137 (1865).

LOPHOPHAPS PLUMIFERA PLUMIFERA.

PLUMED PIGEON.

(PLATE 43.)*

GEOPHAPS PLUMIFERA Gould, P.Z.S., p. 19 (1842), North-west Coast of Australia (between Cape Hotham† and the Island of Depuch).

Geophaps plumifera Gould, P.Z.S., p. 19 (1842); *id.*, B. Austr., V., Pl. 69 (1848); Bonaparte, Consp. Av., II., p. 87 (1855).

Columba plumifera Prévost and Knip, Fig., II., p. 109, Pl. 58 (1838-43).

Lophophaps plumifera Reichenbach, Av. Syst., p. XXV., (1852); Gould, Handb. B. Austr., II., p. 135 (1865); Ramsay, P.L.S., N.S.W., I., p. 183 (1876); Campbell, Vict. Nat., II., p. 129 (1886); Ramsay, Tab. List Austr. B., p. 18 (1888); Campbell, Nests and Eggs Austr. B., p. 691 (1901); Hartert, Nov. Zool., XII., p. 197 (1905); Hall, Key B. Austr., p. 72 (1906); Mathews, Handl. B. Austral., p. 11 (1908); *id.*, Emu, IX., pp. 2, 54 (1909).

Goura plumifera Schlegel, De Dierent., p. 209 (1864).

Phaps plumifera Schlegel, Mus. P.-B., IV., Columbæ, p. 155 (1873), part.

Lophophaps leucogaster (not Gould) Salvadori, Cat. B. Brit. Mus., XXI., p. 535 (1893); † Ingram, Ibis, p. 391 (1907)‡; Le Souëf, Emu, II., p. 154 (1903).

DISTRIBUTION. North-western Australia; Northern Territory.

Adult male. General colour above sandy-buff, barred with black and grey, more coarsely on the wings and sides of neck; primary-coverts and quills chestnut, the latter tipped with blackish-brown; the outermost primary blackish on the outer web; the greater number of the primaries have black shafts; some of the inner secondaries brown, with whitish margins; the innermost secondaries like the back, with metallic-purple spots on the outer webs; middle tail-feathers like the back, outer pair almost entirely black, the remainder reddish-brown, broadly tipped with black; fore-part of the head and ear-coverts blue-grey; hinder part of the crown and crest bright fawn-colour, the elongated plumes straw-colour; a narrow line of black on the forehead, which extends over and below the eye; chin and lower throat black; cheeks and upper throat white; fore-neck, sides of the body and under wing-coverts fawn-colour; abdomen and a band across the breast white; an irregular band across the breast, composed of grey and black bars; under tail-coverts slate-grey, margined with white; "Bill blackish; iris yellow, bare skin round the eyes crimson; tarsi and feet very dark purple" (J. P. Rogers). Total length, 230 mm.; culmen, 19; wing, 108; tail, 62; tarsus, 20.

* The Plate is lettered White-Bellied Plumed Pigeon.

† Cape Hotham is in the Northern Territory, not far from the place where John McDowall Stuart set up his flag after having successfully crossed the Continent in 1862.

‡ Bird examined.



J.G. Keulemans, del.

Witherby & C^o

†
LOPHOPHAPS PLUMIFERA.
(WHITE-BELLIED PLUMED PIGEON).

PLUMED PIGEON.

Adult female. Similar to the adult male, but slightly smaller. Total length, 223 mm.; culmen, 19; wing, 105.

Immature female. Differs from the adult female in the absence of the metallic wing-speculum.

Nest. "A slight depression in the ground, sheltered by herbage—spinifex etc." (Campbell).

Eggs. "Clutch, two; elliptical in shape; texture of shell fine; surface glossy; colour, light creamy-white. Dimensions in inches, 1.0 by .79" (Campbell).

Breeding season. July to September (Ramsay); October (MacGillivray).

MR. ROGERS, writing from near Wyndham, in North-west Australia, says: "These birds first appeared here on October 28th (1908) when a large flock came to drink at a pool near my house. They frequent stony country and only leave it when they come to drink, which is usually about 9 o'clock in the morning. Sometimes, however, they will remain near the water till almost 4 o'clock, going down to drink several times between these hours. Some birds spend the hotter part of the day under a shady tree but always prefer a stone to stand on, others will stand motionless on a stone, in the sun when one can feel the ground hot even through thick boots.

"When going to water, if the distance be short, they walk, but if the distance be great they run a little way, then fly about 150 yards, then run again, and so on."

Mr. Elsey,* writing from the Victoria River, in Northern Territory, says: "This lovely little bird was abundant on the Victoria, especially about rocky holes and exposed hot gullies and on the hot sandy beds of the broad rivers of the Gulf, where it was strutting about in the full glare of the sun, with its crest erect. I have shot six or eight at a time on those rivers."

The bird figured and described is a male, collected on Parry's Creek, North-west Australia, on November 5th, 1908, by Mr. J. P. Rogers.

* Gould's *Hand. B. Austr.* II., p. 136 (1865).

LOPHOPHAPS PLUMIFERA LEUCOGASTER.

WHITE-BELLIED PLUMED PIGEON.

LOPHOPHAPS LEUCOGASTER Gould, B. Austr. Suppl., Pl. 69 (1867), Machrihanish Station, South Australia.

Geophaps plumifera (not Gould) Leichhardt, Journ. Overl. Exp. in Austr., p. 284 (1847); Sturt, Narr. Exp. Centr. Austr., App., p. 43 (1849).

Lophophaps leucogaster Gould, B. Austr. Suppl., Pl. 69 (1867); Ramsay, P.L.S., N.S.W., I., p. 196 (1876); *id.*, P.L.S., N.S.W. (2), I., p. 1095 (1887); *id.*, Tab. List Austr. B., p. 18 (1888); North, Austr. Mus. Cat., No. 12, p. 276 (1889); North and Keartland, Rep. Horn. Sc. Exp., II., p. 99 (1896); Campbell, Nests and Eggs Austr. B., p. 693 (1901); Hall, Key B. Austr., p. 72 (1906); Mathews, Bull. B.O.C., XXV., p. 34 (1910).

Phaps leucogaster Giebel, Thes. Orn., III., p. 90 (1877).

Lophophaps ferruginea Campbell, Vict. Nat., III., p. 166 (1887).

DISTRIBUTION. Central Australia; Queensland (Gulf of Carpentaria, Ramsay).

Adult male. General colour of the upper-surface rich fawn-colour, barred with black and blue-grey on the hind-neck, sides of neck, upper back and wings; lower back, rump, and upper tail-coverts more or less uniform, like the middle tail-feathers; bastard-wing rufous, blackish on the outer webs; primary-coverts and quills chestnut, the latter with black shafts and black tips to the outer ones; secondaries blackish, margined with rufous, innermost secondaries like the back with green and purple metallic spots on the outer webs; basal portion of outer tail-feathers reddish-grey, apical portion black; fore-part of the head and ear-coverts blue-grey; hinder part of the crown and crest deep fawn-colour, the long crest feathers sandy-buff; lores and a line over the eye black, like the chin, and a line from the gape to the eye, also a band across the lower throat; upper throat crossed by a white band; fore-neck, sides of the body, and a narrow band across the lower breast, rich fawn-colour; upper part of the abdomen and a narrow band across the breast pure white, a narrow black and grey band across the breast separating the white and ferruginous bands on the latter; lower abdomen and thighs sandy-buff; under wing-coverts chestnut; under tail-coverts slate-grey, with pale margins; Bill black; tarsi and feet red (in skin). Total length, 227 mm.; culmen, 21; wing, 122; tail, 80; tarsus, 21.

Adult female. Similar to the male, but slightly smaller.

Nest. "A depression in the ground, lined with a few loose straws; generally near a tussock of porcupine grass" (Keartland).

WHITE-BELLIED PLUMED PIGEON.

Eggs. "Clutch, two ; of a dull, creamy-white colour, with rather rough surface and lacking the usual glossy surface of pigeons' eggs" (Keartland). Dimensions in inches, 1.05 by .8 (Ramsay).

Breeding season. June to October (Keartland).

UNDER the heading of *Geophaps plumifera*, Sturt* says : "It was on the return of the party from the eastern extremity of Cooper's Creek, that we first saw and procured specimens of this beautiful little bird. Its range was entirely confined to about thirty miles along the banks of that creek, and it was generally noticed perched on some rock fully exposed to the sun's rays, and evidently taking a pleasure in basking in the tremendous heat. It was very wild and took wing on hearing the least noise, but its flight was short and rapid, like that of a quail, which bird it resembled in many of its habits. In the afternoon this little pigeon was seen running in the grass on the creek side, and could hardly be distinguished from a quail. It never perched on the trees, and when it dropped after rising from the ground, could seldom be flushed again, but ran with such speed through the grass as to elude our search."

Mr. G. A. Keartland† met with this species while with the Horn Scientific Expedition in Central Australia. He says : "At Crown Point, on the 18th of May, Mr. Belt secured the first pair of these birds. They proved to be adults, and the female contained a well-developed egg in the oviduct. Subsequently I obtained them in numbers at Lawrie's Creek, Petermann Creek, Hermannsburg, and in fact wherever rocks and water existed, until we reached Crown Point on the return journey on 26th July. On several occasions they made a welcome addition to our table, where their beautiful white flesh was much appreciated. Their love of rocky country has gained for them their appellation of 'Rock Pigeons.' They are strictly ground birds and never perch on trees, but assemble in small companies on the rocky sides of the gorges through which we passed, where they seemed to enjoy basking in the hot sun. Owing to their colour they are not easily seen on the red sand or rocks. They are easily approached, and when disturbed rise with a 'whirr' like a Quail ; but as soon as they are well on the wing they gently glide away, giving a tempting shot. At Stokes' Pass, Hugh Edgar, one of our camel drivers, found a nest, if such it might be called, containing two young ones nearly able to fly. They were entirely brown, but others probably a week older were found, which had developed the white and black on the throat and head, which were invisible on the nestlings, as the feathers had not formed on these parts. The birds lay their eggs on the ground, generally near a tussock of porcupine grass, and place a few loose straws around, but in such a careless manner that it scarcely deserves the name of nest. Subsequently, at Haast's Bluff, Dr. Stirling found several nests containing eggs

* *Narr. Exp. Centr. Austr.*, App., p. 43 (1849).

Rep. Horn. Sc. Exp., p. 101 (1896).

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or young ones. There were never more than two eggs, which are about one-third smaller than those of *Ocyphaps lophotes*, and are of a dull, creamy-white colour, with rather rough surface and lacking the usual glossy surface of pigeons' eggs. I was informed that these birds have never been found further south than Crown Point, on the Finke River."

I have never seen a specimen of *Lophophaps* from the Gulf of Carpentaria, but both Dr. Ramsay and Mr. North consider it to be *L. leucogaster*.

A specimen of *L. leucogaster* in the British Museum, collected by the Horn Scientific Expedition, has a wing measurement of 119 mm., and a specimen of *L. plumifera*, collected by Mr. Elsey on the Victoria River, Northern Territory, has a wing measurement of 103 mm.

The bird described is a male, collected at Arltonga, in Central Australia, on April 22nd, 1907, and was given me by Mr. Edwin Ashby, of Adelaide.

GENUS—OCYPHAPS.

OCYPHAPS (Gould) Gray, App. List Gen. B., p. 12 (1842) *O. lophotos.*

MUCH larger than *Lophophaps*—almost the size of a Partridge; head with a long crest of very narrow and sharply-pointed feathers. Tail long and graduated, consisting of fourteen rectrices. The wing is peculiar, the *third* primary being strongly attenuated from the middle. Bill less strong than in *Lophophaps*.

DISTRIBUTION. Australia. (One species only.)

OCYPHAPS LOPHOTES.

CRESTED PIGEON.

(PLATE 44.)

COLUMBA LOPHOTES Temminck, Pl. Col., ii., pl. 142 (1823); Blue Mountains, New South Wales.
Columba lophotes Temminck, Pl. Col., ii., pl. 142 (1823); Wagler, Syst. Av. Columba, sp. 103 (1827).

Crested Pigeon of the Marshes Sturt, Two Exp. into S. Australia, I., Pl. p. 79 (1834).

Turtur (?) *lophotes* Selby, Nat. Libr., Pigeons, p. 174, Pl. 18 (1835).

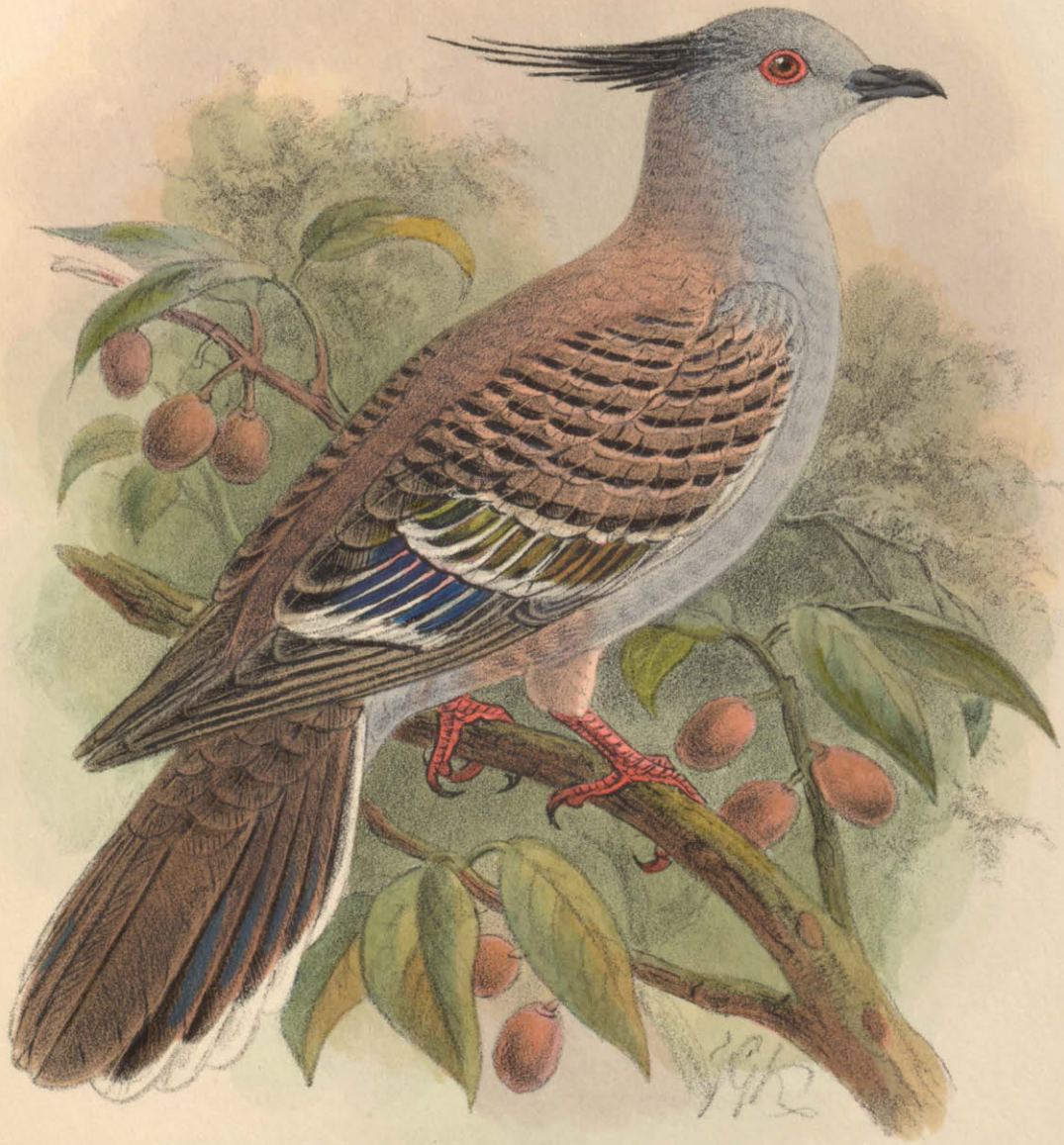
Ocyphaps lophotes Gould, P.Z.S., p. 20 (1842); *id.*, B. Austr., V., Pl. 70 (1848); Sturt, Narr. Exp. Centr. Austr., App., p. 44 (1849); Bonaparte, Consp. Av., II., p. 93 (1855); Gould, Handb. B. Austr., II., p. 139 (1865); Ramsay, P.L.S., N.S.W., VII., p. 410 (1882); *id.*, Tab. List Austr. B., p. 18 (1888); North, Austr. Mus. Cat., No. 12, p. 277 (1889); Salvadori, Cat. B. Brit. Mus., XXI., p. 535 (1893); North, Rep. Horn Sc. Exp., II., p. 99 (1896); Campbell, Nests and Eggs Austr. B., p. 695 (1901); Oates, Cat. Birds' Eggs Brit. Mus., p. 105 (1901); Hall, Emu, II., p. 61 (1902); Carter, Emu, III., p. 173 (1904); Hartert, Nov. Zool., XII., p. 198 (1905); Hall, Key B. Austr., p. 72 (1906); Berney, Emu, VI., p. 47 (1906); Mathews, Handl. B. Austral., p. 11 (1908).

Phaps lophotes Schlegel, Mus. P.-B., IV., Columbæ, p. 156 (1873).

DISTRIBUTION. Australia generally.

Adult male. General colour of the upper-parts grey, with a strong blush of pink, more particularly on the hind-neck, sides of neck, and sides of breast, becoming more olive-grey on the rump and upper tail-coverts, with metallic-coppery reflections on the rump; lesser wing-coverts pale grey, remainder of the coverts and scapulars barred with black, the median and greater series tipped with white, giving the appearance of two parallel bars of white, and enclosing a bronzy-green speculum; the secondary quills also tipped with white, which indicates a third wing-bar; a second wing-speculum of metallic-purple; bastard-wing and primary-coverts grey, edged and tipped with white; quills pale brown, whitish on the inner webs towards the base; tail-feathers blackish, showing bronzy-green reflections and tipped with white, more broadly on the outer feathers; head pale lead-grey, with an elongate crest of black feathers; throat and under-surface pale grey, darker and more dusky on the flanks and under tail-coverts; under wing-coverts and axillaries white. Bill black; iris orange, orbits pinkish-red. Total length, 310 mm.; culmen, 22; wing, 163; tail, 123; tarsus, 25.

Adult female. Similar to the adult male, but somewhat paler on the wings and scapulars, and darker on the under tail-coverts. "Bill dark-grey, iris ochreous-red, orbits carmine; tarsi and feet pink" (F. L. Whitlock). Wing, 156.



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3
OCYPHAPS LOPHOTES.
(CRESTED PIGEON).

CRESTED PIGEON.

Nest. "A slight, flat structure of twigs, usually placed in a bush—polygonum, hakea, salt, etc.—or low tree, sometimes on a stump" (Campbell).

Eggs. "Clutch, two; elliptical in shape, sharply nipped off at one end; texture of shell fine; surface glossy; pure white. Dimensions in inches 1.32 to 1.29 by .92 to .93" (Campbell).

Breeding season. All the year round (Berney).

Incubation-period. In captivity, fourteen days (Selater); nineteen days (Butler).

MR. TOM CARTER sends me the following notes: "On the Gascoyne River, in North-west Australia, in 1887, numbers of these Pigeons used to come and drink at the sheep-troughs as the season was a dry one. Several times I have killed four or five at a shot. I also saw large flocks in Western Australia, similar to those seen by Gould in New South Wales."

Mr. T. P. Sandland, writing from Burra, in South Australia, says: "These birds are plentiful on the polygonum flats fronting the River Murray, but rare in the back country."

Mr. C. F. Belcher says: "I have only once seen this bird in Southern Victoria. In 1888, several made their appearance in Eastern Park, in Geelong."

Gould* found it plentiful on the banks of the Namoi River. He says: "It frequently assembles in very large flocks, and when it visits the lagoons or river-sides for water, during the dry seasons, generally selects a single tree, or even a particular branch, on which to congregate before descending simultaneously to drink.

"Its flight is so rapid as to be unequalled by that of any member of the group to which it belongs; an impetus being acquired by a few quick flaps of the wings, it goes skimming off apparently without any further movement of the pinions. Upon alighting on a branch it elevates its tail and throws back its head, so as to bring them nearly together, at the same time erecting its crest, and showing itself off to the utmost advantage."

Mr. Keartland,† who collected examples in Central Australia, says: "All along the route these beautiful birds were found at the water-holes morning and evening, but during the day they scattered through the forests and scrub. At Goyder's Well they came in numbers soon after sunrise, and alighting about one hundred yards from the water, congregated on a small hillock for a few minutes to plume their feathers. They then marched in procession down to drink. In the flocks very young birds were often present, and also females containing eggs in the oviduct, thus showing their sociable habits during breeding time."

The bird figured and described is a male, collected at Alexander, Northern Territory, by the late W. Stalker, on September 23rd, 1905.

* Gould's *Handb. B. Austr.*, II., p. 139 (1865).

† *Rep. Horn. Sc. Exp.*, II., p. 99 (1906).

GENUS—LEUCOSARCIA.

LEUCOSARCIA Gould, B. Austr., II., Pl. 63 (1843) *L. melanoleuca*.

THIS monotypic genus has been placed by Count Salvadori in his subfamily *Geotrygoninae*, the members of which have no metallic spots or patches on the wings. *Leucosarcia melanoleuca*, the only species in the genus, is a large bird. The exposed portion of the culmen is very short, the frontal feathering extending to the middle of the beak, and reaching almost as far as the nostrils.

The tail consists of fourteen rectrices, and is moderately long and strongly rounded. Metatarsus bare, longer than the middle toe. Wing rounded, third and fourth primaries longest. All the toes have the skin of the soles laterally expanded.

DISTRIBUTION. Australia. (One species only.)



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$\frac{1}{2}$
LEUCOSARCIA PICATA.
(WONGA WONGA).

LEUCOSARCIA MELANOLEUCA.

WONGA-WONGA.

(PLATE 45.)*

COLUMBA MELANOLEUCA Latham, Ind. Orn. Suppl., p. LIX. (1801), New Holland (Port Jackson).

White-faced Pigeon Latham, Gen. Syn. B. Suppl., II., p. 268 (1801).

Pied Pigeon, *id.*, *ib.*

Columba melanoleuca Latham, Ind. Orn. Suppl., p. LIX., No. 1 (1801).

Columba picata, *id.*, *ib.*, No. 2.

Columba armillaris Temminck et Knip, Fig. fam. 2, Pl. VI. (1811); *id.*, Fig. et Gall., I., p. 97 (1813).

Colombe Goad-Gang Temminck, Fig. et Gall., I., p. 369 (1813).

"*Colombe*" Jamieson Quoy et Gaimard, Voy. de l'Uranie et la Phys. Zool., p. 123 (note) (1824).

Columba jamiesonii Desmarest, Dict. Sc. Nat., XL., p. 310 (1826).

Phaps "picata" Selby, Nat. Libr., Pigeons, p. 194 (1835).

Carpophaga melanoleuca Gray, Ann. Mag. Nat. Hist., XI. p. 194 (1843).

Leucosarcia picata Gould, B. Austr., V., Pl. 63 (1843); Bonaparte, Consp. Av., II., p. 86 (1855); Gould, Handl. B. Austr., II., p. 120 (1865); Ramsay, P.L.S., N.S.W., I., p. 183 (1876); *id.*, Tab. List Austr. B., p. 18 (1888); North, Austr. Mus. Cat., No. 12, p. 272 (1889); Salvadori, Cat. B. Brit. Mus., XXI., p. 607 (1893); North, B. County Cumberland, p. 105 (1898); Campbell, Nests and Eggs Austr. B., p. 696 (1901); Oates, Cat. Birds' Eggs Brit. Mus., p. 106 (1901); Hall, Vict. Nat., XVIII., p. 22 (1901); North, Agr. Gaz., XVI., p. 1014 (1905); Hall, Key B. Austr., p. 73 (1906); Sharpe, Hist. Coll. B.M., p. 145 (1906); Le Souëf, Wild Life in Austr., p. 149 (1907); Mathews, Handl. B. Austral., p. 12 (1908).

Goura picata Schlegel, De Dierent., p. 208 (1864).

Leptopila picata Schlegel, Mus. P.-B., IV., Columbæ, p. 163 (1873).

DISTRIBUTION. Queensland; New South Wales; Victoria.

Adult male. General colour above slate-grey, including the entire back, wings, and middle tail-feathers; bastard-wing, primary-coverts, and quills blackish, the latter with narrow white margins on a portion of the inner webs; the four outer tail-feathers

*The Plate is lettered *Leucosarcia picata*.

THE BIRDS OF AUSTRALIA.

tipped with white ; crown of the head and a horse-shoe band on breast and abdomen white ; cheeks and throat grey ; fore-neck and a band on each side of breast dark slate-grey, like the upper-surface ; some of the feathers on the abdomen, sides of body, and flanks have elongated black marks or round spots of black on the middle of the feathers ; under tail-coverts brown, with whitish margins. " Bill black, base pink ; iris brown, orbits red ; tarsi and feet pink " (Moffatt). Total length, 430 mm. ; culmen, 31 ; wing, 214 ; tail, 157 ; tarsus, 40.

Adult female. Similar to the adult male in the colour of the plumage, but with smaller measurements.

Immature male. Differs from the adult male in having the outer webs of the secondary quills shaded with brown.

Nest. " Very frail in structure, composed of sticks or twigs placed on a horizontal branch of a tree at a height of from ten to twenty feet above the ground, in scrub or forest " (Campbell).

Eggs. Clutch, two ; a clutch from the Dawson River, North Queensland, are smooth and glossy. Pure white. Axis, 38 mm. ; diameter, 26.

Breeding season. October to January (Ramsay). Two broods are reared in a season (Campbell).

THIS bird is fairly common on the Blue Mountains in New South Wales. I have frequently come across one (sometimes two) feeding on the ground, on the berries that fall from the "Lilly-pilly" trees. When startled it rises with a clapping noise, caused by the wings meeting ; it generally flies along the path, before turning off into the scrub, and offers a very tempting shot to the collector. When it perches on a tree, it will remain quite still, till all danger seems to have passed. The excellence of its flesh and its large size make these birds much sought after.

As Mr. Campbell* says : " Their loud call-notes are readily distinguished from all other Pigeons', being a rapid, continuous, high-pitched ' hoo-hoo-hoo-hoo ' which may be heard half a mile off."

Mr. Le Souëf,† speaking of this bird in the Riviera district of New South Wales, says : " It is comparatively easy to imitate their note and so bring the birds within gunshot. On several occasions I have noticed that when the male bird has been sitting on the nest and any danger threatens, he lowers his head, raises, and slightly spreads his tail, at the same [time] turning his back towards the intruder. The effect is to hide the bird's body and only show the upraised tail, which looks like a large flower and is comparatively inconspicuous. Like all other species of Australian Pigeons, the male generally sits during the day."

The bird figured and described is a male, collected at Ourimbah, in New South Wales, on April 21st, 1905.

* *Nests and Eggs Austr. B.*, p. 697 (1901).

† *Wild Life in Austr.*, p. 149 (1907).

ORDER V.—RALLIFORMES.

FAMILY—RALLIDÆ.

GENUS—RALLUS.

- RALLUS Linné, Syst. Nat., Xth Ed., p. 153 (1758).. *R. aquaticus.*
Biensis Pucheran, Rev. Zool., p. 278 (1845).. *R. madagascariensis.*
Lewinia "Reich" Bonap., Ann. Sci. Nat., 4th Ser., Zool. I.,
p. 150 (n.n.) (1854).
Lewinia "Bp." Gray, Cat. Gen. Subgen. Birds, p. 120 (1855) *R. pectoralis.*
Donacias Heine und Reichenow, Nomencl. Mus. Hein.,
p. 321 (1888).

SMALL wading or swimming birds, with compressed body, long slender bills, short tarsi, long toes, short rounded wings and short tail. The bill is longer than the head, compressed at the base, and not developing into a horny extension covering the forehead; usually longer than the tarsus, which is shorter than the middle toe and claw. A very deep, long groove occupies more than half the length of the upper mandible, which is slightly curved; nostrils a narrow slit situated in this groove, parallel to the lower edge of the mandible. In the wing the first primary is shorter than the second, third and fourth, the second usually the longest. Tail of twelve rectrices is very short. Over twenty-eight species and subspecies have been separated.

DISTRIBUTION. Cosmopolitan.

Key to the Species.

- | | |
|--------------------------------------|--------------------------------|
| A. Smaller; wing under 110 mm. | <i>R. pectoralis</i> , p. 185. |
| B. Larger; wing over 110 mm. | <i>R. clelandi</i> , p. 189. |



J. G. Keulemans, del.

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⁴³
HYPOTAENIDIA BRACHYPUS.
(SLATE-BREASTED RAIL).

RALLUS PECTORALIS PECTORALIS.

SLATE-BREADED RAIL.

(PLATE 46.)*

RALLUS PECTORALIS Temminck, Pl. Col., Vol. V., 88th liv., page opp. Pl. 523 (1831),
New South Wales.

Rallus pectoralis Temminck, Pl. Col., Vol. V., 88th liv., page opp. Pl. 523 (1831);
Pucheran, Rev. Mag. Zool., p. 276 (1851).

Rallus brachypus Swainson, An. in Menag., p. 336 (1837); Gould, Handb. B. Austr., II., p. 336
(1865); Ramsay, P.L.S., N.S.W., I., p. 193 (1876); North, Austr. Mus. Cat., No. 12,
p. 329 (1889).

Rallus lewinii Swainson, An. in Menag., p. 336 (1837); Gould, B. Austr. VI., Pl. 77 (1848).

Lewinia lewini Gray, Cat. Gen. Subgen. Birds, p. 120 (1855).

Lewinia brachypus Bonaparte, Compt. Rend., XLIII., p. 599 (1856).

Lewinia pectoralis, *id.*, *ib.*

Rallus brachypus Hügel, † Ibis, p. 393 (1875).

Hypotaenidia (Lewinia) brachypus Ramsay, P.L.S., N.S.W., II., p. 199 (1877).

Hypotaenidia brachypus Campbell, Vict. Nat., IV., p. 186 (1888).

Hypotaenidia brachypus Sharpe, Cat. B. Brit. Mus., XXIII., p. 37 (1894); North, B. County
Cumb., p. 108 (1898); Campbell, Nests and Eggs Austr. B., p. 739 (1901); Oates,
Cat. Birds' Eggs Brit. Mus., I., p. 112 (1901); Hall, Key B. Austr., p. 76 (1906);
Mathews, Handl. B. Austral., p. 12 (1908); Littler, Handb. B. Tasmania, p. 110 (1910).

Eulabeornis brachypus Mathews, Birds Austr., p. 184 (1911) (cancelled).

DISTRIBUTION. South Queensland; New South Wales; Victoria; Tasmania; South
Australia.

Adult Male. General colour above black, all the feathers broadly margined with olive-brown
including the mantle, back, upper tail-coverts, and tail; scapulars black, barred with
white; lesser wing-coverts olive-brown; median- and greater-coverts blackish,
narrowly barred with white—these white bars are not always continuous across the
feathers, but only represented by a short bar on each web; bastard-wing, primary-
coverts, quills, uniform dark brown, the long inner secondaries barred with white on

* The Plate is lettered *Hypotaenidia brachypus*.

† I cannot believe that this bird came originally from the Auckland Islands, where *Rallus muelleri*
Rothschild has been found. Dr. von Hügel says he bought it from the captain of a ship coming from the
Auckland Islands, but this of course is not proof that it was captured there.

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the outer webs; tail-feathers black, margined with olive-brown; feathers of the head and hind-neck black margined with chestnut; forehead, eyebrow, and sides of neck bright chestnut; cheeks, throat, and breast grey with a brownish tinge, becoming whitish on the chin; remainder of the under-surface, including the sides of the body black, barred with white, not so sharply defined on the thighs; vent and under tail-coverts tinged with sandy-buff; axillaries and under wing-coverts blackish, slightly tipped with white; "Bill brownish-red; feet flesh-colour, becoming darker about the toes; iris hazel" (J. Gould). Total length, 210 mm.; culmen, 33; wing, 103; tail, 45; tarsus, 29.

Adult female. Similar to the adult male, but differs in being smaller and in having the breast almost pure grey. Total length, 203 mm.; culmen, 33; wing, 93; tail, 41; tarsus, 26.

Immature female. Differs from the adult female in having a darker appearance; the absence of chestnut on the head, hind-neck, and sides of neck; fore-neck and sides of neck blackish, like the under-surface of body, showing only traces of white cross-bars on the lower flanks; throat pale grey like the adult; also paler on the middle of the abdomen.

Nestling covered with black, silky down.

Nest. "Composed of fine grass and rushes, and situated in a swamp amongst thick rushes, which are usually drawn together above, so as to form a covering. There is a staging or landing leading to the nest, which is variously placed from six inches to three feet above the water" (Campbell).

Eggs. Clutch, four to six; ground-colour pale stone, sparingly spotted with pinkish-brown spots, and more thickly with lavender-grey ones. Axis, 36—37 mm.; diameter 28—29.

Breeding Season. October to December (Ramsay).

IN THE Paris Museum Cuvier labelled a species of Rail, *Rallus pectoralis*. It was the custom in those days to quote manuscript names as if they were valid, and therefore Lesson, in the *Traité d'Orn.*, p. 536 (1831), quoted *Rallus pectoralis* Cuv., as if a bird had been described under that name. Unfortunately, Gould used this name (*Birds Austr.*, VI., Pl. 76, 1848) for the Australian form of *Eulabeornis philippensis*, and in this connection it was for many years commonly accepted.

In the *Revue et Mag. Zool.*, 1851, p. 276, Pucheran, from an examination of the specimen so labelled by Cuvier in the Paris Museum, pointed out that the name was affixed to the bird described by Swainson as *Rallus brachipus lewini*, in 1837. As a result, the name *pectoralis* was rejected as applied to the Australian *Eulabeornis philippensis*.

Upon looking into the matter, I found that when Pucheran reviewed this species, he indicated that very probably the same bird had been described by Temminck under the same specific name, and this is actually the case. Curiously all reference to Temminck's *Rallus pectoralis* is omitted from the *Cat. Birds Brit. Mus.*, Vol. XXIII. Temminck's name was published with

SLATE-BREASTED RAIL.

a description in 1831, in the same year that Lesson noted Cuvier's manuscript name, yet has never been recognised hitherto. There can be no doubt that it must replace *brachipus*; and as the type-locality was unknown, Temminck noting that it was supposed to have come from Oceanica, I designate East Australia (New South Wales).

Capt. A. S. White, of South Australia, sends me the following note: "This little Rail makes its appearance on Adelaide Plains about August and September, keeping to the rushes, reeds or grass in the swamps and creeks. In these places its sharp note is heard, but the bird seldom seen, for they keep to cover very closely. The nest is composed of grass and aquatic plants, and placed close to the water. The young, when they leave the nest, are covered in black down. When the young are fully fledged they do not show the barring on the flanks, or any rusty-red on the neck. These birds leave us in November, and I have never known of a case where they stopped throughout the year."

Gould,* speaking of this bird, says: "In Tasmania this species is very abundant in all low, marshy situations, lagoons, and the rushy banks of rivers; it occurs in most of the small islands in D'Entrecasteaux Channel; I have also seen specimens from Southern and Western Australia, which are precisely similar in their markings, and only differ in being somewhat larger."

Mr. Brent† contrasts the nest of the Spotted Crake [*Porzana fluminea*] and this (Lewin's) Rail: "Both Spotted Crake and Lewin's Rail have the stage or track leading up to the nest, but much larger in the latter, on account of the great height of some of the positions from the ground, as compared with those of the Crake, which are low down. I have found the nest of the Rail as high as three feet from the ground, whereas I have never found the other more than one foot high. The nest of the Rail is more compact, rounder and deeper, with fine grass and rushes over head, laced together and formed into a kind of dome-shaped basket-work covering. I should like to draw your attention to the fact that this little bit of workmanship does not occur until such time as the bird is sitting, when she seems to amuse herself by reaching up her long neck and bill, and pulling the rushes down. The nest of the Crake is not like the Rail's, being composed of dry bits of rushes and aquatic weeds, carelessly made, with a slight attempt at an overhead covering. When sitting, the nest-stage and eggs are mostly plastered with a thick coating of mud, in fact, you cannot tell if the latter are eggs or stones. I find I have omitted to say the nest of the Rail is composed of fine band-grass (dry), beautifully put together, with a track of the same material,

* Handb. B. Austr., II., p. 336 (1865).

† Campbell's Nests and Eggs Austr. B., p. 740 (1901).

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which has the appearance of being gathered up by the end, and carried in as far as the nest by the bird, where the end is tucked in, and the remaining part, which is generally long, left lying where the bird entered—by this means the track is formed. In the case of the Crake, she carries nothing for her stage, but simply makes use of the rushes and grass at hand, and with her fine long toes she must tread it into position.”

The bird figured is a female, collected at Bungaree, Victoria, in May, 1886, by Mr. Edwin Ashby, who gave me the specimen.

RALLUS PECTORALIS CLELANDI.

WESTERN SLATE-BREASTED RAIL.

RALLUS PECTORALIS CLELANDI, subsp. n., West Australia.*

? *Donacias brachypus* Heine und Reichenow, Nomencl. Mus. Hein., p. 321 (1888).

Hypotaenidia brachypus Ogilvie-Grant, Ibis, p. 187 (1910).

DISTRIBUTION. Western Australia.

Adult Male. Larger than *R. pectoralis pectoralis* in every dimension. The upper coloration is generally darker, whilst the margins of the feathers on the head and hind-neck are deeper and duller, which colour also shows on the sides of neck; the under coloration of a purer grey than in the Eastern form, while the primaries are black rather than dark brown. Culmen, 42; wing, 114; tarsus, 36 mm.

Immature. Differs only from the Eastern form in its larger size.

THE life-history of this very interesting bird appears to be unknown.

The discovery of this subspecies has been the means of placing the better-known Eastern form in its proper genus. For that subspecies the generic term *Lewinia* was introduced, as of "Reichenbach," by Bonaparte, but only as a nude name, until Gray had correctly denoted the genotype. In the Cat. Birds Brit. Mus., Vol. XXIII., *Lewinia* appears as a synonym of *Hypotaenidia*, and since then the species has been usually placed in the genus *Hypotaenidia*. But the long bill of this subspecies has revealed the fact that the Eastern bird is purely a short-billed *Rallus*. As long ago as 1894 Stone (Proc. Acad. Nat. Sci. Philad., p. 134) noted *Lewinia* as a synonym of *Rallus*, and (p. 135) included it in the synonymy of this latter genus. This new subspecies agrees minutely in every structural detail with *Rallus aquaticus*, the type of the genus *Rallus*. This makes the fourth subspecies of *Rallus pectoralis* to be recognised, the species now being separable as follows:—

| | | | | | | |
|-------------------------------------|----------|-----------------|------------------------|----|----|-----------------|
| <i>Rallus pectoralis pectoralis</i> | Temminck | .. | .. | .. | .. | East Australia. |
| " | " | <i>clelandi</i> | Mathews | .. | .. | West Australia. |
| " | " | <i>exsul</i> | Hartert | .. | .. | South Flores. |
| " | " | <i>alberti</i> | Rothschild and Hartert | .. | .. | New Guinea. |

* Named after Dr. J. Burton Cleland, formerly of Perth, West Australia.

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It is interesting to note that this last-discovered form has varied in the opposite manner from *R. p. pectoralis* than the earlier-named forms, these being lighter and smaller, instead of larger.

GENUS—EULABEORNIS.

EULABEORNIS Gould, P.Z.S. (Lond.), p. 56 (1844) *E. castaneoventris*.

Hypotaenidia Reichenbach, Nat. Syst. Vög., p. xxiii. (1852).. .. *E. philippensis*.

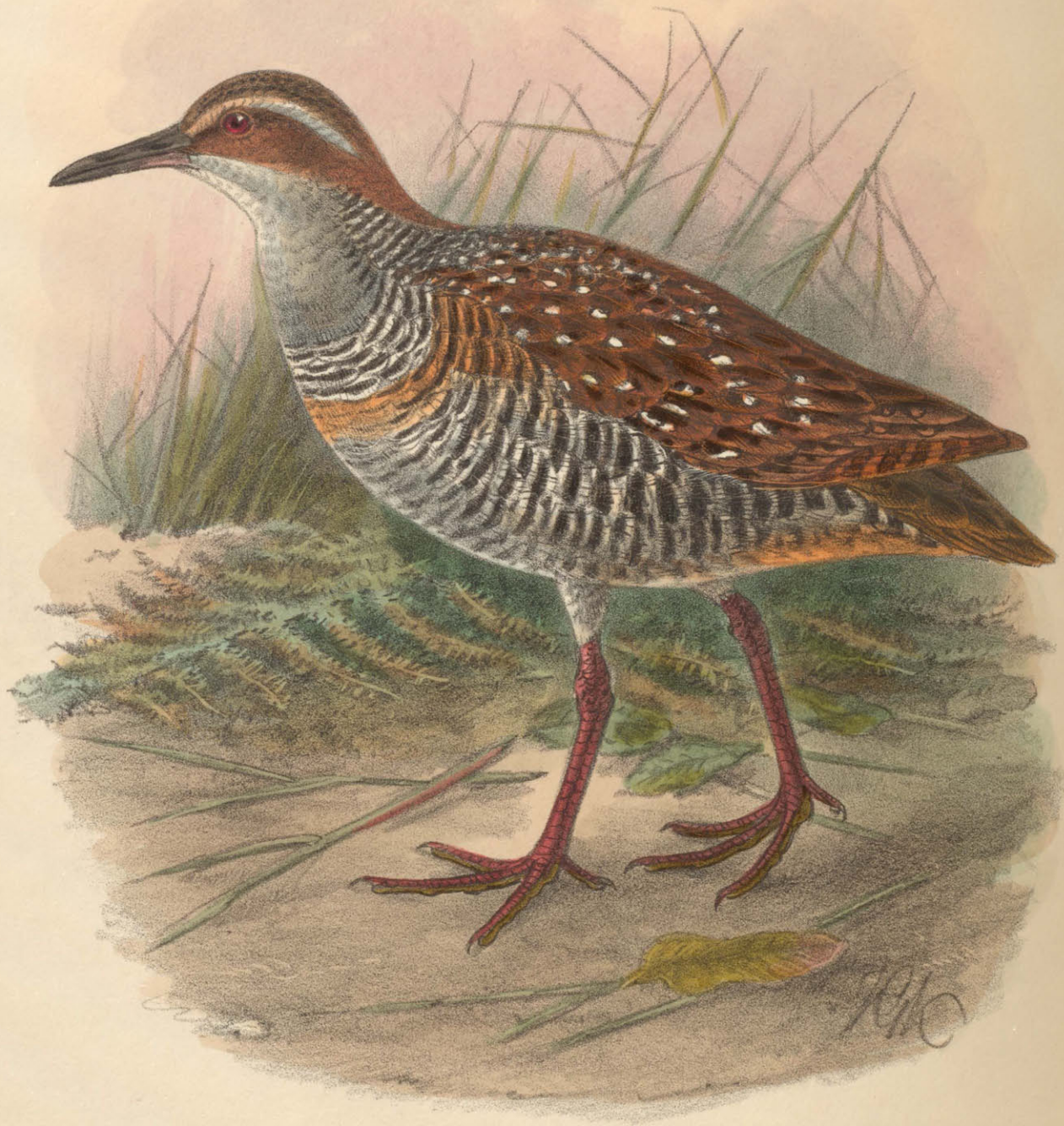
SPECIES generally larger than members of the genus *Rallus*, with a stouter and shorter bill and shorter toes. The bill is almost straight and about three times as long as high, often less, whereas the bill in *Rallus* is always more. The nasal groove is more than half the length of the culmen, but is shallower and wider than in the aforesaid genus, the nostrils being similar, and similarly situated. The culmen is generally shorter than the tarsus, which is about equal to the middle toe and claw. Otherwise the characters are as in *Rallus*. Thirty species and subspecies are known.

DISTRIBUTION. Australia ; Oceania ; New Zealand.

NOTE.—*Gallirallus lafresnayanus* Verreaux and Des Murs, has been placed in the genus *Tricholimnas* created for it alone by Sharpe. The genus may be admitted on account of the curvature of the bill, otherwise the type is typically a member of the genus *Eulabeornis* (s. str.) : a second member of the genus *Tricholimnas* is *Ocydromus sylvestris* Sclater, which has no relationship with *Gallirallus* (= *Ocydromus*) and still less with *Cabalus*, where Sharpe placed it. This location would seem to have been made in deference to the conventional idea that the Lord Howe bird must have some connection with the New Zealand avifauna. Certainly it was not made through a scientific comparison of the birds, as *O. sylvestris* is as obviously congeneric with *T. lafresnayanus* as it differs from *C. modestus* or *Nesolimnas dieffenbachii*.

Key to the Species.

- A. Larger ; wing over 200 mm ; uniform above and below *E. castaneiventris*, p. 200.
- B. Smaller ; wing under 160 mm. :
 - a'*. Uniform above ; no pectoral band *E. robinsoni*, p. 203.
 - b'*. Mottled above ; ochreous pectoral band *E. australis*, p. 193.



J.G.Keulemans, del.

Witherby & C^o

$\frac{3}{4}$
HYPOTÆNIDIA PHILIPPINENSIS.
(PECTORAL RAIL).

EULABEORNIS PHILIPPENSIS AUSTRALIS.

BUFF-BANDED RAIL.

(PLATE 47.) *

Hypotænidia australis Pelzeln, Ibis, p. 42 (1873), Australia.*Rallus philippensis* (not Linné) King, Narr. Surv. Coasts Austr., II., p. 420 (1826).*Rallus pectoralis* (not Temminck) Gould, B. Austr., VI., Pl. 76 (1848); Sturt, Narr. Exp. Centr. Austr., App., p. 54 (1849).*Eulabeornis pectoralis* (not Temminck) Lichtenstein, Nomencl. Av., p. 96 (1854).*Hypotænidia philippensis* Gould, Handb. B. Austr., II., p. 334 (1865); Ramsay, P.L.S., N.S.W., II., p. 199 (1877); *id.*, Tab. List Austr. B., p. 21 (1888); North, Austr. Mus. Cat., No. 12 (1889); *id.*, B. County Cumb., p. 107 (1890); Keartland, B. Melbourne, p. 118 (1900).*Hypotænidia australis* Pelzeln, Ibis, p. 42 (1873).*Rallus* (*Hypotænidia*) *philippensis* Ramsay, P.L.S., N.S.W., I., p. 193 (1876).*Eulabeornis philippensis* Hartert, Katal. Vögel Mus. Senckenberg, p. 212 (1891).*Hypotænidia philippinensis* (not Linné) Sharpe, Cat. B. Brit. Mus., XXIII., p. 39 (1894); Robinson and Laverock, Ibis, p. 650 (1900); Campbell, Nests and Eggs Austr. B., p. 740 (1901); Oates, Cat. Birds' Eggs Brit. Mus., I., p. 113 (1901); Carter, Emu, III., p. 174 (1904); Compton, Emu, IV., p. 168 (1905); Hall, Key B. Austr., p. 76 (1906); Berney, Emu, VI., p. 108 (1907); Austin, Emu, VII., p. 76 (1907); Mathews, Handl. B. Austral., p. 12 (1908); Littler, Handb. B. Tasmania, p. 112 (1910).

DISTRIBUTION. Australia generally; Tasmania.

Adult male. Head reddish-brown, streaked with black; superciliary streak white, merging into grey behind the eye; lores and a broad line through the eye chestnut, like the hind-neck, to which it is joined; sides of neck, lower hind-neck, and mantle blackish, barred and spotted with white; back, rump, upper tail-coverts, and tail black, broadly edged with ochreous-brown, and a few marginal white spots on the upper tail-coverts; scapulars dark-brown, margined with ochreous-brown, and spotted with white; lesser wing-coverts ochreous-brown, with black and white spots on the margins of the feathers; bastard-wing dark-brown, barred with rufous and white; primary-coverts and quills dark-brown, barred with rufous, some of the bars on the two outer primaries white, the innermost secondaries black, with rufous and white bars and fringed with ochreous-brown; throat and fore-neck pale grey, darker on the latter; upper breast and abdomen banded with narrow black and white bars, more broadly* The Plate is lettered *Hypotænidia philippinensis*.

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on the sides of the body and abdomen, as also the axillaries and under wing-coverts; a band of ochreous-buff across the breast; thighs buffy-white; under tail-coverts black, barred with white, and tipped with sandy-buff; quills below barred with rufous and brown of almost equal widths, the two outer primaries more broadly banded with blackish, and more narrowly with white; bill warm brown; feet flesh-red; iris, Indian-red. Total length, 335 mm.; culmen, 33; wing, 153; tail, 66; tarsus, 39. The wing measurements of seventeen birds from the same locality give—the males 143 to 153, the females 133 to 145.

Adult female. Similar to the adult male, but slightly smaller.

Young about eleven days old. "General appearance sooty-black, with down of a hair-like texture. Breast and flanks black, barred with white. Sides of the throat and cheeks black, flecked with white. Iris, grey-hazel" (Mattingley).

Nest situated near swampy ground and placed in the vegetation. Composed of grass and leaves. Egg cavity, 4 inches.

Eggs. Clutch about six. Eggs from the Dawson River, North Queensland, are smooth and glossy; ground-colour creamy or buff, with spots and blotches of chestnut-brown over the surface, but more thickly at the larger end; underlying spots and blotches of lilac-grey. Axis, 33 to 36 mm.; diameter, 24 to 26.

Breeding season. September to December (Ramsay); January (Berney); February (Campbell).

THE Australian form is, like most Rails, extremely shy, trusting rather to its feet than its wings to escape its enemies.

Mr. Tom Carter, of Western Australia, sends me the following: "This bird occurs in the North and South-west of this State, but owing to its shy habits it is not very often seen, especially in long grass. One was shot on October 15th on the *sea-shore* at Point Cloats in the drought of 1891. Another was shot while running about the drafting yards on July 27th, 1901. Several times remains of birds, killed by hawks or cats, were noticed."

Mr. C. Belcher says: "The Buff-banded Rail is sparsely distributed along the banks of the water-courses of Southern Victoria. I saw a nest containing eight eggs on Leopold Hill, near Geelong, in 1887. It is partial to tracts of marshy land covered with the shrub known as 'samphire.'"

I am indebted to Dr. G. Horn, of Melbourne, for the following: "This bird is still fairly common near Melbourne. Unless very hard pressed it will never fly, trusting rather to its strong legs. The young are covered with a black, wiry down. Those we reared got adult plumage in about three months."

Capt. A. S. White, of South Australia, writes me the following: "This bird appears very plentifully in some seasons in the Adelaide Plains in July and August. Their harsh cry is then to be heard night and day from the thick undergrowth on the banks of the River Torrens, and in the standing crops. They are very partial to a corn crop, where they usually build their nests. If the crop surrounding a nest is left undisturbed they will, even so, desert it

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after scattering and, in some instances, destroying the eggs. The chicks, when hatched, are covered with soft black down, which makes them almost invisible on the dark ploughed ground.

"Strange to say, a pair did not depart last January [1910], their usual time, but have stayed on in my garden."

Mr. Berney*, writing from Richmond, North Queensland, says: "May be seen occasionally, generally during the summer months, but its movements are so uncertain that I cannot say whether it is migratory or not. I have one winter record—June, 1903. The only sound I have heard from it is a sharp, slate-pencil-like squeak. They are hard to flush, being so very loth to fly; they are, too, most stupid birds, and fall an easy prey to cats. A pair nested during January, 1904, within 150 yards of the house. . . . eleven eggs were laid. When walking, they carry the tail very erect, and keep flicking it, like the *Porphyrios*."

The bird figured and described was obtained at Beveridge, in Victoria, on the 26th of March, 1908, by Mr. Frank Howe, who kindly gave me the specimen.

When Dr. Sharpe wrote in the *Cat. Birds Brit. Mus.*, Vol. XXIII., he included under "*Hypotaenidia philippinensis*," specimens from the Philippines, Moluccas, Australia, Pacific Islands and New Zealand. He acknowledged (p. 41): "At the same time I must admit that there is a considerable amount of variation in the plumage, which it is difficult to account for," but concluded (p. 42), "Yet there is no reason for separating the species into races, because there is absolutely no character by which these differences can be defined."

I have carefully examined all the material in the British Museum, and also at the Zoological Museum, Tring, and find that the species can be easily split up into races. As everyone hitherto has shirked the task of differentiating the various subspecies, and as it was necessary for me to go thoroughly into this matter, I herewith give the results of my studies. I hope that this will serve as a groundwork, and now that I have initiated this matter, this Rail will receive its fair share of treatment. Apparently up to the present every Rail that looked like the conventional *Rallus philippensis* was so called from whatever portion of the Pacific it might have been brought. The few writers who have named forms have been ignored, and the general unscientific lumping-policy which has been accepted in the *Cat. Birds*, has been since maintained. As a matter of fact the majority of the forms I hereafter separate can easily be recognised, the characters of each subspecies being constant and easily grasped. Much work has still to be done in recording the various phases of the immature plumage, but here

* *Emu*, VI., p. 108 (1907).

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again I anticipate little difficulty in differentiating juvenile forms when once they have been studied. It may be thought I have created too many subspecies, but I venture to anticipate the addition of several more when series from other localities are available.

I have diagnosed twelve subspecies as follows, and would here point out that subspecies of *E. striata* and *E. pectoralis* are already on record from some of these localities:—

| | | | | |
|--|----|----|----|---------------------|
| <i>Eulabeornis philippensis philippensis</i> Linné | .. | .. | . | Philippine Islands. |
| " " <i>australis</i> Pelzeln | .. | .. | . | Australia. |
| " " <i>sethsmithi</i> , subsp. n. | .. | .. | .. | Fiji Islands. |
| " " <i>forsteri</i> Hartlaub | .. | .. | .. | Tonga. |
| " " <i>goodsoni</i> , subsp. n. | . | .. | .. | Samoa. |
| " " <i>swindellsi</i> , subsp. n. | .. | .. | .. | New Caledonia. |
| " " <i>lesouefi</i> , subsp. n. | .. | .. | .. | New Hanover. |
| " " <i>assimilis</i> Gray | .. | .. | .. | New Zealand. |
| " " <i>macquariensis</i> Hutton | .. | .. | .. | Macquarie Islands. |
| " " <i>chandleri</i> , subsp. n. | .. | .. | . | Celebes. |
| " " <i>wilkinsoni</i> , subsp. n. | .. | .. | .. | South Flores. |
| " " <i>andrewsi</i> subsp. n. | .. | .. | .. | Cocos Keeling. |

Eulabeornis philippensis philippensis Linné is restricted to the Philippines, and examination of a series gives the following characteristic features. The birds have scarcely any indication of red on the hind-neck; have little spotting on the back; the feathers on the upper-surface are blackish with very light brown (or ochraceous) margins which are extensive, so that on the rump only the ochraceous is seen, while the tail is unspotted and shows mostly ochraceous, the wing-coverts are very long, but do not hide the quills; the ochraceous tips are most noticeable, the white spot and black-bar are scarcely seen; the secondaries with the same coloration are very long and exceed the primaries in each case, so that this is a distinctive feature; scarcely any indication of a pectoral band exists, but the flanks and breast are washed with olive-brown, a character which is shared by no subspecies; the black-barring of the under-surface indistinct and scarcely indicated on the centre of the belly in the majority of specimens; the lores are dusky brown. The measurements of the series show that the culmen varies from 29 to 31, the wing 141 to 148 and tarsus 41 to 46, the average figures being culmen 31, wing 144 and tarsus 43 mm.

Eulabeornis philippensis australis Pelzeln is well differentiated by means of its small bill and short tarsus, while in coloration the chief points are the decided red hind-neck; the feathers on the top of the head have reddish-brown fringes (not ochraceous as in the Philippine birds); the brown tips to the back-feathers are of a darker shade and much less extensive, and consequently the upper-surface has a generally darker appearance; there is more spotting on the back

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than in the preceding race; the secondaries are much shorter than the primaries; there is a wide, pale buff pectoral band, and the black barring extends across the belly; the olive wash is missing; the lores are rufous. The measurements vary as follows: Culmen 28 to 33, wing 139 to 153, tarsus 37 to 42, the average being, culmen 30, wing 144 and tarsus 39 mm., the female being slightly smaller. This subspecies is probably confined to Australia, though a single specimen from the Astrolabe Mountains, New Guinea, agrees fairly well with some Australian specimens.

Eulabeornis philippensis sethsmithi,* subsp. n., is based on a well sexed series from Fiji, collected by Mr. E. Layard, and which give quite important results. In general coloration they closely approach the Australian subspecies but the pectoral band is almost missing; in only one case out of ten is there an indistinct coloration (and the lower throat is grey instead of being marked with olive, as in birds from the Philippines); they are, however, consistently larger, and show the females as usual to be less than the males. Seven females give the following measurements: culmen 30.5 to 33, wing 137 to 144, tarsus 40 to 43, the average being culmen 32, wing 142 and tarsus 42 mm., while three males show culmen 32.5 to 36, wing 147 to 149, tarsus 44.5 to 47, the average being culmen 34, wing 148 and tarsus 46. The type is in the British Museum.

Eulabeornis philippensis forsteri Hartlaub can be used for the Birds from Tonga. These are generally darker than Fijian birds, and more spotted on the wing-coverts; they have shorter bills and wing, and therefore approach the Australian subspecies; the tarsus is constantly longer than in that bird; the available material shows that the under-surface barring does not extend across the belly. Immature specimens show the young to resemble the adult, inasmuch as they are almost as distinctly marked in every detail on the upper-surface but lighter, while underneath the throat is washed with buffish, and a pale yellowish tinge pervades the whole under-surface, the barring, though present in the same manner as in the adult, is less marked. A faint pectoral wash shows in these young which is lost in the adult. The culmen varies from 28 to 30, the wing from 132 to 141, the tarsus from 40 to 43.

Eulabeornis philippensis goodsoni,† subsp. n., is introduced for Samoan specimens which are near the Tongan subspecies, but are larger and all show traces of pectoral band; they are darker underneath, and have also the tail much barred with white; other subspecies which they resemble have the tail uniform or scarcely marked. The culmen gives 32 to 36, wing 136 to 155, and tarsus 46 to 48. The type is in the Tring Museum, being a male collected on March 28th, 1895—C. M. Woodford Coll., No. 101.

* Named after Mr. David Seth-Smith, of the Zoological Gardens, London.

† Named after Mr. Arthur Goodson, assistant in the bird-rooms of the Tring Museum.

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*Eulabeornis philippensis swindellsi**, subsp. n., is proposed for New Caledonian birds. These are very dark, with faint and few spots above, and very closely barred with black underneath; there are only indications of red on the hind-neck, and there is only a faint wash suggestive of the pectoral band. These are the darkest birds I have met with, and are quite distinctive. The culmen measures 31 to 33, wing 143 and tarsus 41 to 43.

Eulabeornis philippensis lesouefi,† subsp. n., is applied to birds from New Hanover, with which I associate specimens from New Britain. These are almost as dark as the New Caledonian form, but are barred with white on the lower hind-neck and show distinctly the pectoral band. The culmen gives 32 to 33, the wing 136 to 141 and tarsus 40 to 43. The type is in the Tring Museum, and was collected by Capt. Cayley Webster on February the 13th, 1897.

Eulabeornis philippensis assimilis Gray, the New Zealand subspecies, is very distinct. The almost uniform dull brown upper-surface coloration with scarcely any spotting, the almost total absence of red on the hind-neck, and large bill, are characteristic. In addition, the wing-coverts are abnormally developed, practically hiding the quills, while the secondaries are almost equal in length to the primaries, but never exceed them. The pectoral band is usually present and the under-surface barring fairly pronounced. The measurements read, culmen 34 to 38, wing 135 to 145, tarsus 40 to 42, the average being culmen 37, wing 140 and tarsus 42 mm.

Eulabeornis philippensis macquariensis Hutton, from the Macquarie Islands, differs from New Zealand birds in its short bill and wing, and in being darker both on the upper- and under-surface. The measurements of a male and female in bad condition are culmen 29 to 33, wing 122 to 131 and tarsus 39 to 41 mm.

Eulabeornis philippensis chandleri,‡ subsp. n., can be used for the Celebes birds which are closest to the Philippine birds in general coloration, but have a distinct red hind-neck, much more spotting, are generally darker, and have no pectoral band; the barring is much more pronounced on the under-surface, and they have dusky lores, but the secondaries are always shorter than the primaries. The measurements are, culmen 31 to 32, wing 147 and tarsus 43 mm. The type is in the British Museum.

Eulabeornis philippensis wilkinsoni,§ subsp. n., is introduced for South Flores specimens. These are nearest the Celebes form, but are larger. The measurements are, culmen 32 to 33, wing 155 to 157 and tarsus 45 to 46 mm. The East Timor bird may represent still another subspecies, as in the single specimen I have examined, though resembling in coloration the preceding, the

* Named after Mr. A. M. Swindells, of Tasmania.

† Named after Mr. Dudley le Souëf, of Melbourne.

‡ Named after Mr. L. Chandler, of Victoria.

§ Named after Mr. J. Wilkinson of Huddersfield.

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bill measures 36 mm, the wing 142 and the tarsus 45 mm. The type of *E. p. wilkinsoni* is in the Tring Museum, and is a male.

Eulabeornis philippensis andrewsi,* subsp. n., I have instituted for two specimens from Horsbrough Island, Cocos Keeling Group, which are quite distinctive. The brown tips to the upper-surface feathers have almost entirely disappeared, while the white spotting has developed to the greatest extent, even the rump-feathers bearing spots, a feature which is shared by no other subspecies. The colouring on the hind-neck is well marked, but of a duller shade than usual. There is a very distinct pectoral band with a brick tinge, and the under-surface barring is very marked and regular. The measurements are, culmen 33, wing 148, tarsus 42 mm.

A male in the Tring Museum, collected by Kühn on Toeal, Kei Islands, appears to agree with the Australian subspecies, except in its smaller wing-measurement.

Another male, also collected by the same man on Amboina, and also in the Tring Museum, appears to agree with the New Hanover subspecies in many features, but has the pectoral band paler, and is less blackish on the upper-surface.

Another unsexed bird in the Tring Museum, collected by Kubary in the Pelew Islands, somewhat resembles the dark New Guinea form, but has no indication of a rufous pectoral band.

A bird from New Guinea in the Tring Museum seems near to the New Hanover subspecies, but Dr. Hartert will later give particulars of this bird.

* Named after Dr. C. W. Andrews, of the British Museum, where the type is.

EULABEORNIS CASTANEOVENTRIS CASTANEOVENTRIS.

CHESTNUT-BELLIED RAIL.

(PLATE 48.)

EULABEORNIS CASTANEOVENTRIS Gould, P.Z.S., p. 56 (1844) North Coast of Australia (Gulf of Carpentaria?).

Eulabeornis castaneoventris Gould, P.Z.S., p. 56 (1844); *id.*, B. Austr., VI., Pl. 78 (1848); Mathews, Birds Austr., p. 184 (1911) (cancelled).

Eulabeornis castaneiventris Gould, Handb. B. Austr., II., p. 338 (1865); Ramsay, P.L.S., N.S.W., I., p. 193 (1876); *id.*, Tab. List Austr. B., p. 21 (1888); North, Austr. Mus. Cat., No. 12, p. 331 (1889); Campbell, Nests and Eggs Austr. B., p. 742 (1901); Hall, Key B. Austr., p. 76 (1906); Hall and Rogers, Emu VII., p. 142 (1908).

Eulabeornis castaneiventer Sharpe, Handl. B., I., p. 97 (1899); Oates, Cat. Birds' Eggs Brit. Mus., I., p. 113 (1901); Mathews, Handl. B. Austral., p. 12 (1908).

DISTRIBUTION. North-western Australia; Northern Territory; North Queensland.

Adult male. General colour above olive, including the hind-neck, back, wings, and tail, with a tinge of rufous-brown on the rump; inner web of bastard-wing, primary and secondary quills chestnut-brown, as also the tail-feathers; crown of the head, sides of the face, and throat ash-grey; under-surface of body rich chestnut, deeper in colour on the under wing-coverts and under tail-coverts; washed with grey on the fore-neck and chest; thighs ash-grey; "Base of bill green, tip horn-colour; iris yellow, slightly mottled with brown; feet and legs olive-yellow" (J. P. Rogers). Total length, 537 mm; culmen, 61; wing, 212; tail, 136; tarsus, 70.

Adult female. Differs from the adult male in having the upper hind-neck ash-grey like the head, instead of olive like the back. Total length, 502 mm.; culmen, 56; wing, 206; tail, 130; tarsus, 66.

Nest. "Placed on a low slanting mangrove, and built of sticks, with no lining. Placed from 3 to 7 feet from the ground" (Rogers).

Eggs. Clutch four. "Rather lengthened in form, of a pale pinky-white, dotted all over with reddish-chestnut, the spots being thinly dispersed, and some of them appearing as if beneath the surface of the shell, giving them a darker tint; two inches and one-eighth long, one inch and five-eighths broad" (Gould).

Breeding season. September to November (Rogers).

My collector, Mr. J. P. Rogers, appears to be the only man who knows anything about the life-history of this bird, and he has collected all the specimens of this



J.G. Keulemans, del.

Witherby & Co

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EULABEORNIS CASTANEIVENTER.
(CHESTNUT-BELLIED RAIL).

CHESTNUT-BELLIED RAIL.

Rail I have seen. I sent him specially to the North-west to find out anything possible about it. He writes: "This bird one hears but seldom sees, as it never leaves the thick patches of mangrove. I have heard one nearly every day since I camped in the mangroves, but it is very shy and lives in the thickest patch of scrub. The only chance of seeing them, is to sit still, not an easy matter, as the mosquitoes and sand-flies are numerous. The specimen forwarded was obtained by a fluke. I had watched for it for an hour and could stand the pests no longer, so started home; and having killed a *Pœcilodryas*, was plugging its mouth, etc., when I saw something move in a bunch of young mangroves about fifteen yards away. I fired a half charge and secured a specimen of this bird. The legs are very heavy and muscular. The 'drumstick' measured three and one quarter inches in circumference after the skin was removed. It builds a flat nest of sticks in a low mangrove, choosing a slanting tree up which it can easily climb. The natives aver that this bird cannot fly, and their dogs catch them at times.

"They moult in March.

"On March 7th I had a good look at one of these birds. It was walking in an open space in a mangrove-thicket. Its carriage was not unlike that of the *Porphyrio melanotus*, and the tail was flicked in the same manner. The pectoral muscles are small and flabby when compared with the great development of the legs. One I wounded went off through the mangroves, flapping both wings and hopping on one leg—it made no attempt to fly. The mangroves, where they live, are very dense, and the aerial roots spread out and the stems grow close together on fairly firm mud, so the bird has a splendid opportunity of escaping by running. Sometimes they come very close to one, searching for food, which seemed to be a small shellfish. When probing in the small puddles of salt water, they put their heads in up to the eyes, the tail flicking all the time. So long as I remained seated I could move my gun, take off my hat, etc., without the bird taking any notice, but as soon as I stood up it ran off at great speed for about twenty yards, and then stopped and looked back at me. The natives say the old nests are repaired every year."

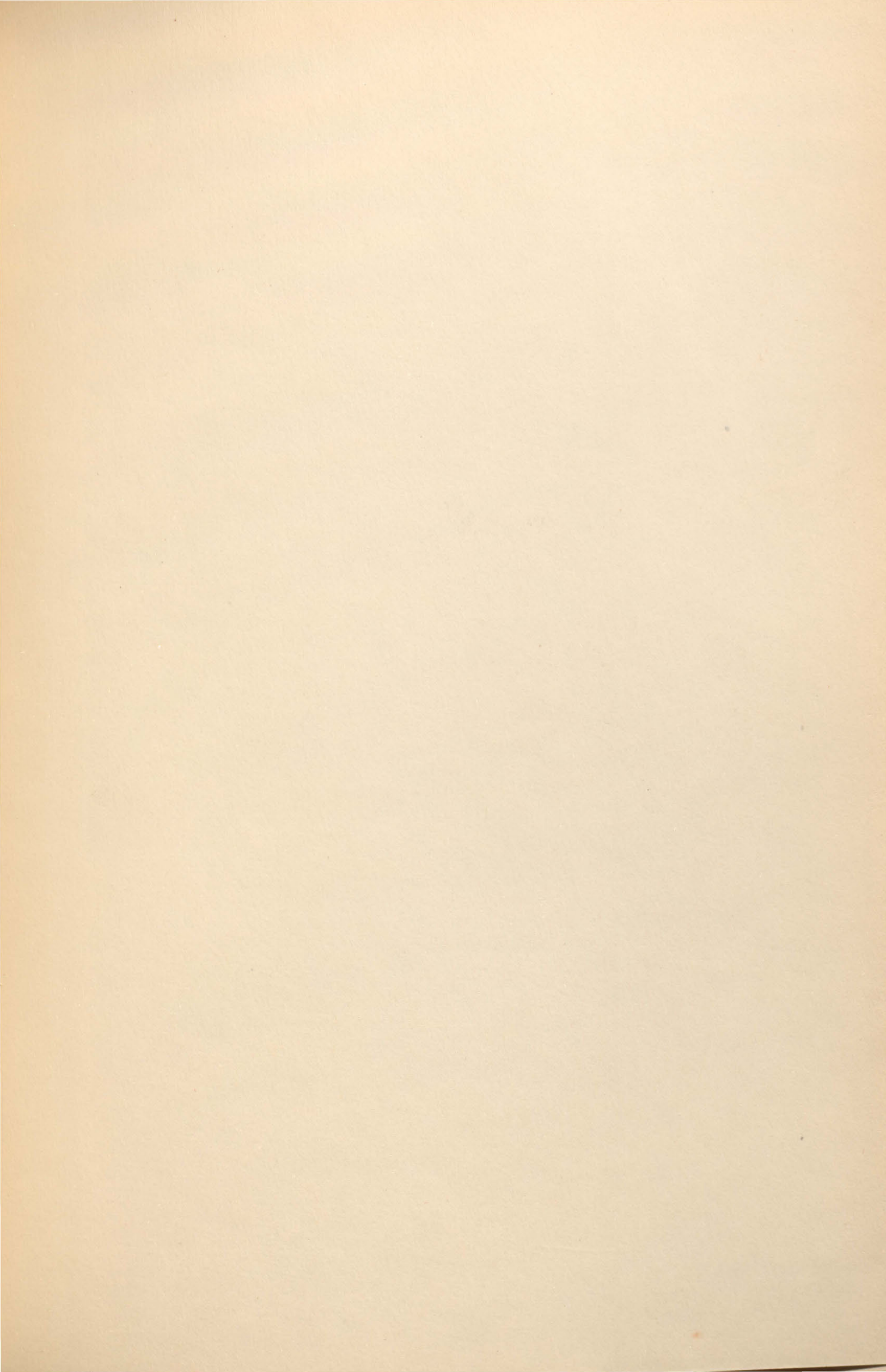
Again, the same man, writing from North-western Australia*, says: "Chestnut-bellied Rail was secured at Storm Camp, 8 miles west of Malmalero, 26/8/02. It has a call that quite puzzles one on first acquaintance. The sound is unlike that of any other bird in the bush, consisting of alternate notes rapidly repeated many times, the first being more like the alarm notes of the white Cockatoo (*C. galerita*); the second like the drumming of an Emu, but much louder. The call is generally given when a gun is fired. On hearing the bird, I tried for hours to get a sight of it, my idea of it being that a

* Emu VII., p. 142 (1908).

THE BIRDS OF AUSTRALIA.

Bittern was calling. A few days later, and when I had given up all hope of seeing it, one called when in a patch of mangroves, and walked straight up to me. Upon wounding the bird with my gun it fell, and then rose and bolted through the scrub, I following the fastest feathered creature yet hunted by myself. Tracking the bird in the soft mud I heard a cry and finally found it about one hundred yards away, quite dead."

Of the birds described, the male was collected by Mr. J. P. Rogers, at Obagama, in North-west Australia, on January 21st, 1904; and the female at the same place, on August 26th, 1902. I am indebted to the Hon. Walter Rothschild for having given me the bird figured.





J.G. Keulemans, del.

Witherby & Co.

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RALLINA TRICOLOR.

(RED-NECKED RAIL).

EULABEORNIS TRICOLOR ROBINSONI.

RED-NECKED RAIL.

(PLATE 49.)*

EULABEORNIS TRICOLOR ROBINSONI, subsp. n., Queensland.

Rallina tricolor (not Gray) Gould, P.Z.S., p. 218 (1866); *id.*, B. Austr. Suppl., Pl. 78 (1869); Ramsay, P.Z.S., p. 603 (1875); *id.*, P.L.S., N.S.W., I., p. 196 (1876); Ramsay, Tab. List Austr. B., p. 21 (1888); North, Austr. Mus. Cat., No. 12, p. 330 (1889); Sharpe, Cat. B. Brit. Mus., XXIII., p. 79 (1894); Robinson and Laverock, Ibis., p. 650 (1900); Campbell, Nests and Eggs Austr. B., p. 742 (1901); Hall, Key B. Austr., p. 76 (1906); Mathews, Handl. B. Austral., p. 12 (1908).

Eulabeornis tricolor Mathews, Birds Austr., p. 184 (1911) (cancelled).

DISTRIBUTION. North Queensland.

Adult male. Head, hind-neck, mantle, and entire breast bright chestnut, somewhat paler on the sides of the face, and whitish on the chin; back and scapulars olive-brown; wings, rump, upper tail-coverts and tail dark brown; bastard-wing brown, with whitish spots on the inner webs, and sometimes on the outer webs also; primary-coverts uniform brown; primary and secondary quills brown, with white bars on the inner webs and faint traces of bars on the outer webs; abdomen, lower flanks, vent, and under tail-coverts sooty-black with rufous cross-bars, paler and inclining to white on the middle of the abdomen; under wing-coverts and axillaries black, barred with white; "Bill, green; iris red; feet slaty-green" (E. Olive). Total length, 276 mm.; culmen, 34; wing, 148; tail, 70; tarsus, 47.

Adult female. Similar to the adult male.

Nestling. "The young, on leaving the egg, are covered with a sooty-black down, having a dark, plumbeous tinge on the under-surface."

Immature. "The young at about five months old have the upper-surface of a dull, dark brown tinged with olive, and washed with light rufous-brown on the back of the neck; the under-surface is of a duller and more plumbeous-brown, with a faint wash of rufous-brown on the chest and under tail-coverts, which latter have two pale rufous bars on each feather; the under-surface of the wings blackish, dull brown, a band of white spots near the base, and a similar band about the middle of the quill-feathers; bill, olive-brown; legs greenish-olive; iris reddish-brown. Total length, 7 inches; wing, 3.6; tail, 1.5; tarsus, 2 in.; bill, 9 in." (Ramsay, P.Z.S., p. 604 (1875)).

* The Plate is lettered *Rallina tricolor*.

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Nest. "Composed of a few leaves and grass and hidden among *débris* at the root of a tree, in a dense part of the scrub" (Ramsay).

Eggs. Clutch, four to six. Colour creamy-white, with rust-brown spots and blotches, and underlying spot of lilac-grey over the entire surface, more thickly at the larger end. Axis, 41 mm.; diameter, 29.

Breeding season. September to December (Ramsay).

THE following note by Dr. Ramsay* is the best account of this bird's life-history I can find. He says: "I found this fine species of Rail by no means rare in the dense scrubs which fringe the rivers and creeks of the coast range near Rockingham Bay: but although tolerably plentiful, they are always very difficult to obtain, on account of the nature of the localities they frequent and their retiring disposition. They are seldom to be seen without lying in wait for them; and not always then can one obtain a shot, except, perhaps, at such close quarters as would entirely destroy them.

"They move about in the evenings and early morn, and at night may be heard calling to one another as they traverse the dense masses of rank vegetation which abound in those districts. I never met them out of these scrubs, although thick swampy grass-beds close by were frequented by allied species.

"They seem very local in their habits, a pair frequenting the same spot for months or perhaps the whole year round, and breeding near the same place year after year; the young soon begin to take care of themselves, and leave the parents before they are well able to fly. I found them some four or five months old in pairs. The note resembles a hoarse croak quickly repeated in a somewhat mournful tone, and a quick 'cluck, cluck' when come upon suddenly."

The bird figured is a male, collected in North Queensland.

This bird has been usually referred to the genus *Rallina*. The type of *Rallina*, however, is *Rallus fasciatus* Raffles, which is a small "Porzanoid" Rail; it has the tarsus almost twice as long as the culmen. "*Rallina*" *tricolor* and its subspecies are much larger birds, and the tarsus is little longer than the culmen. They differ more from *R. fasciatus* than they do from *Eulabeornis*, with which they agree quite well in structural features, though they are admittedly not typical. I, however, prefer to include the Australian bird in the latter genus in preference to providing a new name. As showing the difficulty of classing these aberrant forms of Rallidæ, I would quote the case of the Guadalcanar bird described by Grant as *Rallina woodfordi*, and which Sharpe transferred to *Eulabeornis* (Cat. Birds B.M., XXIII., p. 50). This bird agrees closely in every structural character with "*Rallina*" *tricolor*,

* P.Z.S., p. 603 (1875).

RED-NECKED RAIL.

and disagrees in no manner with *Eulabeornis castaneiventris*. I have, therefore, less hesitation than I would otherwise have had in adopting the generic name *Eulabeornis* for the *tricolor* species.

The distribution of "*Rallina*" *tricolor* has been quoted as "Aru Islands, New Guinea and North Australia." Upon comparison of birds from these three localities I find that they are easily separable—the Australian bird has a shorter and more slender bill, shorter tarsus and is less barred on the abdomen than the typical form, while, as Sharpe noted, the New Guinea specimens are different, the abdomen being barred with white and more numerous than in the other subspecies. In addition the upper-surface of the Australian bird is of a warmer tone than in the northern forms, lacking the slaty tinge commonly seen in the latter. I have therefore named the Australian subspecies as above, and I propose for the New Guinea subspecies the name *E. tricolor GRAYI*. The types of both are in my collection, the former being No. 8012 and the latter No. 187.

GENUS—C R E X .

- CREX Bechstein, Orn. Taschenb., II., p. 336 (1803) *C. crex.*
Octygometra Forster, Syn. Cat. Brit. Birds, p. 27 (1817) *C. crex.*
Octogometra id., ib., p. 27 (1817).
Ortygometra id., ib., p. 59 (1817).

SOLE species similar to members of the genus *Porzana*, but larger and of stouter build, with a short, stout bill and short toes; the bill at the base is more than half its length, and the culmen tapers to a point as it enters the forehead. The culmen is shorter than the middle toe, which is shorter than the tarsus, while the base of the gonys forms a decided angle. Other characters as in *Porzana*.

DISTRIBUTION. Australia and New Zealand (accidental); Europe and Northern Asia to West Siberia, wintering in Africa, Arabia, and India; casual in eastern North America.



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$\frac{3}{4}$
CREX CREX.
(*CORN-CRAKE*).

CREX CREX.

LAND-RAIL.

(PLATE 50.)

RALLUS CREX Linné, Syst. Nat., Ed. X., I., p. 153 (1758), Europe.

Rallus crex Linné, Syst. Nat., Ed. X., I., p. 153 (1758); *id.*, *ib.*, Ed. XII., I., p. 261 (1766); Thienemann, Fortpflanz. ges. Vögel, Pl. LXXII., figs. 3, a-e (1850).

Gallinula crex Tunstall, Ornith. Brit., p. 3 (1771); Gould, B. Europe, IV., Pl. 341 (1837).

Crex pratensis Bechstein, Orn. Taschenb., II., p. 337 (1803); Gould, B. Gr. Brit., IV., Pl. 87 (1863); Gurney, Ibis, p. 331 (1863); Dresser, B. Europe, VII., p. 291 (1878); North, B. County Cumb., p. 108 (1898); Bonhote, Zool., p. 29 (1900).

Ortygometra crex Forster, Syn. Cat. Brit. Birds, p. 27 (1817).

Ortygometra crex id., *ib.*, p. 59.

Crex herbarum Brehm, Handb. Naturg. Vög. Deutschl., p. 694 (1831).

Crex alticeps id., *ib.*

Rallus featherstonii Buller, Essay Ornith. New Zealand, p. 18, Note (1865).

Eulabeornis featherstonii Gray, Handl. B., III., p. 56 (1871).

Crex crex Sharpe, Ed. Layard's B. South Africa, p. 611 (1884); North, Rec. Austr. Mus., II., p. 82 (1893); Sharpe, Cat. B. Brit. Mus., XXIII., p. 82 (1894); Campbell, Nests and Eggs Austr. B., p. 744 (1901); Oates, Cat. Birds' Eggs Brit. Mus., I., p. 115 (1909); Hall, Key B. Austr., p. 76 (1899); Mathews, Handl. B. Austral., p. 12 (1908).

DISTRIBUTION. The same as the genus.

Adult male (in Autumn). General colour above olive-grey with blackish centres to the feathers, including the head, hind-neck, back, scapulars, long innermost secondaries, upper tail-coverts and tail; lesser median and greater wing-coverts pale chestnut, like the bastard-wing; primary-coverts dark brown edged with rufous; quills dark brown; the first primary white along the outer edge, the remainder rufous on the outer webs, with a blackish spot at the tips, the secondaries for the most part pale rufous; lores and a line over the eye rufescent; throat and middle of abdomen whitish; breast sandy-rufous, darker on the sides of the body, where it is barred with white; under tail-coverts similar, and tipped with white; axillaries and under wing-coverts pale chestnut; edge of wing white. In summer, the sides of the neck and a stripe over the eye are blue-grey; bill, feet and claws a pale brown; iris hazel. Total length, 240 mm.—culmen, 22; wing, 130; tail, 75; tarsus, 35.

Nestling. Covered with sooty-black down, which is darker on the head and throat, with lines of rufous feathers and black tips on the back, sides of the body, and the

THE BIRDS OF AUSTRALIA.

flanks. Another example, rather more advanced in age, shows that the dorsal tracts of feathers have merged, the feathers having dark brown centres with rufous-brown margins; the tracts on the side of the body are divided by a wide ventral space of black down; the feather-tracts on the flanks are more rufous. Another example, slightly older and still more fledged, shows the last remains of the black down on the head, throat, wings, tail, thighs, and a narrow ventral line; the growth of the feathers having closed in the spaces mentioned above; the secondary quills are just making their appearance, but the primary quills are scarcely perceptible. (These three examples were sent me by Mr. John Lewis Bonhote.)

An almost adult approaching breeding-plumage has the flank feathers very definitely barred with rufous-brown and white; the white on the throat, the grey on the face, and the buff streak through the eye, very clearly defined.

Nest. A scantily lined depression in the ground, placed in the field, near swampy places.

Eggs. Clutch, six to ten. Ground-colour drab-grey, blotched and spotted with chestnut, and underlying spots of lavender-grey, chiefly at the larger end. Surface smooth and glossy. Axis 35 to 38.5 mm.; diameter 26 to 27.

THE first record of this bird having been found in New Zealand was made by Buller, in 1865. He, considering it a new bird, called it *Rallus featherstonii*. It was at once pointed out by Hutton* that the specimen was referable to *O. crex*, and that "Its title to rank as a New Zealand bird is, therefore, very doubtful; but as Mr. Buller has taken the specimen to England with him for comparison, this point will, I hope, be settled." Apparently, in deference to the views of the English Ornithologists, Buller dropped his species, but, very strangely, never acknowledged his error nor justified the record, but simply altogether ignored the matter. Nor is this synonym given in the Catalogue of Birds, Vol. XXIII.

The species was afterwards recorded from New South Wales by Mr. A. J. North (*l.c.*). This specimen was shot by Mr. Walter Higgs, on June 14th, 1893, at Randwick, near Sydney.

In England, where I had opportunities of observing this bird, I found it extremely difficult to flush, especially in the breeding season; it lives among the grass by the sides of the stream, or in marshy places. When its habitat is invaded, it seeks safety by running with great speed through the grass, rather than trusting to its wings to carry it out of danger. When it is flushed it flies, with its feet hanging down, for a short distance only. At times, when picked up after being wounded, it will feign death.

"The 'creaking' call-note uttered by the male—especially towards evening—can easily be imitated by passing the edge of the thumb-nail across the teeth of a comb, and by this means the bird may be lured to within a short distance; the ventriloquial powers attributed to this species are, in my opinion, due to the rivalry of two birds, as well as the marvellous rapidity with which the Land-Rail sneaks, unperceived, from one spot to another."†

* *Cat. B. New Zeal.*, pp. 33, 87 (1871).

† Saunders, *Man. Brit. B.*, 507 (1899).

LAND-RAIL.

“Having been once flushed, it is difficult to put them up a second time: for, besides running with great swiftness, they have a curious method of evading the dogs by leaping with closed wings and compressed feathers over the long grass some three or four yards, and then, running a short distance, they leap again. The scent being thus broken, they generally evade the most keen-scented dogs; and so quickly are these strange leaps made, that it is only by mere chance that the birds are seen.”*

Mr. Tom Iredale tells me: “In the North of England I watched this bird with glasses, endeavouring to find out the reason of its ventriloquial prowess. I saw that it fed after the manner of a common fowl, moving and picking in an erratic manner. At intervals it lifted up its head and uttered its cry, and according to the direction of its head so was the sound heard. Although its cry appeared to come from various quarters, the bird did not alter its position to any extent. When a boy I have made it take wing by continuous chase, but only after a very tiresome pursuit. It has no predilection for swampy places, and its nest was most commonly brought to light by the reaping-machine in the hayfield. It will be seen that my explanation of the apparent ventriloquial powers of this bird differs entirely from that proposed by Saunders.”

The bird figured and described is an adult male in autumn plumage.

* Gurney, *Ibis*, p. 331 (1863).

GENUS—PORZANA.

- PORZANA Vieillot, Analyse, p. 61 (1816) *P. porzana*.
 ? *Zaporina* Forster, Syn. Cat. Brit. Birds, p. 59 (1817).
Zapornia Stephens, in Shaw's Gen. Zool., XII., pt. I., p. 230 (1824) *P. parva*.
Phalaridion Kaup., Skizz. Entw.-Gesch. Nat. Syst., p. 173 (1829) *P. parva*.
 (Also spelt *Phalaridium*.)
Rallites Pucheran, Rev. Zool., p. 277 (1845) *P. parva*.
Mustelirallus Bonaparte, Compt. Rend., XLIII., p. 599 (1856) .. *P. albicollis*.
 (Also spelt *Mustellirallus*.)
Galeolimnas Heine und Reichenow, Nomencl. Mus. Hein., p. 320
 (1888).
Poliolimnas Sharpe, Bull., B.O.C., I., p. XXVIII. (1893) *P. cinerea*.

SPECIES generally as small as or smaller than members of the genus *Rallus*, with short stout bills and long slender toes. The bill is generally shorter than the head, with the nasal groove and nostrils much as in *Eulabeornis*. The culmen is shorter than the tarsus, which is usually much less than the middle toe and claw. Other characters much as in *Rallus*. Twenty species and subspecies are known.

DISTRIBUTION. Cosmopolitan.

Key to the Species.

- A. Upper-surface mottled with brown and black :
 - a'*. Upper-surface splashed with white :
 - a''*. Lateral under tail-coverts white *P. fluminea*, p. 212.
 - b''*. Lateral under tail-coverts barred with black *P. palustris*, p. 214.
 - b'*. Upper-surface not splashed with white; Distinctive white eyebrow *P. leucophrys*, p. 218.
- B. Upper- and under-surfaces uniform *P. immaculata*, p. 216.

PORZANA FLUMINEA.

AUSTRALIAN SPOTTED CRAKE.

(PLATE 51.)

Porzana fluminea Gould, P.Z.S., p. 139 (1842), New South Wales.

Porzana fluminea Gould, P.Z.S., p. 139 (1842); *id.*, B. Austr., VI., Pl. 79 (1848); *id.*, Handb. B. Austr., II., p. 339 (1865); Ramsay, P.L.S., N.S.W., I., p. 193 (1876); *id.*, P.L.S., N.S.W., II., p. 199 (1877); *id.*, Tab. List Austr. B., p. 21 (1888); Campbell, Vict. Nat., V., p. 162 (1889); Sharpe, Cat. B. Brit. Mus., XXIII., p. 101 (1894); Morgan, Trans. Roy. Soc. South Austr., XXIII., p. 193 (1898); North, B. County Cumb., p. 108 (1898); Campbell, Nests and Eggs Austr. B., p. 745 (1901); Hall, Key B. Austr., p. 77 (1899-1906); Campbell, Emu, V., p. 196 (1906); Berney, Emu, VI., p. 108 (1907); Mathews, Handl. B. Austral., p. 12 (1908); Littler, Handb. B. Tasmania p. 113 (1910).

Ortygometra fluminea Gray, List Spec. in Brit. Mus., pt. III., p. 118 (1844).

Rallus novæ-hollandiæ Pucheran, Rev. Mag. Zool., p. 278 (1851).

Porzana novæ-hollandiæ Bonaparte, Compt. Rend., XLIII., p. 599 (1856).

Ortygometra novæ-hollandiæ Gray, Handl. Gen. Sp. Birds, B.M., III., p. 62 (1871).

DISTRIBUTION. Queensland; New South Wales; Victoria; Tasmania; South Australia.

Adult male. General colour above, olive-brown, the feathers centred with black mostly concealed, and thickly spotted with white on the mantle and streaked with white on the lower-back and rump; all the white markings edged with a narrow line of black; upper tail-coverts also olive-brown, with concealed black centres to the feathers, which have small white spots on either web; wing-coverts for the most part uniform olive-brown, the median- and greater-coverts with white spots, each of which is margined with black; quills brown, the first primary with a few linear spots of white on the outer web, which is less indicated on the others; inner secondaries spotted with white, the innermost blackish down the centre and more profusely spotted with white, like the adjoining greater-coverts; tail-feathers olive-brown, centred with black and spotted or edged with white; crown of head like the back, the white spots being very small and nearly obsolete on the mantle; base of forehead, sides of crown, sides of face and ear-coverts leaden-grey, the latter washed with olive-brown, and speckled with tiny white spots; lores black; feathers in front of the eye, as well as the forepart of the cheeks, grey; throat, foreneck and entire breast leaden-grey; centre of abdomen whitish, barred with grey; under tail-coverts black, lateral ones white; sides of body and flanks distinctly barred with white and black, the black bars being somewhat the broader; axillaries blackish, barred with white, and resembling the flanks; under wing-coverts dusky



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PORZANA FLUMINEA.
(SPOTTED CRAKE).

AUSTRALIAN SPOTTED CRAKE.

brown barred with whitish ; quills dull ashy-brown below ; " Bill olive-green, orange-red at the base ; feet dark olive-green " (Gould). Total length, 172 mm ; culmen, 20 ; wing, 93 ; tail, 37 ; tarsus, 27.

Adult female. Similar to the adult male.

Nest. " Composed of grass, dry and green intermixed, placed above water-level, in a bush growing in the water of a lake or swamp " (Morgan).

Eggs. " Five. The ground-colour is of a light olive-brown, with dark reddish-brown spots, more plentiful at the larger end, but not forming a distinct ring, some of the marking appear as if beneath the surface. At the larger end there are, in each egg, a few round, almost black spots. Measurements in inches $1\frac{5}{16} - 1\frac{7}{16}$ by $\frac{1}{16}$." (Morgan).

Breeding season. August (Morgan) ; September to December (Ramsay).

I CAN find little regarding the life history of this bird. Capt. S. A. White tells me it is the shyest of all the family. It keeps to the thickest mass of rushes, and can only be flushed with the assistance of dogs. Berney's experience* is as follows : " I had it " (the bird procured) " and a mate under observation for a fortnight. They kept to the thick beds of bulrushes on some bore water, only showing out to feed along the edge in the early morning and evening, and got back to cover wading through the water, as soon as disturbed, but not displaying any great shyness."

The bird figured and described is a male, collected near Adelaide, South Australia.

* *Emu*, VI, p. 108 (1907).

PORZANA PUSILLA PALUSTRIS.

LITTLE CRAKE.

(PLATE 52.)

PORZANA PALUSTRIS Gould, P.Z.S., p. 139 (1842), Tasmania.

Blue-necked Rail, var. A. Latham, Gen. Hist. B., IX., p. 378 (1824).

Porzana palustris Gould, P.Z.S., p. 139 (1842); *id.*, B. Austr., VI., Pl. 80 (1848); *id.*, Handb. B. Austr., II., p. 340 (1865); Ramsay, P.L.S., N.S.W., I., p. 193 (1876); *id.*, *ib.*, II., p. 200 (1877); *id.*, *ib.*, VII., p. 56 (1882); *id.*, Tab. List Austr. B., p. 21 (1888); North, Austr. Mus. Cat., No. 12, p. 332 (1889); Sharpe, Cat. B. Brit. Mus., XXIII., p. 109 (1894); North, B. County Cumb., p. 108 (1898); Campbell, Nests and Eggs Austr. B., p. 747 (1901); Hall, Key B. Austr., p. 77 (1899-1906); Sharpe, Hist. Coll. Nat. Hist. Brit. Mus., II., p. 149 (1906); Mathews, Handl. B. Austral., p. 13 (1908); Littler, Handl. B. Tasmania, p. 114 (1910).

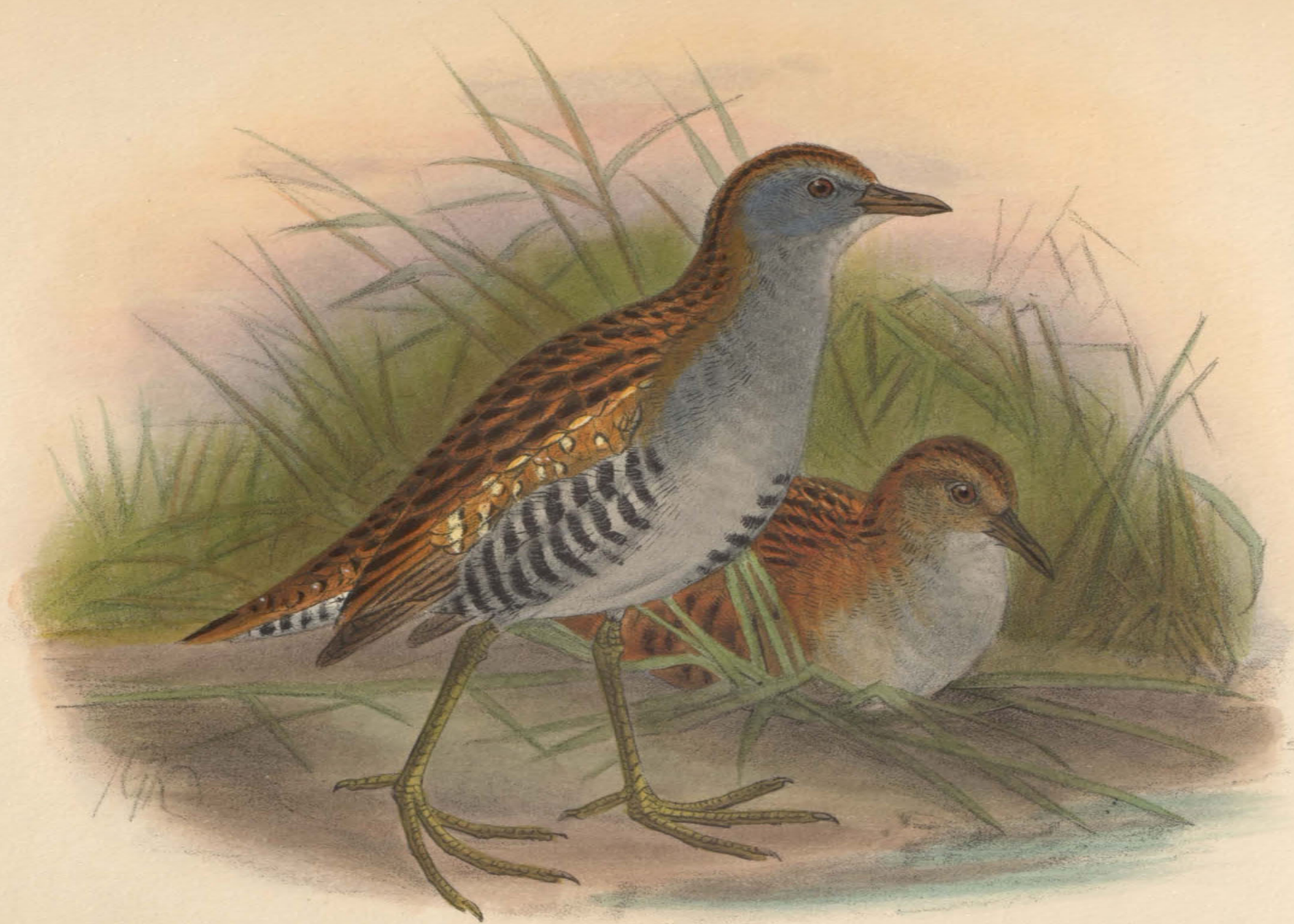
Ortygometra palustris Gray, List Spec. in Brit. Mus., p. 119 (1844).

DISTRIBUTION. Queensland; New South Wales; Victoria; Tasmania; South Australia; Western Australia.

Adult male. General colour above tawny-brown, duller on the head, which is mottled or spotted, with black centres to the feathers, more sparsely on the nape and hind-neck; mantle and back black, as well as the scapulars, the feathers mostly edged with tawny-brown or white, and having subterminal spots or streaks of white, producing a freckled appearance; upper tail-coverts and tail-feathers tawny-brown, with black centres and white spots or bars; wing-coverts tawny-brown, the greater series with white, black-edged spots or bars near the ends; bastard-wing brown, with white on the outer margin; primary-coverts and quills dark brown, the first primary edged with white; the long inner secondaries black, with tawny-brown borders and broken bars of white; eyebrow, sides of face and sides of neck, slate-grey, becoming paler on the chin, throat and middle of breast and abdomen; sides of body and flanks, and under tail-coverts regularly barred with black and white; thighs uniform slaty-grey, paler internally; under wing coverts dusky brown, with broad white margins; axillaries dusky brown with a few white bars; "Bill and feet olive-brown" (Gould). Total length, 158 mm.; culmen, 15 to 17; wing, 86 (varies from 77 to 88); tail, 45; tarsus, 25.

Adult female. Similar to adult male.

Immature. Differs from the adult in having the bars on the sides of the body not so sharply defined, and more or less mixed with the tawny colour of the upper-surface, which also pervades the sides of the breast, which is white like the under-surface.



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†
PORZANA PALUSTRIS.
(*LITTLE CRAKE*).

LITTLE CRAKE.

Nest. " Slightly concave on top ; composed of portions of small round or flat (according to the species) rushes or other aquatic plants, and concealed in rushes, etc., in shallow water or on the mud of swamps. Dimensions over all, about 4 in. by 6 in. in height ; egg-cavity, about $\frac{1}{2}$ in. deep. There are usually two small (back and front) entrances to the nest, through the clump of herbage containing the nest " (Campbell).

Eggs. " Clutch, four to eight ; oval in shape ; texture of shell fine ; surface glossy ; colour brownish-olive, fairly but faintly mottled over the whole surface with a darker shade of the same colour. Dimensions in inches, 1.0 to 1.12 by .75 to .77 " (Campbell).

Breeding season. October to January (Ramsay).

Porzana palustris is the Australian representative of Baillon's Crake (*Porzana pusilla*) of Europe, and may be recognised from its European representative by its much smaller size. I have examined a series of thirteen specimens of the latter species, in my own collection and that of the British Museum. I find that *P. palustris* is a much paler bird, having the throat and breast paler and more of a French grey, instead of being dark leaden-grey as in *P. pusilla*, which has also the bill slightly larger. The chief difference that I can perceive between *P. pusilla* and *P. palustris*, consists in the markings of the abdomen and flanks. In addition to the dark leaden-grey under-surface of *P. pusilla*, the abdomen and the flanks are black with distinct bars of white. In *P. palustris*, however, the under-surface is much lighter grey, as well as the abdomen, the white bars being confined to the flanks, both these and the black bars being very broad and of about equal width.

Mr. C. F. Belcher tells me the only occasion he knows of this bird breeding near Geelong, was in 1891, when a nest of four eggs was taken.

The birds figured and described are from New South Wales.

PORZANA PLUMBEA IMMACULATA.

SPOTLESS CRAKE.

(PLATE 53.)*

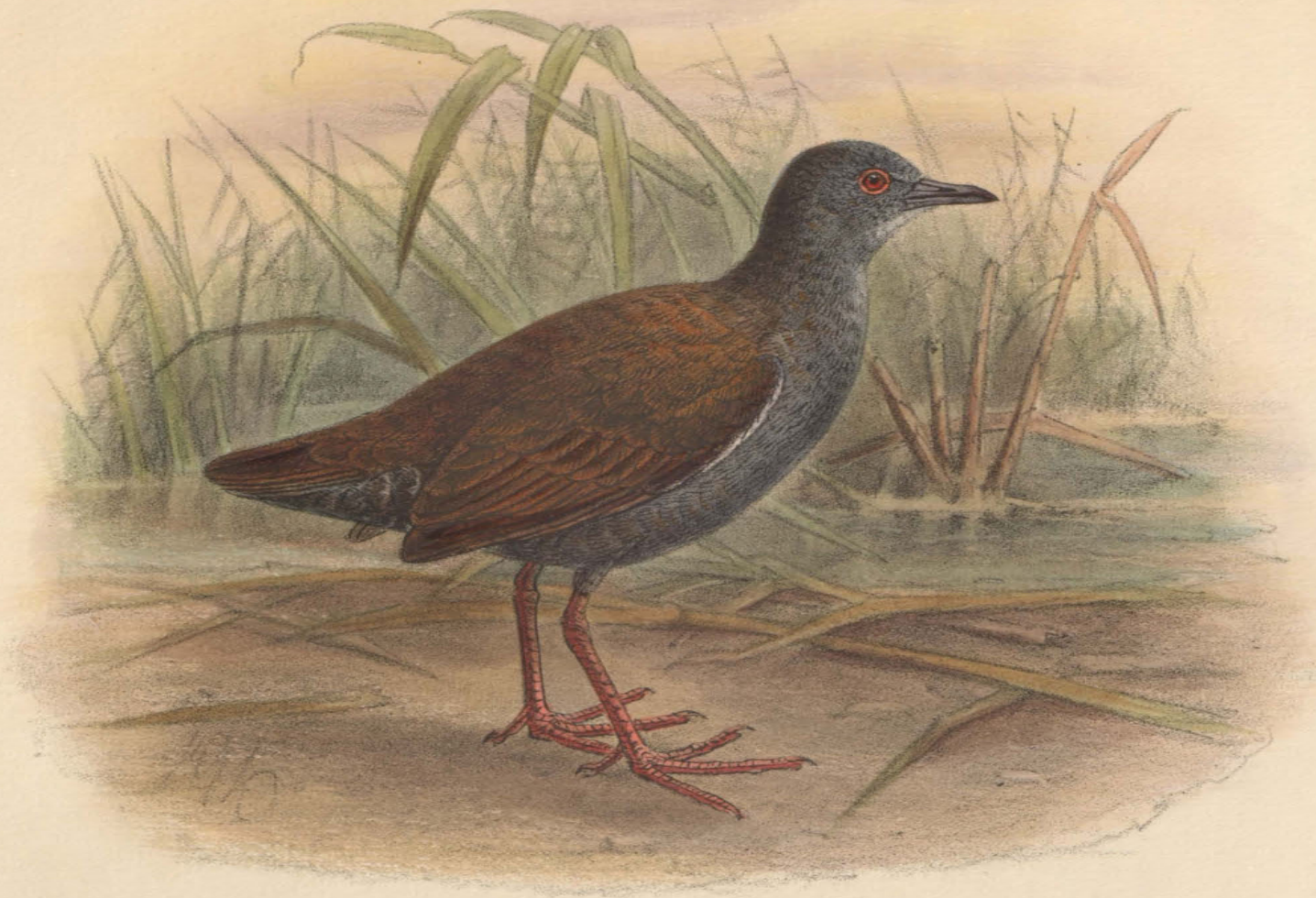
GALLINULA IMMACULATA Swainson, An. in Menag., p. 337 (1838), Tasmania.

Gallinula immaculata Swainson, An. in Menag., p. 337 (1838).*Ortygometra plumbea* (part) Gray, List Spec. in Brit. Mus., III., p. 120 (1844).*Corethrura tabuensis* (part) Gray, Genera Birds, III., p. 595 (1846).*Porzana* (?) *immaculata* Gould, B. Austr., VI., Pl. 82 (1848).*Porzana* (?) *tabuensis* Gould, Handb. B. Austr., II., p. 341 (1865).*Porzana tabuensis* Ramsay, P.L.S., N.S.W., I., p. 194 (1876); *id.*, *ib.*, II., p. 200 (1877); *id.*, Tab. List Austr. B., p. 25 (1888) (part); Sharpe, Cat. B. Brit. Mus., XXIII., p. 111 (1894); Hall, Key B. Austr., p. 77 (1899); Campbell, Nests and Eggs Austr. B., p. 748 (1901); Hall, Key B. Austr., 2nd Ed., p. 77 (1906); Littler, Handb. B. Tasmania, p. 114 (1910).*Phalaridium tabuense* Heine und Reichenow, Nomencl. Mus. Hein., p. 319 (1888).*Ortygometra tabuensis* Hartert, Katal. Vög. Mus. Senckenberg, p. 212 (1891).*Porzana tahitiensis* (part) Stone, Proc. Acad. Nat. Sci. Philad., p. 144 (1894).*Porzana plumbea* Sharpe, Handl. B. Brit. Mus., I., p. 102 (1899); Mathews, Handl. B. Austral., p. 13 (1908); Oglivie-Grant, Ibis, p. 187 (1910).

DISTRIBUTION. Australia; Tasmania.

Adult male. Colour above chocolate-brown; wing-coverts like the back, the greater series dull sepia-brown, externally chocolate-brown; bastard-wing sepia-brown, with white margins to the outer feathers; the primary-coverts and quills sepia-brown, the first primary edged with white, the inner secondaries blackish, margined with chocolate-brown; upper tail-coverts and tail blackish, slightly washed with chocolate-brown; top of the head and hind-neck slaty-black; lores, sides of face, sides of neck and entire under-surface of body dark leaden-grey, a little paler on the throat; under tail-coverts black, with a few twin spots or bars of white; axillaries ashy-brown with narrow whitish ends; under wing-coverts dusky grey, more or less intermixed with white; quills dusky brown below; "Bill black; eye and eyelash red; feet dull brick-red" (Gould). Total length, 181 mm.; culmen, 20; wing, 82 (varies from 80 to 91); tail, 50; tarsus, 26.

Adult female. Similar to the adult male.* The Plate is lettered *Porzana plumbea*.



J. G. Keulemans. del.

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♂
PORZANA PLUMBEA.
(SPOTLESS CRAKE).

SPOTLESS CRAKE.

Nestling. Covered with greenish-black down.

Immature. An apparently immature bird from Tasmania is not so chocolate-brown above; slightly darker underneath, with the throat uniform with the breast. Bill and iris black; legs and feet light brown.

Nest. "Composed of dry grass, placed on the ground under the shelter of a clump of rushes or band-grass, in the proximity of water" (Littler).

Eggs. "Clutch, four usually; lengthened oval in shape; texture fine; surface glossy; colour greyish-white, mottled with chestnut. Dimensions in mm. of a clutch from 28 to 26.75 by 21.5. to 20" (Littler).

Crex plumbea was proposed by Gray (in Griffith's Ed. Cuvier's Animal Kingdom, VIII., p. 410 (1829), for a bird of unknown habitat. The specimen upon which the description was based is still preserved in the British Museum, and upon comparison with Australian specimens it was found to differ, in that it possessed a longer bill and longer tarsus, and also duller upper coloration. The latter might be due to the age of the specimen, but upon carefully examining the series in the British Museum, the New Zealand specimens were found to agree very closely with the type, and possessed longer bills and tarsi than Australian specimens. An additional connecting link between the type and the New Zealand birds was observed in the length of the secondaries, which were almost equal to the primaries, whereas in the Australian form they are considerably shorter. I therefore designate New Zealand as the type-locality of Gray's *Crex plumbea*. In consequence it becomes necessary to revert to Swainson's name *immaculata*, given to a Tasmanian bird, for the Australian subspecies. Here again it would seem that several other subspecies will have to be recognised, but as yet I have not the material at hand to separate them.

The Dark Rail of Latham (Gen. Hist. B., IX., p. 378 (1824)) recognised by Gray (Ann. Mag. Nat. Hist., XI., p. 194 (1843)) as *Porzana plumbea* and by Sharpe (Hist. Coll. Nat. Hist. Brit. Mus., II., p. 149 (1906)) as *Porzana tabuensis*, was founded upon the drawing of a bird from Norfolk Island. These references may be applicable to the Australian subspecies, but at present this cannot be decided, as no specimens from Norfolk Island are available.

I can find no notes regarding the life-history of this bird. The bird figured and described is a male collected in New South Wales, in December, 1888.

PORZANA CINEREA LEUCOPHRYS.

WHITE-BROWED CRAKE.

(PLATE 54.)*

PORZANA LEUCOPHRYS Gould, P.Z.S., p. 33 (1847), Port Essington.

Porzana leucophrys Gould, P.Z.S., p. 33 (1847); *id.*, Birds Austr., VI., Pl. 81 (1848).*Erythra leucophrys* Bonaparte, Compt. Rend., XLIII., p. 600 (1856).*Ortygometra leucophrys* Finsch, Neu-Guinea, p. 181 (1865).*Porzana cinerea* (part) Schlegel, Mus.-Pays. Bas., V., Ralli, p. 32 (1865).*Erythra quadristrigata* Gould, Handb. B. Austr., II., p. 343 (1865); Ramsay, P.Z.S., p. 388 (1868); North, Austr. Mus. Cat., No. 12, p. 332 (1889).*Porzana (Erythra) quadristrigata* Ramsay, P.L.S., N.S.W., I., p. 194 (1876).*Porzana cinereus* Ramsay, P.L.S., N.S.W., II., p. 200 (1877); *id.*, Tab. List Austr. Birds, p. 21 (1888).*Poliolimnas cinereus* (part) Sharpe, Cat. B. Brit. Mus., XXIII., p. 130 (1894); Campbell, Nests and Eggs Austr. B., p. 749 (1901); Hall, Key B. Austr., p. 77 (1899); Le Souëf, Emu, II., p. 156 (1903); Hartert, Nov. Zool., XII., p. 198 (1905); Hall, Key B. Austr., 2nd Ed., p. 77 (1906); Mathews, Handl. B. Austral., p. 13 (1908); *id.*, Emu, IX., p. 54 (1909).*Ortygometra cinerea* North, Vict. Nat., XIX., p. 34 (1902).

DISTRIBUTION. North-western Australia; Northern Territory; Queensland.

Adult Male. General colour above dark brown mottled with black, the centres of the feathers being blackish with light olive-brown margins, the blackish centres being indistinct on the mantle, but very distinct on the back and scapulars, less pronounced on the lower-back, rump and upper tail-coverts, which become browner; wing-coverts olive-brown; bastard-wing, primary-coverts and quills dark sepia-brown, the first primary margined with hoary white; the innermost secondaries resembling the scapulars, being blackish, edged with light rufous-brown; tail-feathers dark brown; crown of head almost blackish in appearance, and slightly washed with olive-brown on the nape; lores and feathers around the eye black, with a small supra-loral spot of white extending over the forepart of the eye; throat white, extending in a line below the eye and above the ear-coverts, which are grey, like the sides of the neck and upper-breast; abdomen, white; the lower flanks and under tail-coverts sandy-buff; thighs internally whitish, externally brown; axillaries smoky brown; under wing-coverts grey, with paler tips, lower primary-coverts and under-surface of

* The Plate is lettered *Poliolimnas cinereus*.



J.G. Keulemans, del.

Witherby & Co.

‡
POLIOLIMNAS CINEREUS.
(*WHITE-BROWED CRAKE*).

WHITE-BROWED CRAKE.

quills dusky brown; "Bill red at base, distal half olive-yellow; feet olive-yellow, the tarsus olive-green; iris red; eyelid red" (J. P. Rogers). Total length, 184 mm; culmen, 22; wing, 95; tail, 48; tarsus, 33.

Adult female. Similar to the adult male.

Young. "The young differ from the adult in having only an indication of the marks on the face, in having the crown of the head brown instead of brownish-black, and the sides of the neck and flanks deep buff instead of grey" (Gould).

Nest. "Made of rushes or coarse herbage, lined with grass, and situated among swampy vegetation" (Le Souëf).

Eggs. "Vary from four to six in number: are oval or rounded in form, the shell being close grained, smooth and slightly lustrous. The ground-colour varies from a dull greenish-white to a light yellowish-clay shade, which is almost obscured by innumerable fleecy markings, varying from yellowish-brown to dull chestnut-brown. As a rule the markings are fairly even in size and distributed over the entire surface; in others they are intermingled with a few large confluent patches, while in some they are larger and predominate chiefly on the thicker end. Measurements in inches, 1.13 to 1.07 by .9 to .83" (North).

Breeding season. January and February (North); February to May (Le Souëf).

IN the Cat. Birds Brit. Mus., XXIII., Sharpe included *P. leucophrys* Gould as a synonym of *P. cinerea* Vieillot, for which he proposed the new generic name *Poliolimnas*, and since then the Australian bird has been called *Poliolimnas cinereus*. The characters used by Sharpe for differentiating this bird generically are not of generic value, though this bird is rather an aberrant *Porzana*. As, however, these small *Porzanae* vary considerably, I have not considered the characters noted as sufficiently important to necessitate the retention of Sharpe's monotypic genus.

The type-locality of Vieillot's *P. cinerea* is Java, and upon comparing specimens from that locality with Australian birds, I find the latter easily separable by the much darker coloration of the upper-side. The crown of the head in the Javan form is slate or bluish-grey (Sharpe called it "dark ashy-grey"), whereas the Australian bird has the head blackish with faint brownish tips to some of the feathers; all the dark brown coloration of the Australian bird is replaced by very light brown in the Javan ones. The Javan birds have long secondaries, often exceeding the primaries in length, while in Australian specimens the secondaries are obviously shorter. The coloration of the under-side of the Australian birds is of a darker shade throughout. As a matter of fact, I conclude that *P. cinerea* may be separable into several more subspecies, but the material available does not permit me to diagnose them satisfactorily.

My collector Mr. Rogers, when stationed about twenty miles south of Wyndham, in the North-west of Australia, found this bird fairly common, and easily procured specimens. He bears out the following remarks by Gould:*

* Handb. B. Austr., II., p. 343 (1865).

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“This species is an inhabitant of the northern parts of Australia, where it frequents the thick clumps of mangrove roots bordering the lakes. It is a somewhat familiar bird, and is but little disturbed by the approach of an intruder; on the contrary, it will frequently run up a branch, turn round, gaze at him, and utter its very singular loud and chattering *cutche cutche*, with but little apparent alarm. Occasionally several are heard in chorus, as if attempting to excel each other in noise.”

The bird figured and described was collected at Parry's Creek, in North-west Australia, by Mr. J. P. Rogers, on January 6th, 1909.

GENUS—TRIBONYX.

- TRIBONYX Du Bus, Bull. Acad. Roy. Brux., VII., p. 212
(April, 1840). (Also spelt *Tribonix*.) *T. mortieri*.
- Brachytrallus* La Fresnaye, Rev. Zool., p. 231 (August, 1840) *T. mortieri*.
- Microtribonyx* Sharpe, Bull. B.O.C., I., p. xxix. (1893) *T. ventralis*.

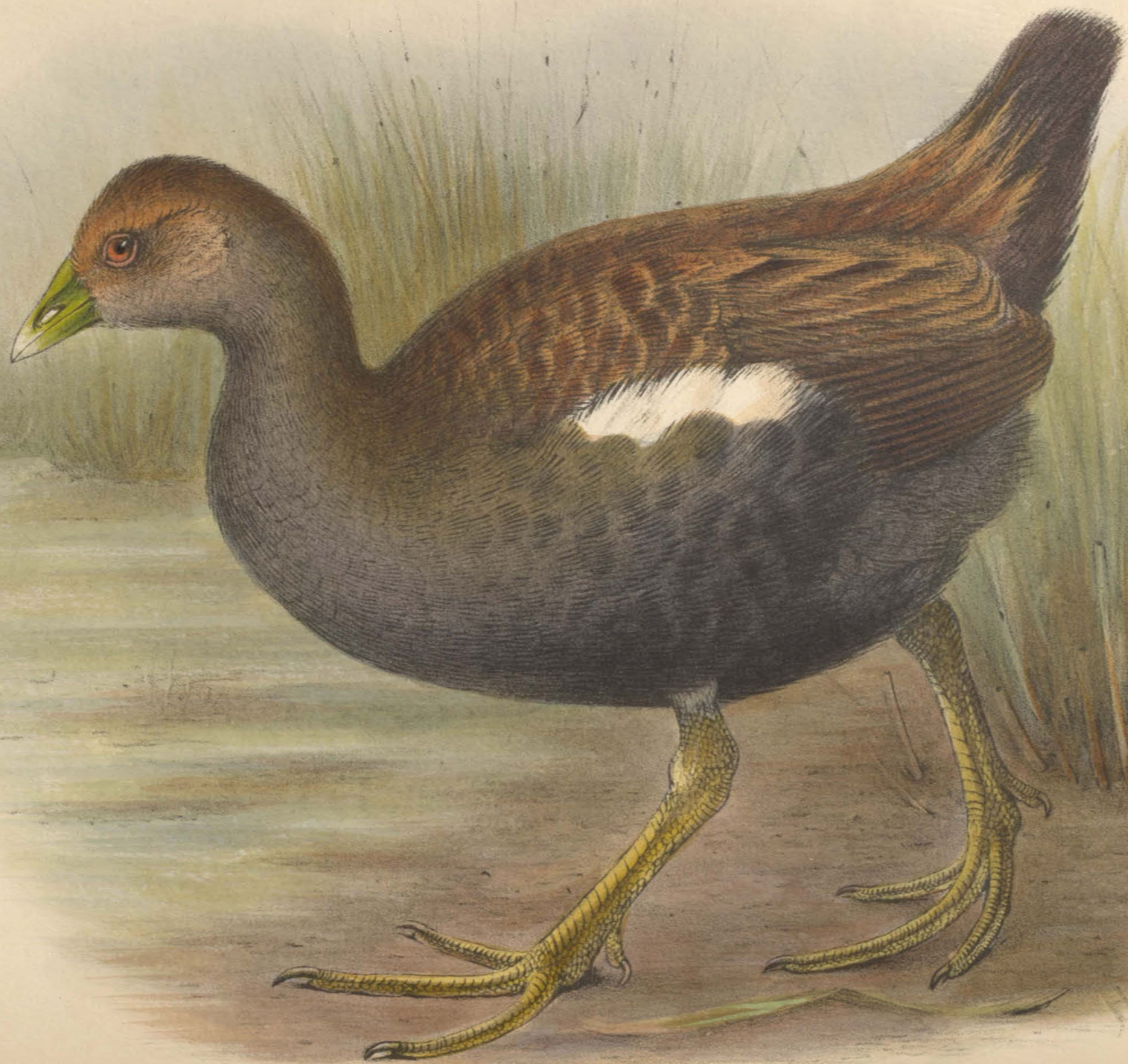
BILL very high and stout. No distinct frontal shield. Nostrils oval, pervious ; occupying the fore-part of the nasal groove. Tarsi longer than the middle toe. Otherwise characters much as in *Gallinula*. Only two species known.

DISTRIBUTION. Confined to Australia and Tasmania.

NOTE.—Sharpe separated the two species belonging to this genus, on account of the greater development of the wings in one case. No one can, however, accept such slight characters as of generic value in this family, and I have used them in conjunction with other characters as of only sub-specific value in some cases.

Key to the Species.

- A. Smaller; outer web of the first primary white;
long flank-feathers black, with a central pear-
shaped white spot *T. ventralis*, p. 227.
- B. Larger; outer web of the first primary uniform,
like the rest of the quills; long flank-feathers
black, broadly tipped with white *T. mortieri*, p. 223.



H. Grönvold. del.

Witherby & Co

$\frac{1}{2}$
TRIBONYX MORTIERI.
(NATIVE HEN).

TRIBONYX MORTIERI.

NATIVE HEN.

(PLATE 55.)

TRIBONYX MORTIERI Du Bus, Bull. Acad. Roy. Brux., VII., p. 214 (plate) (1840), Tasmania.

Tribonyx mortieri Du Bus, Bull. Acad. Roy. Brux., VII., p. 214 (1840); Gould, B. Austr.; VI., Pl. 71 (1848); *id.*, Handb. B. Austr., II., p. 324 (1865); Ramsay, P.L.S., N.S.W., I., p. 193 (1876); *id.*, *ib.*, II., p. 199 (1877); *id.*, *ib.*, p. 209 (1877); *id.*, Tab. List Austr. B., p. 21 (1888); North, Austr. Mus. Cat., No. 12, p. 324 (1889); Sharpe, Cat. B. Brit. Mus., XXIII., p. 164 (1894); Campbell, Nests and Eggs Austr. B., p. 752 (1901); Oates, Cat. Birds' Eggs Brit. Mus., I., p. 122 (1901); Littler, Emu, III., p. 215 (1904); Hall, Key B. Austr., p. 77 (1899-1906); Mathews, Handl. B. Austral., p. 13 (1908); Littler, Handb. B. Tasmania, p. 115 (1910).

Brachytrallus ralloides La Fresnaye, Rev. Zool., p. 232 (1840).

Tribonix mortieri Bonaparte, Compt. Rend., XLIII., p. 600 (1856).

Tribonyx gouldi Selater, Ann. and Mag. Nat. Hist. (3), XX., p. 123 (1867); Ramsay, P.L.S., N.S.W., II., p. 209 (1877).

Tribonyx "*ralloides*" Gray, Handl. Gen. Sp. Birds, B.M., III., p. 66 (1871).

DISTRIBUTION. Tasmania.*

Adult male. General colour above warm brown, including the head, hind-neck, back, upper tail-coverts, scapulars and innermost secondaries; lesser wing-coverts slate-grey; bastard-wing black, with pale outer webs and white tips; quills black with pale edges, the two outer primaries fringed with white at the tips; tail-feathers black, with brown on the outer webs; lores and feathers behind the eye and forepart of cheeks brown, like the head, but slightly paler; throat, fore-neck and breast slate-colour; a tuft of black feathers, with broad white tips, on the sides of the body, giving the appearance of a lateral white patch; lower flanks and thighs grey, minutely tipped with white; middle of abdomen black, with minute white tips to the feathers; under tail-coverts intense black; under wing-coverts blackish, tipped with white; "Bill yellowish-green; iris ruby; tarsi and feet yellowish" (Frank M. Littler). Total length, 509 mm.; culmen, including frontal shield, 40; wing, 187; tail, 95; tarsus, 78.

Adult female. Similar to the adult male, but very slightly smaller. Total length, 502 mm; culmen, 39; wing, 185; tail, 95; tarsus, 77.

Immature male. Is distinguished from the adult in being paler brown on the head, grey on the hind-neck and mantle, and having the lower back washed with grey. The chief

* The occurrence of this bird in South Australia is not authentic.

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distinction is the white marks on the wing-coverts, which are pear-shaped, and as the bird advances in age, become narrow streaks, and finally disappear when the adult plumage is attained; the white margins to the feathers of the lower flanks are also much more strongly pronounced.

*Nestling (ten days old).** Covered with black down, with a white spot on each side of the flank; ear-coverts, silver-grey.

*Young (three weeks old).** Olive-brown above; tail black; head streaked with black; chin white; throat streaked with blackish and grey; sides of the neck grey; a stripe of blackish-brown down the middle of the under-surface, on both sides of which is grey; the tuft of feathers on the side, buff.

Nest. "Usually placed on the bank of a stream or lagoon. Made of tussocks pulled up by the roots and tramped down by the birds' feet, and lined with soft reeds" (Fletcher).

Eggs. Clutch, six to nine. Smooth and slightly glossy; stone-colour, minutely spotted with chestnut over the entire surface, with bolder blotching of the same colour and paler underlying markings, sparsely distributed. Axis, 59 mm.; diameter, 39 to 41.

Breeding Season. September, October, and November (Fletcher).

MR. FRANK M. LITTLE, of Tasmania, to whom I am indebted for skins of this species, sends me the following notes: "These birds are very common on the flats by the river. In September, 1904, two nests were found, one in the centre of a clump of broad-grass, some three feet from the water's edge, composed entirely of grass stems; its diameter was about a foot, and it contained seven eggs fairly well incubated. The second nest was also this season's, but empty. It was placed on the top of a pile of rubbish some forty feet from the water, and was composed of the same material as the first. The birds ran about freely in the open, but were quite silent. Some of the birds among the reeds were making a noise like the low rumbling bellow of a bull heard from a distance. Some low grunting sounds also emanated from the same localities. They run in a very jerky fashion, the tail is jerked up and down, both when standing still and running.

"This species is distributed more or less over the greater part of the Island, being particularly plentiful where the nature of the country allows the formation of marshy land in the vicinity of slow-running streams and also where the land is devoted to agriculture. So plentiful is it in some districts that it is considered a pest, and every effort made to reduce its numbers by poisoning, trapping and shooting. No protection is afforded it under any Game Protection Act. It is during the breeding season that it becomes the greatest pest, for whenever practicable it constructs its nest as near as possible to a grain field, so that when hatching and rearing its young it may not have far to go for food. The havoc that it makes among young grain is very great. A small flock of Native Hens are capable of doing more damage in a given time than double the number of farmyard poultry. When a number of birds of this species are feeding in a grain field there is generally, if not always, one or more birds acting as

* Given me by Mr. Swindells of Tasmania.

NATIVE HEN.

sentinels ; should anything of an alarming nature come into sight, a harsh cry is uttered and the birds seek safety with the utmost celerity. I have never seen the Native Hen make any serious attempt to use its wings even when hard pressed by dogs. Its running powers are very great ; when going at top speed its wings are pressed close to its sides, the neck stretched to its utmost with the bill held rather upwards. It can more than hold its own in point of speed against most sporting dogs ; greyhounds and other dogs that are trained to hunt hares are able to run it down owing to their greater staying powers, but even they can only succeed after tiring it out, as it can turn and dodge with the agility of a hare.

“ On account of its very shy habits it is often very difficult to get a sight of this bird even in those places where it is numerous, especially if the place where it lives is infested with gorse and sweet briar. In the early morning, and also in the evening, the Native Hen is a very noisy bird. The clamour made by a flock of, say from twelve to twenty birds, is extremely great. The cry is harsh and discordant in the extreme and varies greatly in tone, sometimes resembling the sharpening of a saw, at other times the sawing of iron with an ordinary hand-saw. To fully appreciate its grating harshness, one wants to creep, as I have sometimes done, to the edge of a thicket of gorse behind which a company of Native Hens are holding high revel, and stay listening for a while. The sounds that issue are often so ludicrous that one is forced to make one's presence known, then in a fraction of a second a dead silence reigns.

“ The nest is usually placed on the bank of a river or stream either among undergrowth or just in the long grass. My experience has been that the nature of the growth on the banks to a very great extent determines the situation of the nest. Where there has been no growth along the banks of a stream but only sedges and reeds growing in the water, I have found the nest securely anchored in the middle of a thick clump of reeds and afloat all the while. In a stream not far from Great Lake I remember finding more than one nest constructed on shelving ledges jutting into shallow water and quite unscreened by any growth. Should there be any debris washed on to the banks or sweet briars growing along them, the nest is constructed among the former or in the grass at the foot of the latter.

“ As is only to be expected, nearer the haunts of man, more closely is the nest hidden and more retiring becomes the bird. The nest is circular in shape except when constructed at the foot of a sweet briar or some other bush, when it is irregular on the inner side. The materials employed are grass, rootlets, leaves and fine twigs ; there is practically no lining in the egg cavity, if cavity it can be called, as the depression is so slight. The diameter of a nest ranges from twelve inches to fifteen inches.”

Miss Fletcher, also from Tasmania, says : “ It was not until the last

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week in September, 1908, that these birds were heard making their peculiar 'saw-sharpening' cackle,* and that generally in the evening, beginning soon after dusk. They also have a peculiar grunting noise which they make running, as they do, with their necks stretched downwards. Both birds assist building the nest. They pull up some of the tussocks by the roots and lay them across the place chosen for the nest, where they tramp them down with their feet. The lining used is principally soft round reeds found growing in the deeper waters. Sometimes a few small water-lily leaves are added.

"Both birds attend the young, which leave the nest almost at once after hatching. In one instance the birds reared a second brood in the same nest.

"The eggs are laid every day and the birds sit as soon as the last egg is laid.

"During the evening and early morning of the breeding-season these birds are very noisy, chasing one another through the reeds, and making their loud creak or saw-sharpening noise.

"The birds feed on dock and thistle seeds. I have seen them digging in the ground on the plains and they appeared to be eating grubs. They will also trail up and down the furrows of a newly-ploughed field. They are very destructive to grain; and stock refuse to graze where they have been."

Nests were observed from the ground level, to some placed six feet up in a willow tree. The nests that are placed in conspicuous positions are generally not used for laying in, but are only decoy nests.

A sitting bird when disturbed slips off her nest and runs away, but its manner of running always betrays ownership of a nest or hidden young.

Crows often hunt these birds in pairs; one Crow will frighten a hen off her nest and chase her away some distance, while the other Crow will fly off with the eggs.

Mr. A. M. Swindells says: "The young take to the water as soon as they are hatched and swim well. The adult will swim and dive with almost the ease of a Cormorant and can ford the strongest rapids."

I am indebted to Mr. Frank Littler, Mr. Robert Hall and Mr. A. M. Swindells for skins of this species, and to Miss Fletcher for some clutches of their eggs.

The bird figured and described is a male, and was collected by Mr. James Taylor, in Tasmania, in December, 1862.

* When making this sound, the birds dart backwards and forwards.



J. G. Keulemans, del.

Witherby & Co.

$\frac{1}{2}$
MICROTRIBONYX VENTRALIS.
(BLACK-TAILED NATIVE HEN).

TRIBONYX VENTRALIS.

BLACK-TAILED NATIVE HEN.

(PLATE 56.)

GALLINULA VENTRALIS Gould, P.Z.S., p. 85 (1836), Swan River, Western Australia.

Gallinula ventralis Gould, P.Z.S., p. 85 (1836).

Tribonyx ventralis Gould, in Gray's Journ. Disc. Austr., II., p. 420 (1841); *id.*, B. Austr., VI., Pl. 72 (1848); Sturt, Narr. Exp. Centr. Austr., App., p. 53 (1849); Gould, Handb. B. Austr., II., p. 325 (1865); Ramsay, P.L.S., N.S.W., I., p. 193 (1876); *id.*, *ib.*, II., p. 199 (1877); *id.*, *ib.*, VII., p. 56 (1882); *id.*, Tab. List Austr. B., p. 21 (1888); North, Austr. Mus. Cat., No. 12, p. 324 (1889); Kewartland, B. Melbourne Dist., p. 117 (1900).

Tribonix ventralis Bonaparte, Compt. Rend., XLIII., p. 600 (1856).

Microtribonyx ventralis Sharpe, Bull. B.O.C., I., p. xxix. (1893); *id.*, Cat. B. Brit. Mus., XXIII., p. 165 (1894); Campbell, Nests and Eggs Austr. B., p. 752 (1901); Oates, Cat. Birds' Eggs Brit. Mus., I., p. 122 (1901); Nicholls, Emu, V., p. 81 (1905); Hall, Key B. Austr., p. 77 (1906); Berney, Emu, VI., p. 108 (1907); Ingram, Ibis, p. 391 (1907); Mathews, Handl. B. Austral., p. 13 (1908); Ogilvie-Grant, Ibis, p. 187 (1910).

DISTRIBUTION. Australia generally.

Adult male. Olive-grey above, including the head, hind-neck, sides of neck, back and upper tail-coverts; wing-coverts olive-brown; bastard-wing, primary-coverts and quills blackish, olive-brown on the outer webs; outer web of first primary edged with white; tail-feathers black, fringed with olive-brown on the outer webs; chin, lores and cheeks black; lower throat, fore-neck and breast dark slate-grey, which extends on to the sides of the body; middle of abdomen and under tail-coverts black, axillaries and lower flanks brown; long flank-plumes black with white pear-shaped spots at the tips; under wing-coverts dusky with subterminal black bars and white tips; "Bill apple-green, base of lower mandible orange; iris deep yellow; tarsi and feet coral pink" (T. Carter). Total length, 340; culmen, including frontal shield, 32; wing, 221; tail, 85; tarsus, 56.

Adult female. Very similar to the adult male but smaller, and differs in having the flank-plumes grey instead of black, and the wing-coverts paler. Total length, 309 mm.; culmen, including frontal shield, 28; wing, 194; tail, 73; tarsus, 59.

Nest. "Open, constructed of grass, and placed on the ground among bushes such as polygonums, etc., in a swampy situation" (Campbell).

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Eggs. Clutch five to seven, smooth and glossy in texture, ground-colour pale green, minutely spotted over the entire surface with brown dots, with a few large, bold blotches of chestnut-brown, as well as paler underlying spots of a lavender-grey. Axis 43 to 46 mm ; diameter, 29 to 32.

Breeding season. October to January or February ; one clutch taken at Cooper's Creek 20th June, 1887 (Campbell) ; July and August (Carter).

THE appearance of this bird, suddenly in large numbers, has been recorded by many writers. Sturt* mentions it, writing: "The line on which this bird migrates seems to be due north. It was never seen at the Depôt, or in any of the creeks to the west, excepting Stizelechi's Creek, and a creek we crossed on our way to Lake Torrens, when on both occasions they were migrating southwards."

Mr. J. P. Rogers, writing from Wyndham, North-west Australia, on November 25th, 1908, says: "These birds are in small flocks on the banks of some of the swamps. In April, 1909, they all disappeared, the last being seen on the 14th."

Mr. P. T. Sandland says that it only appears near Morgan, in South Australia, after very heavy rain, and never stops for more than a week or two.

Mr. Tom Carter sends me the following note from North-west Australia: "This species was very common in wet seasons, almost every little water hole having some feeding round it. The birds appear all at once and vanish almost as suddenly. And although great numbers remain for some months in some seasons, comparatively few appear to breed. Several clutches of eggs were observed between July 13th and August 3rd in different years. Seven was the greatest number of eggs seen in a nest. Immediately after the heavy rain which terminated the drought of 1894 to 1897, countless thousands of these birds appeared at Geraldton, and although some of the corn fields were absolutely black with their numbers, they were very wary and not easy to shoot."

Captain S. A. White says: "This bird visits us in South Australia once in every few years, coming from the North and remaining generally from July to November. Their food seems to consist almost entirely of vegetation, grass, thistles, etc. I have never known them to nest down South."

Mr. Charles Belcher observes: "The distribution of this species in Victoria depends almost entirely on the wetness of the season. When water becomes plentiful, this species is one of the first of the larger water-fowl to appear in any numbers. Riverina must be looked on as its stronghold in Southern Australia, whence it makes excursions into the drier parts whenever the season is sufficiently good. In the County of Rodney (Victoria) it makes its appearance yearly in the month of October, probably flying at night, for though great numbers are seen running along the irrigation channels and dams, during the day time the

* Narr. Exped. Centr. Austr., App., p. 54 (1849).

BLACK-TAILED NATIVE HEN.

birds are rarely, if at all, to be observed on the wing. They remain in the irrigated country till the end of the summer, living on the freshwater snails and insects, which abound in the marshy ground.

“In April, 1900, during a partial break in the great drought, numbers followed the course of the Willandra Billabong (Kilfera, N.S.W.) as the water came down. In the extreme south of Victoria the bird is rare, its visits only occurring when there is plenty of water there and more or less drought in the interior; as was the case at the end of 1891 and beginning of 1892, when this species was very common in the lower reaches of the Barwan River between Geelong and the sea.”

Mr. Edgar Christian, of Northern Victoria, writes: “I find the sudden appearance of these birds here (Avoca River) is a forerunner of heavy floods. When feeding, every now and then one of the birds will run round in a small circle, violently flapping its wings and then ends up by running swiftly with wings outspread but motionless, suddenly coming to a stop, it goes on feeding. When so occupied, they are fairly quiet, but an odd bird, from time to time would give out a peculiar sharp cry. They seldom swim or wade, but prefer to walk about on the banks or edges of pools. They rarely use their wings, and even then for no great distance. I have never seen them fly very high, and when they are disturbed they just fly for a short distance, and when alighting they run along the ground, so that flying merges into running. I have never seen one by itself, the smallest flock noticed was five birds, and the largest fifty.”

Mr. C. B. Nicholls* mentions that a bird of this species, that used to feed with domestic fowls, fought and defeated a rooster six times its own size. He also says: “In flying it rose gently from the ground, after a short run, without any noisy flapping or whirring of wings, and slowly drew up the dangling legs into a horizontal position as the flight balance was gained.”

Mr. Campbell says: “The young in down are jet black and can swim like ducklings. The old birds feed their young on bits of thistle, dock, etc.”

Mr. F. Berney† writing from the Richmond District of North Queensland, says these birds arrive there in January, but are most erratic in their visitations: sometimes only a few putting in an appearance, sometimes they come in overwhelming numbers. In 1905 it was a common sight for a horseman to have five or six thousand running in front of him along a creek, like a mob of sheep. They leave that district every year about June.

The bird figured and described is a male, collected by Mr. Tom Carter at Broome Hill, Western Australia, on October 2nd, 1907.

* Emu V., p. 81 (1905).

† Op. cit., p. 108 (1907).

GENUS—GALLINULA.

| | |
|--|-----------------------|
| GALLINULA Tunstall, Ornith. Brit., p. 3 (1771) | <i>G. chloropus.</i> |
| <i>Hydrogallina</i> Lacépède, Tabl. Ois., p. 19 (1799) | <i>G. chloropus.</i> |
| <i>Stagnicola</i> Brehm, Vög. Deutschl., p. 702 (1831) | <i>G. chloropus.</i> |
| <i>Amaurornis</i> Reichenbach, Nat. Syst. Vög., p. XXI. (1852) | <i>G. olivacea.</i> |
| <i>Erythra</i> Reichenbach, Nat. Syst. Vög., p. XXI. (1852) | <i>G. phoenicura.</i> |
| <i>Pisynolimnas</i> Heine und Reichenow, Nomencl. Mus. Hein., p. 317 (1888). | |

BILL strong and sharply pointed, shorter than the head; nostrils a short, pervious slit in a nasal groove; forehead covered by an extension of the horny covering of the bill (rudimentary in the young); middle toe longer than the tarsus; toes with a slight lateral membrane or margin; tail short; wings rounded. Fifteen forms appear to be separable.

DISTRIBUTION. Almost cosmopolitan.

NOTE.—Sharpe, in the Cat. Birds Brit. Mus., XXIII., recognised Reichenbach's genus *Amaurornis*, with which he synonymised *Erythra* of the same author. I am unable to separate *Amaurornis* from *Gallinula*, the only difference being the less developed frontal shield of the former genus.

Key to the Species.

A. Under tail-coverts white *G. tenebrosa*, p. 232.

B. Under tail-coverts vinous chestnut *G. ruficrissa*, p. 234.

GALLINULA TENEBROSA TENEBROSA.

BLACK MOOR-HEN.

(PLATE 57.)

GALLINULA TENEBROSA Gould, P.Z.S., p. 20 (1846), South Australia.

Gallinula tenebrosa Gould, P.Z.S., p. 20 (1846); *id.*, B. Austr., VI., Pl. 73 (1848); *id.*, Handb. B. Austr., II., p. 328 (1865); Ramsay, P.L.S., N.S.W., I., p. 193 (1876); *id.*, *ib.*, II., p. 199 (1877); *id.*, *ib.*, VII., p. 56 (1882); Ramsay, Tab. List Austr. B., p. 21 (1888); North, Austr. Mus. Cat., No. 12, p. 325 (1889); Sharpe, Cat. B. Brit. Mus., XXIII., p. 168 (1894); Hall, Key B. Austr., p. 78 (1899); Oates, Cat. Birds' Eggs Brit. Mus., I., p. 123 (1901); Campbell, Nests and Eggs Austr. B., p. 754 (1901); Hall, Key B. Austr., 2nd Ed., p. 78 (1906); Mathews, Handl. B. Austral., p. 13 (1908).

DISTRIBUTION. Australia generally.

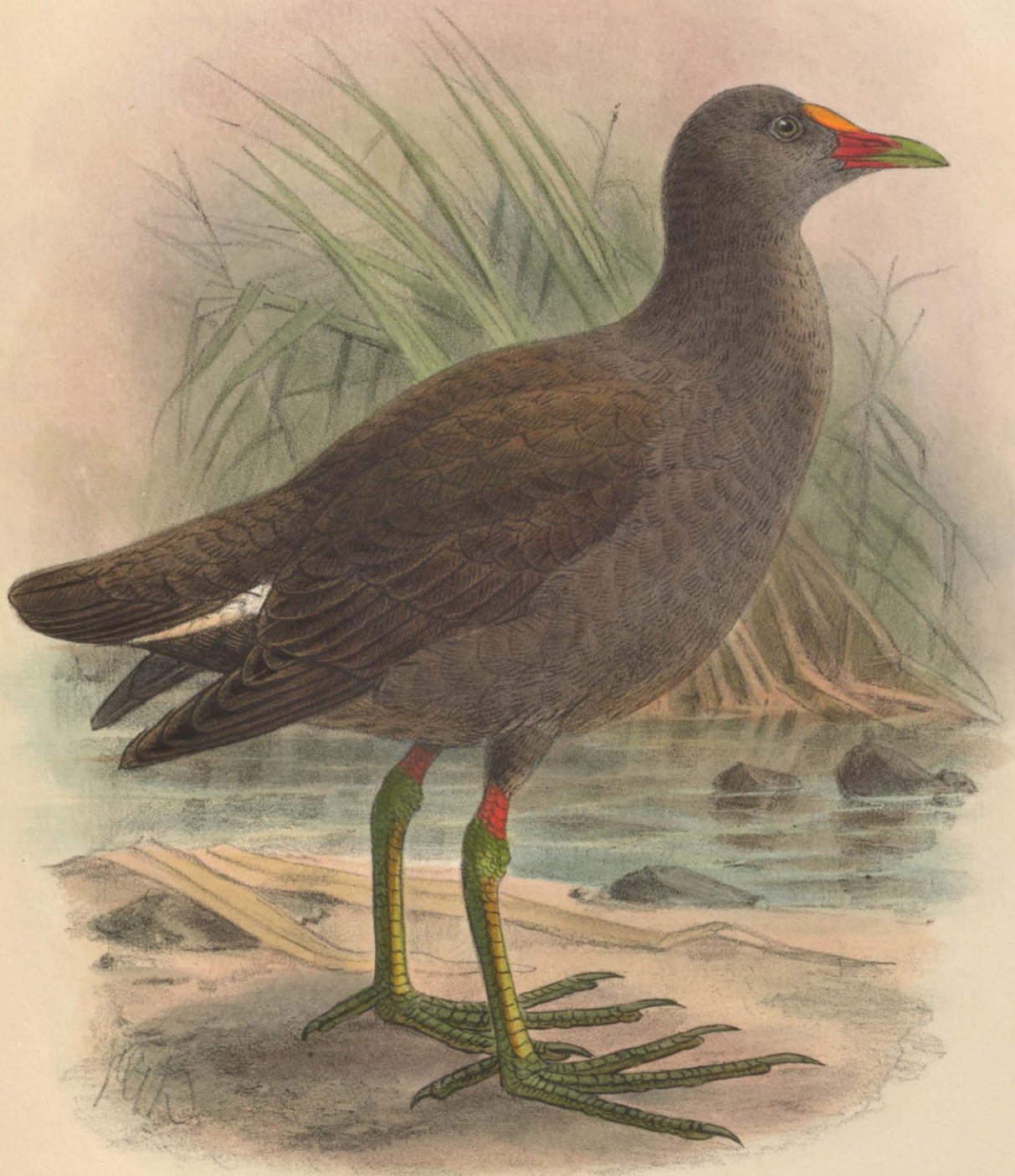
Adult male. General colour dark slate-grey, including the head, hind-neck and under-surface, becoming paler on the lower abdomen; entire back and scapulars tinged with brown; wing-coverts dark slate-grey; bastard-wing, primary-coverts and quills black; tail-feathers black, more or less fringed with brown on the outer webs; central under tail-coverts black, the lateral ones white; "Bill, frontal plate orange, base blood red, tip greenish yellow, above the knee a garter of yellow and scarlet; joints of legs and feet olive; sides of tarsi and frontal plates of toes yellow; iris olive" (J. Gould). Total length, 360 mm; culmen, including frontal shield, 47; wing, 220; tail, 80; tarsus, 65.

Adult female. Similar to the adult male.

Immature male. Similar to the adult female, but having the under-surface paler with white margins to the feathers, most conspicuously on the chin and lower abdomen; a line round the bend of the wing white, as also the outer edge of the first primary.

Nestling (in down). Greenish-black above, sooty-black below, with white hair-like tips to the down on the chin and throat.

Nest. "Slightly concave on the top, composed of dead flags or rushes, sometimes with twigs added; lined with the paper-like bark of tea-tree (*Melaleuca*), and placed in water among rushes, etc., or at the base of tea-trees. Dimensions over all, about 12 inches; height (from the water) about 12 inches" (Campbell).



J.G. Keulemans, del.

Witherby & C^o

$\frac{1}{2}$
GALLINULA TENEBROSA.
(BLACK MOORHEN).

BLACK MOOR-HEN.

Eggs. Clutch, seven to ten ; smooth and glossy ; ground-colour buff ; blotched and spotted with purplish-brown over the entire surface. Axis, 53 to 54 mm ; diameter, 36.

Breeding season. November (Belcher) to January (Campbell).

MR. CHARLES BELCHER, writing from Victoria, says : " Unlike *Tribonyx ventralis* this bird is a stationary species. Year after year the same birds will, if unmolested, breed in the same patch of reeds. It is far from being a common bird in Victoria, although when once one knows the localities it haunts, no bird is easier to find. They bred in the swamp between the boat sheds at Princes' Bridge, Melbourne, till it was filled in when Alexandra Avenue was made. They occur at intervals along several of the rivers and creeks west of Port Philip ; and wherever the bird is found it may be considered as a breeding species. I found two nests on November 4th, 1893, in a reed-bed on the banks of a salt creek near Geelong ; one contained nine eggs and the other eight, all hard set. The eggs vary a good deal in markings and one variety closely resembles the egg of *Porphyrio melanotus*.

J. Gould* says : " When disturbed, it readily eludes pursuit by running with great swiftness into a place of safety. It swims with considerable ease and buoyancy, and its food consists of various aquatic insects and small shelled mollusks."

Captain S. A. White says : " I have met with this bird on nearly all the permanent water-courses and lakes in South Australia : they are very numerous on the lower reaches and swamps of the River Murray. Their call is a very harsh, grating one ; and they are very swift of foot, darting away to the rushes or tangled mass of roots on the banks of the river. They nest in the roots of upturned trees or in the debris brought down by flood water. The eggs are generally 6 to 8 in number, but in 1908 I took 10 eggs from a nest."

The bird figured and described was collected on the Richmond River, New South Wales, in September, 1905.

* Handb. B. Austr., II., p. 329 (1865).

GALLINULA MOLUCCANA RUFICRISSA.

RUFIOUS-TAILED MOOR-HEN.

(PLATE 58.)*

GALLINULA RUFICRISSA Gould, Ann. and Mag. Nat. Hist. (4), IV., p. 110 (August 1st, 1869), Cape River (Queensland).

Gallinula ruficrissa Gould, Ann. and Mag. Nat. Hist. (4), IV., p. 110 (1869); *id.*, Suppl. B. Austr., Pl. 79 (1869) (dated August); Ramsay, P.L.S., N.S.W., I., p. 193 (1876); *id.*, *ib.*, II., p. 199 (1877); North, P.L.S., N.S.W. (2), p. 446 (1887); Ramsay, Tab. List. Austr. B., p. 21 (1888); North, Austr. Mus. Cat., No. 12, p. 326 (1889).

Erythra ruficrissa Salvadori (part), Ann. Mus. Genova, VII., p. 795 (1875).

Amaurornis moluccana (part) Sharpe, Cat. B. Brit. Mus., XXIII., p. 153 (1894); Robinson and Laverock, Ibis, p. 650 (1900); Campbell, Nests and Eggs Austr. B., p. 751 (1901); Le Souëf, Emu, II., p. 94 (1902); Hall, Key B. Austr., p. 77 (1906); Mathews, Handl. B. Austral., p. 13 (1908).

DISTRIBUTION. Northern Territory; Queensland.

Adult. Head, hind-neck and mantle olive-brown, becoming chocolate-brown on the scapulars, back, upper tail-coverts and tail; wing-coverts like the back, somewhat more chestnut-brown on the greater-coverts, which resemble the inner secondaries; bastard-wing, primary-coverts and quills dark brown, somewhat paler on the outer webs; lores and sides of head and ear-coverts dull slaty-grey, lighter on the cheeks and inclining to greyish-white on the chin and upper-throat; lower-throat, breast and abdomen darker slaty-grey, slightly washed with olive on the fore-neck; sides of body entirely olive-brown; lower abdomen vinous isabelline; a patch of feathers on each side of the vent, thighs and under tail-coverts vinous chestnut; under wing-coverts and axillaries dark sepia-brown; quills dusky brown below; "Bill green, frontal shield orange; iris reddish-brown; feet yellow" (Olive)† Total length, 213 mm.; culmen, including frontal shield, 30; wing, 143; tail, 56; tarsus, 56.

Nest. "Composed of coarse grass and other herbage; 3½ inches in breadth" (Le Souëf).

Eggs. "Clutch, three; buffy-white, slightly glossy, and having dark brown markings, especially at the larger end, those beneath the surface being lilac. Measurement in inches, 1.40 to 1.32 by 1.07 to 1.01" (Le Souëf).

Breeding season. April (Le Souëf).

* The Plate is lettered *Amaurornis moluccana*.

† On the Plate the feet are coloured greenish.



J. G. Keulemans, del.

Witherby & Co

$\frac{3}{4}$
AMAUORNIS MOLUCCANA.
(RUFIOUS-TAILED MOORHEN).

RUFOUS-TAILED MOOR-HEN.

THIS is another instance where the lumping of two forms, when adopted in the *Cat. B. Brit. Mus.* (XXIII., p. 153 (1894)), has been followed by all recent Australian ornithological writers.

Wallace described *G. moluccana* from Ternate, and with it Sharpe synonymised Gould's *G. ruficrissa* from Queensland. Australian ornithologists not having the opportunity of checking such attachments for want of specimens from other countries, have been in most cases compelled to accept the dicta of their better situated colleagues. In this case the Queensland bird cannot be confused with any other of the subspecies of *G. moluccana* when placed alongside them, but Sharpe had only one Australian skin, and was therefore not in a position to judge if the differences, which he probably noticed, were more than individual.

Upon comparing Australian specimens with a typical specimen (if not the type) collected by Wallace himself, the former are characterised by their shorter bills, shorter tarsi, and much warmer coloration above. Birds from New Britain agree with the Queensland bird in the shortness of their toes and tarsi, but are quite different in coloration, being colder in tone than the typical form.

In the *Notes, Leyden Mus.*, I., p. 163 (1879), Schlegel proposed to name a wholly brown bird from N.E. New Guinea, *Gallinula frankii*. This would appear to be the immature plumage of this species, as specimens from New Britain in the Rothschild Museum, Tring, have the grey under-surface showing the brown tips. This would be an interesting point for Australian ornithologists to clear up, as the immature plumage of *G. ruficrissa* appears to be undescribed. As Schlegel's bird was of unknown locality, received via N.E. New Guinea, it is very probable that it was obtained on New Britain, and it would be better to use his name for that subspecies than to propose a new one.

I have no notes on the life-history of this bird. The specimen figured and described is a female, collected in Queensland.

Mr. H. G. Barnard, writing in the *Emu** on the birds of Cape York, says he found the eggs of *Rallina tricolor*, which were *white*. If this be correct, it upsets the observations of all Australian oologists. Broadbent collected eggs of this species in January, 1889, on the Murray River, North Queensland. These eggs, now in the Brisbane Museum, were described by Mr. A. J. Campbell.†

Mr. Barnard further says: "I am satisfied that further search will prove that the spotted eggs hitherto attributed to *Rallina tricolor*, really belong to the second Rail, which I suppose to be the Rufous-tailed Moor-hen."

If so, the eggs described by me (*ante*, p. 204) are those of *Gallinula moluccana ruficrissa*, and the eggs of *Eulabeornis tricolor robinsoni* are: Clutch four; glossy white. Axis 40—38.5 mm.; diameter 30—28.5.

* XI., p. 19 (1911).

† *Emu*, X., p. 244 (1910).

GENUS—PORPHYRIO.

| | |
|--|--------------------------|
| PORPHYRIO Bonnaterre, Tabl. Ency. Méth. Orn., Vol. I., p. xciv. (1790) | <i>P. porphyrio.</i> |
| <i>Cæsarornis</i> Reichenbach, Nat. Syst. Vög., p. xxi. (1852) (Also spelt <i>Cesarornis.</i>) | <i>P. poliocephalus.</i> |
| <i>Ionornis, id., ib.</i> | <i>P. martinica.</i> |
| <i>Glaucestes, id., ib.</i> | <i>P. flavirostris.</i> |
| <i>Porphyryula</i> Blyth, Cat. Birds Mus. As. Soc., p. 283 (1852) (Also spelt <i>Porphyriola.</i>) | <i>P. alleni.</i> |
| <i>Hydrionia</i> Bonaparte, Compt. Rend., XLIII., p. 599 (1856) (Also spelt <i>Hydrornia.</i>) | <i>P. alleni.</i> |
| <i>Jonocicca</i> Salvadori, Ann. Mus. Civ. Gen. (2), III., p. 236 (1887) | <i>P. alleni.</i> |

BIRDS generally larger than the species of *Gallinula*, with a short, high, and strongly curved, compressed bill, and the frontal shield very large. Nostrils oval or rounded, pervious; no nasal groove, but a shallow depression only. Wings short and rounded; toes very long, the middle toe with claw exceeding the tarsus in length; no lateral membranes or lobes to the toes. About twenty-five forms are referable to the genus.

DISTRIBUTION. Almost cosmopolitan.

Key to the Species.

- A. Upper-breast verditer; lower-breast purple; legs green.. *P. bellus*, p. 238.
- B. Upper- and lower-breast purple; legs red:
- a.* Wing under 290 mm. *P. melanotus*, p. 239.
- b.* Wing over 290 mm. *P. fletcheræ*, p. 243.
- C. Upper- and lower-breast cobalt; legs red .. *P. neomelanotus*, p. 246.

PORPHYRIO MELANOTUS BELLUS.

BLUE BALD COOT.

(PLATE 59.)*

PORPHYRIO BELLUS Gould, P.Z.S., p. 176 (1840), Western Australia.

Porphyrio bellus Gould, P.Z.S., p. 176 (1840); *id.*, B. Austr., VI., Pl. 70 (1848); *id.*, Handb. B. Austr., II., p. 322 (1865); Diggles, B. Austr., Pl. 107 (1877); Ramsay, P.L.S., N.S.W., I., p. 193 (1876); *id.*, *ib.*, II., p. 199 (1877); *id.*, Tab. List Austr. B., p. 21 (1888); Campbell, Vict. Nat., V., p. 161 (1889); Campbell, Nests and Eggs Austr. B., p. 756 (1901); Hall, Key B. Austr., p. 78 (1906); Mathews, Handl. B. Austral., p. 13 (1908); Ogilvie-Grant, Ibis, p. 187 (1910).

DISTRIBUTION. South-western Australia.

Adult male. Back, wings, and tail glossy blackish-brown; lesser wing-coverts ultramarine-blue, forming a shoulder patch; median- and greater-coverts like the back; bastard-wing, primary-coverts, and quills blackish, with blue on the outer webs; innermost secondaries like the back; chin, lores, fore-part of cheeks, crown of head, hind-neck, and sides of neck blackish; mantle purplish-blue like the lower-breast, sides of body, and outer portion of thighs; middle of abdomen and inner-portion of thighs sooty-black; throat and upper-breast verditer-blue; axillaries blackish, tinged with verditer-blue; lesser under wing-coverts verditer-blue, greater-coverts glossy black, like the quills below; under tail-coverts pure white; "Frontal plate and bill scarlet; iris red-hazel, tarsi and feet olive-green" (T. Carter). Total length, 480 mm.; culmen, including frontal shield, 70; wing, 293; tail, 110; tarsus, 97.

Adult female. Similar to the adult male, slightly less, but not so brilliantly coloured.

Nestling. Black; bill bluish, the base pink; eyes deep brown, eye-lid pink; feet brown.

Nest. Similar to that of the Tasmanian Bald Coot (*P. melanotus fletcheræ*), p. 243.

Eggs. "Clutch, five (about); stout oval in shape; texture of shell somewhat coarse; surface glossy; colour deep stone, fairly blotched and spotted with brown and purplish-brown of different shades. Dimensions in inches 2.3 to 2.2 by 1.65 to 1.59" (Campbell).

Breeding season. August to November (Ramsay).

MR. TOM CARTER tells me that this species occurs in the dense vegetation growing on the banks of water-courses and swamps throughout the south-west of Western Australia, and that he has also shot it at Albany.

The bird figured and described is a male, collected by Mr. Carter at Albany on February 8th, 1905.

* The Plate is lettered *Porphyrio bellus*, Large Blue Coot.



J.G. Keulemans, del.

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$\frac{2}{5}$

PORPHYRIO BELLUS.
(LARGE BLUE COOT).

PORPHYRIO MELANOTUS MELANOTUS.

EASTERN BALD COOT.

PORPHYRIO MELANOTUS Temminck, Man. d'Orn., II., p. 701 (1820), Australia (New South Wales).

Porphyrio melanotus Temminck, Man. d'Orn., II., p. 701 (1820); Gould, B. Austr., VI., Pl. 69 (1848); Sturt, Narr. Exp. Centr. Austr., App., p. 53 (1849); Bennett, Gather. Nat. Austr., p. 187 (1860); Gould, Handb. B. Austr., II., p. 321 (1865); Ramsay, P.L.S., N.S.W., I., p. 192 (1876); *id.*, *ib.*, II., p. 199 (1877); *id.*, P.Z.S., p. 343 (1877); *id.*, Tab. List Austr. B., p. 21 (1888); North, Austr. Mus. Cat., No. 12, pp. 323, 415 (1889) (*partim*).

Porphyrio melanotus Newton, Zool. Rec., p. 104 (1868); Sharpe, Cat. B. Brit. Mus., XXIII., p. 205 (1894) (*partim*); North, B. County Cumb., p. 108 (1898); Hall, Key B. Austr., p. 78 (1899); Keartland, B. Melb. Dist., p. 117 (1900); Robinson and Laverock, Ibis, p. 650 (1900); Campbell, Nests and Eggs Austr. B., p. 757 (1901); Oates, Cat. Birds' Eggs Brit. Mus., I., p. 128 (1901); Hall, Key B. Austr., p. 78 (1906); Berney Emu, VI., p. 109 (1907); Mathews, Handl. B. Austral., p. 14 (1908) (*partim*).

DISTRIBUTION. Queensland; New South Wales; Victoria; and South Australia.

Adult male. Entire back, scapulars, tail, and the greater portion of the wings greenish-black, with a slight glossy tinge; lesser wing-coverts ultramarine-blue, like the outer webs of the bastard-wing; marginal-coverts, inner webs of the bastard-wing, primary-coverts, and quills black; lores, fore-part of the cheeks, occiput, and hind-neck also black; hinder-neck, throat, entire breast, sides of the body, under wing-coverts, and flanks purplish-blue; middle of abdomen black; under tail-coverts pure white; axillaries black, some tipped with blue; quills below glossy black; bill and frontal plate red; iris red; tarsi and feet dusky red. Total length, 500 mm.; culmen and frontal plate, 69; wing, 266; tail, 110; tarsus, 95.

Nest. Similar to that of *P. melanotus fletcheræ*, p. 243.

Eggs. Clutch three to five, smooth and slightly glossy; ground-colour sandy-buff, blotched and spotted with chestnut over the entire surface, with underlying spots of lead-grey. Axis 48—49 mm.; diameter 35—36.

This clutch was collected by Mr. T. H. Tregellas on the 29th of October, 1908, at Caulfield, Victoria.

Breeding season. January and February (Berney); October (Tregellas).

MR. CHARLES BELCHER observes: "This is the commonest water-fowl in Victoria and it may be found wherever there are reed-beds. It is however most plentiful north of the Divide, the great centre from which the species is distributed, being,

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as in the case of many other water-birds, the river-system of the Murray and its tributaries. No doubt the seasons affect its numbers in any given place, but speaking generally one may call it a local species. At Lake Cooper it breeds in thousands, nests being found every dozen yards or so. When it flies (as it does more readily than any other member of the family) its wings beat very rapidly and the flight is low, thus rendering it an easy prey to the pot-hunter. One nest was placed in the young shoots of a Willow tree at the Gut, on the Barwin River."

Mr. J. W. Mellor, of South Australia, tells me that when walking, this bird keeps the tail flicking up and down; the white under tail-coverts being conspicuous when the tail is up.

Mr. Mattingley* says, that when the birds are disturbed they utter their sharp fright-note and then go "fluttering away with their long, red legs dangling down in a broken fashion for some distance before they tuck them up under their blue feathers."

Dr. Ramsay† observes: "They are also very fond of the Indian corn when ripe: perching on the side of the stems, they detach the 'cobs' which they hold steady on the ground with one foot while they pick off and eat the grains. I have seen them eating pieces of cooked and raw meat, holding them in the same way." Other writers also remark that when eating soft kinds of food, this bird holds it up to its mouth in one claw, after the manner of a Parrot.

Mr. F. L. Berney,‡ writing from the Richmond district of North Queensland says: "The handsome Bald-Coot, like so many more of the semi-aquatic birds that may be found here throughout the year, is not represented through the winter and spring by anything like the number of individuals that are to be seen during the summer and autumn. This is only natural, as their hunting grounds, the shallow lagoons and swamps, disappear so quickly once the wet season goes by; but this is not a very numerous species even in the summer. They nest here during January and February among the bullrushes; they appear to commence a lot of nests which are abandoned before completion. It is interesting to notice the gangway of reeds they often construct, sometimes winding a considerable distance, leading up to the nest, which may be placed a couple of feet above the water. I was told of two broods, one in the down, and the other half-grown, being seen early in October, 1904. The chick has the frontal-plate from the egg-shell."

Porphyrio melanotus has hitherto been considered to inhabit the major portion of Australia, Tasmania, New Zealand, New Guinea, and the Moluccas. Unfortunately long series from the majority of the islands are unavailable; and

* *Vict. Nat.*, XXV., p. 62 (1908).

† *P.Z.S.*, p. 343 (1877).

‡ *Emu*, VI., p. 109 (1907).

EASTERN BALD COOT.

the differences observed, being inexplicable through the paucity of material, have generally been attributed to age—a safe refuge in case of doubt.

I have carefully studied my own material, and confirmed my observations by examination of the series at the British Museum, and confidently put forward my solutions, with the hope that—interest being taken in this bird—the results of my investigations will receive confirmation at an early date. Hitherto it would seem to have been the practice of ornithologists to independently assume a special knowledge of some particular branch of bird-life, and then somewhat casually ignore the criticisms of their co-workers. I assert that no lasting good can be effected save by co-operation, and I cordially invite criticisms—but would point out that I can only regard those that are the results of observation, and not supposition.

Thus in the Catalogue of Birds we have *P. bellus*, *P. melanotus*, and *P. chathamensis* as inhabiting Australia and New Zealand; the former occurring in West Australia alone, the latter in the Chatham Islands alone, while *P. melanotus* was distributed over the remainder of Australia and New Zealand; but *P. chathamensis* was compared with *P. bellus*. Such discontinuous range suggested re-investigation, and therefore I purpose to state my results as follows:—

| | | | | | | |
|-------------------------------|----|----|----|----|----|-----------------------|
| <i>P. melanotus melanotus</i> | .. | .. | .. | .. | .. | East Australia. |
| ,, <i>fetchera</i> | .. | .. | .. | .. | .. | Tasmania. |
| ,, <i>neomelanotus</i> | .. | .. | .. | .. | .. | North-west Australia. |
| ,, <i>bellus</i> | .. | .. | .. | .. | .. | South-west Australia. |
| ,, <i>stanleyi</i> | .. | .. | .. | .. | .. | New Zealand. |
| ,, <i>chathamensis</i> | .. | .. | .. | .. | .. | Chatham Islands. |
| ,, <i>samoensis</i> | .. | .. | .. | .. | .. | Samoa. |
| ,, <i>vitiensis</i> | .. | .. | .. | .. | .. | Fiji Is. |
| ,, <i>pelewensis</i> | .. | .. | .. | .. | .. | Pelew I. |
| ,, <i>aneiteumensis</i> | .. | .. | .. | .. | .. | New Hebrides. |
| ,, <i>melanopterus</i> | .. | .. | .. | .. | .. | New Guinea. |
| ,, ? | .. | .. | .. | .. | .. | Aru Is. |

The first five I am certain of; I have tentatively separated the others from a perusal of the literature and a study of the few specimens I have been able to examine.

When making comparisons it is imperative that only adults should be used, and it must be carefully observed that the females are slightly smaller than the males in all dimensions. I have also noted that the frontal-shield increases in size as the bird grows older, and I believe that the wing and tarsus also grow; at least, from whatever locality I have measured specimens, the ones with the largest frontal shields had also the longest wings and tarsi.

Thus, it is no use comparing a bird with a small frontal shield from one locality, with a bird with a large frontal shield from another, in the present state of our knowledge. When long series of all the forms above noted have

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been studied, I do not doubt that we shall find that juveniles will be as easily separable as adults.

Porphyrio melanotus was described simply from Australia; I have therefore designated New South Wales as the typical locality. In the synonymy above I have placed all Australian references that can be traced to belong to East Australia; the other references which have been used in connection with the Bald Coot generally, cannot be allotted to any special subspecies.

P. m. melanotus has the under-coloration purplish throughout, with the shoulder patches of the same colour, and back greenish-black; the Tasmanian race has the same coloration, but is a much larger bird when fully grown. It should be noted that Gould, comparing a specimen not fully adult, concluded that the Tasmanian race was smaller.

The south-western bird has always been recognised as distinct, as the back is browner and there is a distinct wash of verditer on the throat and upper-breast, and the shoulder patches are also verditer. The hind-neck, lower-breast and flanks are of the same colour as the Eastern form.

From the north-west comes a bird which was recorded as *P. bellus* by Ramsay, Sharpe, Keartland, and myself. This bird I have called *P. neomelanotus*, and the under-coloration is ultramarine or cobalt, rather than purple. The colour on the throat and upper-breast is brighter than on the lower-breast and flanks, but the colours blend. This is the bird described in the Catalogue of Birds as *bellus*. At the time that was written, no specimen of true *bellus* was in the British Museum. It is this connecting link which has caused me to reduce *bellus* to the rank of a subspecies only.

These subspecies seem to differ also in size:—

| | Culmen. | Wing. | Tarsus. |
|------------------------------|---------|---------|---------|
| <i>P. m. melanotus</i> | 68-76 | 265-281 | 97-103 |
| „ <i>fletcheræ</i> | 67 | 301 | 98 |
| „ <i>bellus</i> | 70 | 293 | 97 |
| „ <i>neomelanotus</i> | 73.5-76 | 269-276 | 89-93 |

PORPHYRIO MELANOTUS FLETCHERÆ.

TASMANIAN BALD COOT.

PORPHYRIO MELANOTUS FLETCHERÆ,* subsp. n., Tasmania.

Porphyrio melanotus (not Temm.) Littler, Handb. B. Tasmania, p, 117 (1910).

DISTRIBUTION. Tasmania.

Adult Male. Differs from *P. melanotus melanotus* in having a much longer wing, viz., 301 mm.: Type no. 4376 in my collection.

Nest. Not so bulky as that of the mainland form; composed of flags and lined with grass; placed in the reeds. Outside measurements 12 by 6 inches deep; inside 9 by 2 inches deep.

Eggs. Clutch three to six larger; and finer and more heavily marked than those of the mainland, and also a little more glossy; axis 50 to 53.5 mm.; diameter 35 to 37. One egg sent has a decided blue ground-colour.

The above nest and twenty eggs were given me by Miss Ada Fletcher of Tasmania.

Breeding season. August to November (Fletcher).

WRITING from Tasmania, Miss Fletcher says: "These birds have a very heavy, ugly flight and alight clumsily in the water, as they seem to stiffen their legs somehow. Immediately anything suspicious is noticed a warning cry is given, which is answered sometimes from bird to bird right across the lagoon. They build tiny platforms on which to stand and feed; these are formed of reeds bitten off and placed across one another in the soft mud, and sometimes on short reeds. About these platforms are to be found round balls, about the size of marbles, of chewed-up green-stuff, which have apparently been ejected from the mouth; also there is often much excreta about these places. The birds have extensive tracks or run-ways, in the reeds. Sometimes, if the reeds are very dense and weighted down, the tracks run over them till the more open reeds are reached. Before making their nests, these birds make a great number of starts which apparently do not satisfy them. I have counted ten commencements around the reeds near a finished nest. They have a track leading to the nests. They often bend the growing reeds over the nest, which of course is a great protection.

* Named after Miss A. Fletcher, of Tasmania.

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“ I think they lay an egg every day, and they sit as soon as the last egg is laid. They usually begin to breed in October (but sometimes do so in August) at which time they become noisy and quarrelsome, but I have found most nests with eggs in November. The young leave the nest at once. The *Circus gouldi* are their greatest enemies. On one occasion I saw a Harrier attack a Bald Coot and every time the Harrier swooped down, the Coot jumped up some distance to the attack. If two Harriers attack one Coot, it avoids the onslaught by diving.

“ The 1910 season from May to December was very wet, constant rains keeping all lagoons and rivers frequently in flood. The Tasmanian Bald Coots had many of their first-made nests completely covered by the continued rising of the waters, and in many instances were driven to making their nests right out amongst the tussocks along the edge of the lagoons. In other cases, the birds added and added until the nests were several storeys high.

“ When the sword-grass tussocks were chosen for the site of the nest, the inside or centre was opened and forced apart, and the nest itself was made of silky tussocky-grass. In several patches around the lagoon the extent of torn up tussocks of this grass was quite a sight to see. Should the birds be at work when the observer came along, they would run towards the reeds, then flop heavily down among the far outer ridge of reeds. I could never surprise a bird actually carrying material.

“ Similar to the habit of the *T. mortieri* this Coot appears to build several large and conspicuously placed nests, generally on the ground. As far as I have observed these are simply ‘decoys,’ for they are not used, and are apparently constructed to mislead birds of prey. Later on masses of excreta, or sometimes ejected ‘chewed-up’ reeds, show that these ‘decoy’ nests are used as resting-places.

“ My observations show that a pair always keep within touch of the nest they are constructing, or in which an unfinished clutch is lying; the parents or owners searching for their food in its near surroundings. This season these birds even resorted to adding strips of gum bark to assist in the stability of their home.

“ I also found nests of these birds along the banks of the Macquarie River, which were made in the centre of five feet high clumps of round, green reeds growing in certain bends of this river. Some of the nests found contained young, others chipping or fresh eggs.

“ One nest found on 19.11.10 contained three young ones and a chipping egg. The chicks were clothed completely in black down, against which the light red of their feet, helmet and bill showed out in contrast. I always think they are much prettier than the *Tribonyx* chickens. When I put my hand in the

TASMANIAN BALD COOT.

nest, the little Bald Coots tumbled over the side and hid, some of them head downwards, in the thickness of the reed-clump. The one in the egg started squeaking as loudly as he could. I hunted up the chicks and put them back in the nest, when they all cuddled down, with their heads outstretched. Further on a nest of the same with the young and five chipping eggs, was discovered; the mother slipping off in great haste and swimming across the river. This chick, whose down was hardly dry, tried to wriggle out of sight, but only succeeded in burying its head in the reeds.

“While their offspring are very small the parent birds keep them along the shallow edge of the lagoon, where good cover is found among the reeds. The old birds are very fond of pulling up the reeds in deeper water and eating the white root-end. They also feast on frog’s spawn and a tiny water-snail which abounds in the waters of these midland lagoons. Occasionally they would wander on to the common and mix with the domestic fowls.”

Writing from Tasmania, Mr. Stuart Dove tells me: “While out boating on the Mersey River, on April 12th, 1909, we disturbed several Bald Coots; one flew into the top of a tea-tree about twenty feet from the ground, and sat there till we got too close, when it flew. This is the first one I have seen fly up in a tree in this manner.”

Gould,* writing of this species in Tasmania, gives the following note: “Early in the morning, and on the approach of evening, it sallies forth over the land in search of food, which consists of snails, insects, grain, and various vegetable substances; it runs with great facility, and readily avails itself of this power on the approach of an intruder, making for the thickest covert, and threading it with amazing quickness, much after the manner of the Moor-Hen (*Gallinula chloropus*) of Europe.”

* *Handb. B. Austr.*, II., p. 321 (1865).

PORPHYRIO MELANOTUS NEOMELANOTUS.

NORTH-WESTERN BALD COOT.

(PLATE 60.)*

PORPHYRIO MELANOTUS NEOMELANOTUS, subsp. n., North-west Australia.

Porphyrio bellus (not Gould) Ramsay, P.L.S., N.S.W. (II.), II., p. 172 (1887); Sharpe, Cat. B. Brit. Mus., XXIII., p. 202 (1894) (specimens, not synonymy); Keartland, Trans. Roy. Soc. S.A., XXII., p. 188 (1898); Mathews, Handl. B. Austral., p. 13 (1908) (*partim*); *id.*, Emu, IX., p. 54 (1909).

DISTRIBUTION. North-west Australia.

Adult male. Entire back, scapulars, tail, and greater portion of wings blackish, lesser wing-coverts ultramarine-blue, like the outer webs of the bastard-wing and marginal-coverts; inner webs of bastard-wing, primary-coverts, and quills black; lores, fore-part of cheeks, occiput, and hind-neck black; hinder-neck, throat, entire breast, sides of body, and flanks ultramarine-blue; middle of abdomen black; under tail-coverts pure white; axillaries blue, the longer ones black; under wing-coverts ultramarine-blue; quills below glossy black; "Bill and frontal plate red; iris red; tarsi and feet dusky red" (J. P. Rogers). Total length 470 mm., culmen and frontal plate, 75; wing, 276; tail, 110; tarsus, 90.

Adult female. Similar to the adult male, but smaller. Total length, 423 mm.; culmen and frontal shield, 60; wing, 263; tail, 94; tarsus, 90.

Nest. "Bulky, carelessly built of dry and green reeds, which had apparently been crushed and softened between the bird's bill. Situated on the top of tussocks of grass, in shallow water; sometimes ten feet from the bank. Outside measurements 14 inches from top to bottom, and 16 wide. Egg cavity 9 by 4 inches" (J. P. Rogers).

MR. J. P. ROGERS, writing from Wyndham, North-western Australia, in 1908, says: "On November 10th I saw the first bird of the season on Parry's Lagoons, and early in December they were very numerous; but had not commenced to breed by the end of the year. They swim well and when wounded, dive."

The type figured and described is a male collected near Wyndham, North-western Australia, by Mr. J. P. Rogers, on January 3rd, 1909.

* The Plate is lettered *Porphyrio melanonotus*.



J.G. Keulemans, del.

Witherby & Co

$\frac{2}{5}$
PORPHYRIO MELANONOTUS.
(BLUE COOT).

PORPHYRIO ALBUS.

WHITE GALLINULE.

FULICA ALBA White, Journ. Voy. New South Wales, p. 238 (1790), Lord Howe Island.

White Gallinule Phillips, Voy. Botany B., p. 273 (with Plate), 1789.

Fulica alba White, Journ. Voy. N.S.W., p. 238 (with Plate), 1790; Salvin, Ibis, p. 295, Pl. X. (1873).

Gallinule alba Latham, Ind. Orn., II., p. 768 (1790).

Porphyrio albus Temminck, Man. d'Orn., II., p. 701 (1820).

Notornis ? alba Pelzeln, Sitz. Kaiserl. Akad. Wissen. Wien, XLI., p. 328 (1860).

Notornis albus Mathews, Handl. B. Austral., p. 14 (1908).

PROBABLY as much has been written about the "White Gallinule" as any bird, and the conclusion that it belonged to the genus *Notornis* (first proposed by Pelzeln, *Sitz. Kaiserl. Akad. Wissen. Wien*, XLI., p. 328 (1860)), has been endorsed by most writers.

Formerly supposed to have lived on Norfolk and Lord Howe Islands, only two specimens are known to exist in collections. Both have been figured, and my examination of the figures led me to doubt the attachment of the birds to *Notornis*.

By the courtesy of Dr. Clubb of the Liverpool Museum, I have been able to examine the specimen in that Institute (the type of *Porphyrio Stanleyi* Rowley). This bird has been fully discussed by Rowley* and Forbes.†

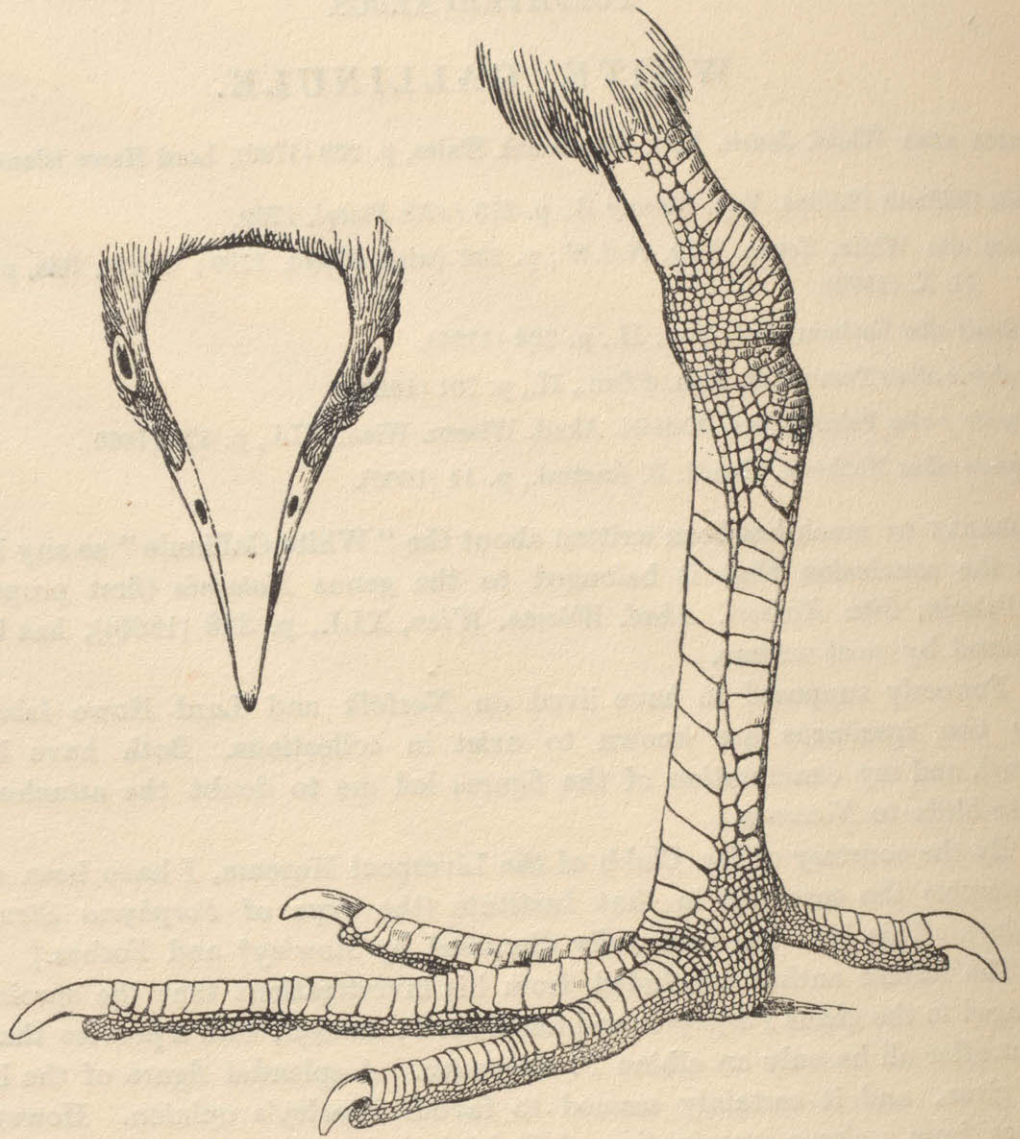
The former author concluded from his investigations that the specimen belonged to the genus *Porphyrio* and named it *P. stanleyi*, with a proviso that it might after all be only an albino *P. melanotus*. A splendid figure of the bird was given, and it certainly seemed to favour Rowley's opinion. However, Forbes, from a closer examination of the bird, declared that he disagreed with Rowley, and favoured the idea that it should be classed in *Notornis*. But the data Forbes produced to a large extent discounted that result; hence my desire to reconsider the matter.

Firstly, Forbes went into the history of the specimen, and wrote: "It must, however, have reached this country in June, 1771, the date of the return

* In the *Ornith. Miscell.*, I., p. 37 (1875).

† *Bull. Liverpool Mus.*, III., p. 62 (1901).

THE BIRDS OF AUSTRALIA.



PORPHYRIO STANLEYI.

WHITE GALLINULE.

of the 'Endeavour' to England." If this be accepted as correct, the bird could not have been brought from Norfolk or Lord Howe Islands. The former island was not discovered until 1774, the latter not until 1788. It should also be noted that the habitat of this bird was given as New Zealand.

Forbes, comparing it with *P. melanotus*, wrote: "One point is very obvious, that the legs and toes are very different; they are unlike those of any specimen of *P. melanotus* in the large series with which I have compared it"; and, "it is difficult to bring oneself to believe that they are albinos of *P. melanotus*, from which our bird differs so conspicuously in the form of its legs and toes." Then follow the measurements of the bird, with details of various specimens of *P. melanotus*. Rowley's figure did not show any conspicuous difference in the feet and toes. Before making any further comparisons I was compelled to work up *Notornis*. I found that Owen in the *Trans. Zool. Soc.*, III., p. 366, Pl. LVI., Figs. 7—13 (1848), had proposed this generic name for a part-fossil skull of a bird from the North Island of New Zealand. Later, a bird somewhat agreeing with the hypothetical possessor of the fossil skull was captured in the South Island of Zealand. This bird was at once referred both specifically and generically to the fossil, and was beautifully figured as *Notornis mantelli* by Gould in the *Suppl. to the Birds of Australia*, Pl. 76. However, in 1883, Meyer in the *Abbild Vogel Skelet Lief.*, IV. and V., p. 28, Pl. xxxiv—xxxvii., gave beautiful photographs of the skeleton of the recent bird, and from his comparison of the recent skeleton with the fossil remains, decided that the former was specifically distinct, and named it *Notornis hochstetteri*. He pointed out that the femur, tibia, and tarso-metatarsus were all shorter in the recent bird than in *Notornis*. I have carefully compared the figures given by Meyer with those of Owen, and consider the reference of the recent bird to such a fragmentary fossil to be improper. As all the comparisons to be made later will be with the recent bird, and will be of characters not available in the fossil and very problematically identical, I herewith propose the new generic name of *Mantellornis* for *Notornis hochstetteri* Meyer. By this means I can accurately give the features possessed by that bird and make my observations intelligible. Certainly the skulls of *Notornis mantelli* and *Mantellornis hochstetteri* differ considerably, and the logical conclusion is that the possessors would have differed as constantly. I shall show the generic characters of the genus *Mantellornis* as given by the only species later. The leg of *Mantellornis* is of quite a different nature to that of *Porphyrio*. It therefore seemed simple to decide absolutely the generic location of the Liverpool bird, and settle at once in favour of Forbes or Rowley.

Forbes was apparently not acquainted with *Mantellornis*, or rather did not have a specimen of that genus in front of him when his comparisons were made. But the figure of *Notornis Mantelli* in the *Suppl. to Gould's Birds of*

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Australia, Pl. 76, shows the peculiar scutellations of the tarsus, and the short hind toe peculiar to that genus. Had this figure ever been examined, the fallacy of attaching the Liverpool bird to *Mantellornis* would have been apparent.

I have very carefully measured the Liverpool bird once more, and my figures agree very closely with those given by Rowley and Forbes. They are: Tarsus 83; middle toe without claw 68; outer toe without claw 59; inner toe without claw 50; hind toe without claw 28; naked front of the tibia 35; wing 226; bill (sheath missing) from tip to the end of the shield 62; from tip to beginning of the shield 38 mm. These measurements are taken from the bird as mounted, and consequently should not be absolutely compared with figures taken from skins, as regards the tarsus and toes.

However, instead of a conspicuous difference, all these figures easily fall within the limits of *P. melanotus*. Indeed, a small specimen from New Zealand chosen at random, gave measurements exceedingly close in every detail to those I have just quoted. Moreover, the scutellations of the tarsus and the toes agree so minutely with those of *P. melanotus*, that I am compelled to assert that the Liverpool specimen not only is not referable to *Mantellornis*, but that it is undoubtedly only an albino of *P. melanotus*; consequently, the data that it arrived in June, 1771, and came from New Zealand, can be accepted. A further point in favour of this view, is the fact that New Zealand is noted for the albinistic tendencies of its avifauna.

The texture of the feathers of the Liverpool bird was supposed to be soft as in *Mantellornis*, but with specimens of that genus in front of me, I do not find this; on the contrary, they are exactly as in *P. melanotus*.

Rowley concluded that the bird had been volant; and here again I must disagree with Forbes, who suggested it had been non-volant. The wing is quite like that of *P. melanotus*, and just as unlike that of *Mantellornis* or of any other non-volant Rail.

Sharpe, in the *Cat. B. Brit. Mus.*, XXIII., referred *P. stanleyi* Rowley, to the synonymy of *P. melanotus*, and so must I.

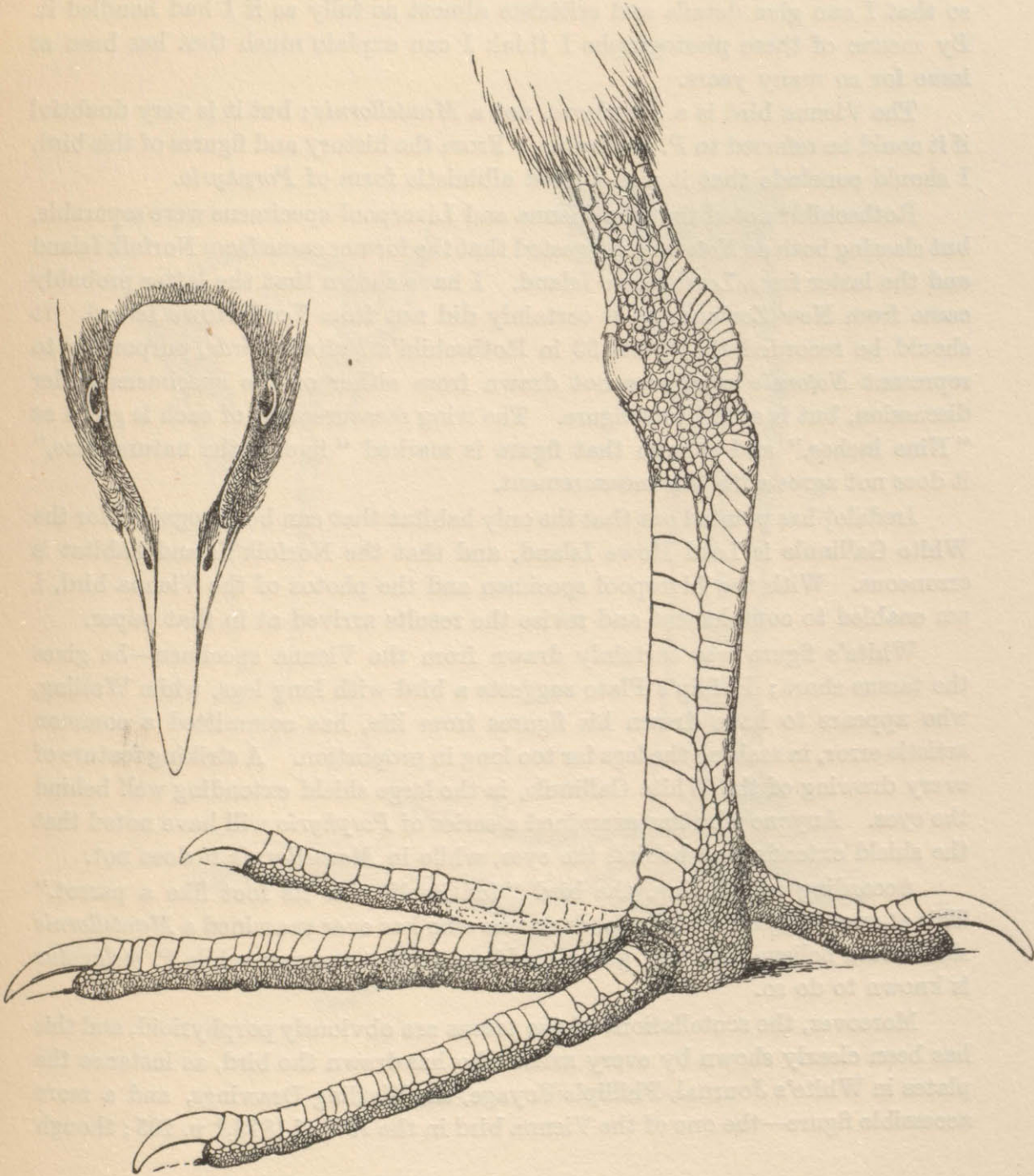
It must be noted that Forbes was really quite doubtful as to the correctness of placing this bird in *Mantellornis*, though he argued well for that disposition.

The other specimen of a "White Gallinule" is of greater interest, inasmuch as its history is undoubtedly well known.

White* described *Fulica alba* and gave a figure. The specimens described in this work were, as we are informed, deposited in the Leverian Museum. When this museum was dispersed, the White Gallinule became the property of the Vienna Museum, where the skin is still preserved. I have been unable to see

* *Journal of a Voyage to New South Wales*, p. 238 (1790).

WHITE GALLINULE.



PORPHYRIO ALBUS.

THE BIRDS OF AUSTRALIA.

this specimen, but my friend Dr. Sassi has courteously forwarded me measurements accurately taken, and also had the skin photographed in various positions, so that I can give details and criticism almost as fully as if I had handled it. By means of these photographs I think I can explain much that has been at issue for so many years.

The Vienna bird is a *Porphyrio*, not a *Mantellornis*; but it is very doubtful if it could be referred to *P. melanotus*. From the history and figures of this bird, I should conclude that it was a fixed albinistic form of *Porphyrio*.

Rothschild* noted that the Vienna and Liverpool specimens were separable, but classing both as *Notornis*, suggested that the former came from Norfolk Island and the latter from Lord Howe Island. I have shown that the latter probably came from New Zealand, as it certainly did not from Lord Howe Island. It should be recorded that Plate 33 in Rothschild's *Extinct Birds*, purporting to represent *Notornis alba*, was not drawn from either of the specimens under discussion, but is a fictitious figure. The wing measurement of each is given as "Nine inches," and though that figure is marked "five-ninths natural size," it does not agree with this measurement.

Iredale† has pointed out that the only habitat that can be recognised for the White Gallinule is Lord Howe Island, and that the Norfolk Island habitat is erroneous. With the Liverpool specimen and the photos of the Vienna bird, I am enabled to complement and revise the results arrived at in that paper.

White's figure was certainly drawn from the Vienna specimen—he gives the tarsus short; Phillip's Plate suggests a bird with long legs, while Watling, who appears to have drawn his figures from life, has committed a common artistic error, in making the legs far too long in proportion. A striking feature of every drawing of the White Gallinule, is the large shield extending well behind the eyes. Anyone who has examined a series of *Porphyrio* will have noted that the shield extends well behind the eyes, while in *Mantellornis* it does not.

According to Watling, the bird "fed itself with its foot like a parrot." This at once suggests *Porphyrio*, as no one who has ever examined a *Mantellornis* skin would believe that that genus could act in that manner, while *P. melanotus* is known to do so.

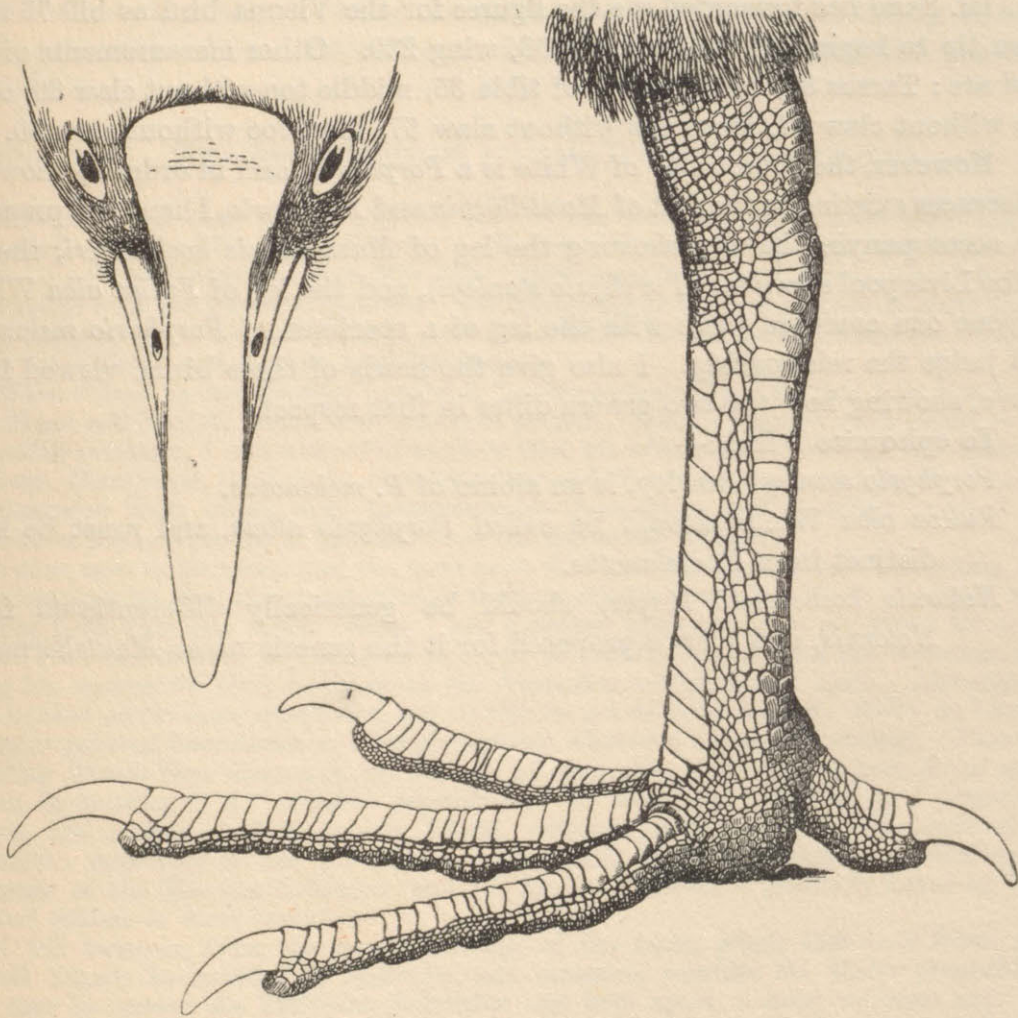
Moreover, the scutellations of the tarsus are obviously porphyrioid, and this has been clearly shown by every artist who has drawn the bird, as instance the plates in White's Journal, Phillip's Voyage, the Watling Drawings, and a more accessible figure—the one of the Vienna bird in the *Ibis* of 1873,‡ p. 295; though

* *Extinct Birds*, pp. 143-4.

† *P.L.S., N.S.W.*, XXXV., p. 778 (1911).

‡ The pose in this figure is obviously incorrect, the artist being prejudiced by the supposed generic location of the bird.

WHITE GALLINULE.



MANTELLORNIS HOCHSTETTERI.

THE BIRDS OF AUSTRALIA.

the shield and the legs there are well figured, the pose entirely disagrees with the Watling Drawings. These latter are absolutely figures of a species of *Porphyrio*, and are drawn to scale (except the legs, and these would have appeared too short if accurately drawn).

The figure, which Watling says is "one-third natural size," gives the measurement of the bill, from tip to the end of the shield, 26 mm., and the wing (as near as can be taken) 78 mm. In life, therefore, we have bill 78 mm., wing 234.

Dr. Sassi has forwarded me the figures for the Vienna bird as bill 76 mm., from tip to beginning of the shield 56, wing 230. Other measurements of this bird are : Tarsus 82, bare portion of tibia 35, middle toe without claw 80, outer toe without claw 67, inner toe without claw 57, hind toe without claw 30.

However, the *Fulica alba* of White is a *Porphyrio*, and in order to show the differences existing in the feet of *Mantellornis* and *Porphyrio*, I have had prepared the accompanying blocks, showing the leg of *Mantellornis hochstetteri*, the leg of the Liverpool specimen (*Porphyrio stanleyi*), and the leg of *Fulica alba* White. Anyone can compare these with the leg of a specimen of *Porphyrio melanotus* and judge the relationship. I also give the heads of these birds, viewed from above, showing how the two genera differ in that respect.

To epitomize I find :—

Porphyrio stanleyi Rowley, is an albino of *P. melanotus*.

Fulica alba White, should be called *Porphyrio albus*, and must be kept distinct from *P. melanotus*.

Notornis hochstetteri Meyer, should be generically differentiated from *Notornis*, and I have proposed for it the generic name *Mantellornis*.

GENUS—MANTELLORNIS.

CLOSELY allied to *Porphyrio*, but of a stouter build. The upper wing-coverts are much elongated, nearly covering the quills, and the secondaries nearly as long as the primaries. The scutellations of the tarsi are also different (see annexed Plates). Only one species.

DISTRIBUTION. New Zealand (almost extinct) (four skins are known).

THE discovery that the Porphyroid bird at one time inhabiting Lord Howe Islands has no relationship with the "*Notornis* (= *Mantellornis*) of New Zealand, but is purely a *Porphyrio*, coupled with the fact that the "*Ocydromus*" of Lord Howe Island has no relationship with the genera *Ocydromus*" (= *Gallirallus*) or *Cabalus* of New Zealand but is a degenerate *Eulabeornis*, has brought once more before me for consideration the alliances of the Lord Howe and Norfolk Island avifaunas.

When I drew up my *Handlist* I called it "of Australasia," and by that title I included Lord Howe and Norfolk Island with Australia proper. When I came to work slowly at the Australian avifauna, I was compelled to allow that the affinities as shown by the existence of *Nestor*, *Hemiphaga*, *Ocydromus*, *Cyanoramphus* and *Notornis* surely outweighed those of the Passerine birds which were unquestionably Australian, and therefore omitted the avifauna of the two groups in question from the Australian avifauna.

I have now to recognise that the facts as at that time understood were misleading, and must acknowledge that the attachment of these groups to Australia is more in accord with the true facts than any other. Since I had accepted their inclusion, my friend Mr. A. F. Basset Hull has written to the *Emu* (XI., p. 58 (1911)), questioning my rejection, and giving his reasons for their inclusion in the Australian avifauna once again. Although we have arrived at the same conclusion, my reasons do not coincide with Mr. Hull's, as I do not recognise *political* boundaries as having anything whatever to do with zoology. I am not including British New Guinea in my scheme of Australia, although I believe I am quite correct in terming it a "political dependency" of Australia. Neither do I propose to include the avifauna of Macquarie Island, although it is a political dependency of Tasmania: moreover it has always been recognised by New Zealand scientists as an appanage of the Maorian Subregion, and the fauna as known is generally noted by New Zealand writers in most branches.

I will however, from the new knowledge of the facts, admit that Lord Howe and Norfolk Islands be included in Australia, and moreover consider Mr. Hull's proposition, that they be termed the Phillipian Subregion and kept apart, a most welcome one.

I propose to discuss fully the relationship of these groups in another place, and more clearly show the exact alliances of the Phillipian Subregion than is here advisable.

GENUS—FULICA.

| | | | | |
|---|----|----|----|----------------------|
| FULICA Linné, Syst. Nat., Xth Ed., p. 152 (1758) | .. | .. | .. | <i>F. atra.</i> |
| <i>Phalaria</i> Reichenbach, Nat. Syst. Vög., p. XXI. (1852) | .. | .. | .. | <i>F. gigantea.</i> |
| <i>Lysca id., ib.</i> | .. | .. | .. | <i>F. ardesiaca.</i> |
| <i>Lupha id., ib.</i> | .. | .. | .. | <i>F. cristata.</i> |
| <i>Lophophalaris</i> Heine, Nomencl. Mus. Hein. Orn., p. 317 (1888) | .. | .. | .. | <i>F. cristata.</i> |

BIRDS like the species of *Gallinula* but differing in having the toes lobed. Bill stout and somewhat laterally compressed, shorter than the head, and with a large frontal shield. Nostrils pervious, elongated slits in the fore-part of the nasal groove; wings short and rounded; tarsus short, laterally compressed, provided posteriorly with a membranous fringe; tail short, consisting of fourteen, sometimes sixteen, rectrices; toes long, the middle toe without claw exceeding the tarsus in length, each joint having a membranous lobe on each side. About sixteen forms are attached to this genus.

DISTRIBUTION. Almost cosmopolitan, save Polynesia and New Zealand.



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$\frac{1}{2}$
FULICA AUSTRALIS.
(COOT).

FULICA ATRA AUSTRALIS.

AUSTRALIAN COOT.

(PLATE 61.)

FULICA AUSTRALIS Gould, P.Z.S., p. 2 (1845), Western Australia.

Fulica australis Gould, P.Z.S., p. 2 (1845) (published 1846); *id.*, B. Austr., VI., Pl. 74 (1848); *id.*, Handb. B. Austr., II., p. 329 (1865); Castelnau and Ramsay, P.L.S., N.S.W., I., p. 386 (1876); Ramsay, *ib.*, I., p. 193 (1876); *id.*, *ib.*, II., p. 199 (1877); *id.*, Tab. List. Austr. B., p. 21 (1888); North, Austr. Mus. Cat., No. 12., p. 326 (1889); Sharpe, Cat. B. Brit. Mus., XXIII., p. 217 (1894); North, B. County Cumb., p. 108 (1898); Keartland, Trans. Roy. Soc. S. Austr., XXII., p. 189 (1898); *id.*, B. Melb. Dist., p. 118 (1900); Hall, Key B. Austr., p. 78 (1899); *id.*, *ib.*, p. 78 (1906); Campbell, Nests and Eggs Austr. B., p. 758 (1901); Buller, Suppl., I., p. 75 (1905); Berney, Emu, VI., p. 109 (1907); Mathews, Handl. B. Austral., p. 14 (1908); Ingram, Ibis, p. 614 (1909); Ogilvie-Grant, *ib.*, p. 186 (1910); Littler, Handb. B. Tasmania, p. 118 (1910).

Fulica tasmanica Grant, Tasm. Journ., II., p. 310 (1846).*Fulica atra* Schlegel, Mus. P.-B., V., Ralli, p. 60 (1865) (*partim*).

DISTRIBUTION. Australia generally; Tasmania.

Adult male. General colour plumbeous-grey, paler and duller on the under-surface; head and neck all round black; bastard-wing, primary-coverts, and quills dark brown; edge of wing white at base of outer primary-quill; under tail-coverts black, greater under wing-coverts and quill lining slaty-grey. "Bill pale bluish-grey; iris brick-red, feet steel-grey" (W. Stalker). Total length, 390 mm; culmen and frontal shield, 42; wing, 187; tail, 45; tarsus, 55.

Adult female. Similar to the adult male but paler in colour, more especially on the under-surface. Total length, 324 mm.; culmen, 40; wing, 191; tail, 47; tarsus, 55.

"*Young in down* are black, having yellow hair-like tips, the down thickest about the face and neck; bill, cream-colour" (Campbell).

Nest. Large, loose structure, composed of reeds and rushes; placed near the water. Dimensions 15 inches by 8 inches deep; egg cavity 8 by 3 deep.

Eggs. Clutch about six or seven; smooth and glossy; stone-colour, minutely dotted with black, evenly over the entire surface. Axis, 44 mm.; diameter, 33.

Breeding season. August to February (North); September to November (Miss Fletcher, Tasmania).

THE BIRDS OF AUSTRALIA.

MR. TOM CARTER writes: "This was an occasional visitor in the North-west when the pools were plentiful; and it was most numerous in the years 1898 and 1900."

Mr. F. L. Berney* writing from the Richmond district of North Queensland, says: "But seldom seen, and then during the wet season, though I have had them reported to me in June. Never very numerous. I have seen as many as thirty on a swamp."

Miss Fletcher tells me that she took the eggs of this species in Tasmania in September, 1909. She says the lagoon where she found the nest was a small one, surrounded by rushes. Before deciding on a particular spot this bird (like *Porphyrio melanotus*) makes a great many commencements, treading down the rushes and partly building nests. All the nests found were made of coarse rushes bitten into lengths, and were without any lining. They were built in reeds standing in from one to two feet of water and about six inches above the surface. Generally the clumps containing the nests were close to open sheets of water, and the birds when disturbed slipped quickly through the rushes and disappeared. In one instance a platform was constructed to a nest. They desert any nest from which they have been startled. The eggs measured 1.9 to 1.8 by 1.4 to 1.3 inches.

Mr. J. W. Mellor informs me that these birds are to be seen on the principal waters of South Australia. They go in large flocks. He has seen them on Lakes Alexandrina and Albert in hundreds, beating up against the wind at the lake's side. They fly with a quick, sharp motion. He also says their nests are placed just out of reach of water at flood time.

Mr. Littler† says: "Diving is often resorted to when feeding; the birds give a slight upward spring and then disappear for a short space, returning with some food plucked from below. In addition to vegetable stuffs, the usual insects and molluscs found in and about lakes and lagoons are devoured."

The bird figured and described is a male collected by the late William Stalker, near Alexandra Station in the Northern Territory, on March 10th, 1906.

* *Emu*, VI., p. 109 (1907).

† *Handbook B. Tasmania*, p. 119.

ORDER V.—PODICIPEDIFORMES.

FAMILY—PODICIPEDIDÆ.

GENUS—PODICEPS.

| | | |
|--|-------|--------------------------|
| PODICEPS Latham, Gen. Syn. Suppl., I., p. 294 (1787) | .. | <i>P. fluviatilis.</i> |
| <i>Colymbus</i> Illiger, Prodrömus, p. 281 (1811) | .. .. | <i>P. cristatus.</i> |
| <i>Dytes</i> Kaup, Skizz Entw.-Gesch. Nat. Syst., p. 41 (1829) | .. | <i>P. auritus.</i> |
| <i>Pedetaithya id., ib.,</i> p. 44 | .. .. | <i>P. griseigena.</i> |
| (Also spelt <i>Pedeaithya</i> , <i>Pedetaithya</i> , <i>Podæthya</i> , and <i>Podetaithya</i> .) | | |
| <i>Proctopus id., ib.,</i> p. 49 | .. .. | <i>P. nigricollis.</i> |
| <i>Lophaithya id., ib.,</i> p. 72 | .. .. | <i>P. cristatus.</i> |
| (Also spelt <i>Lophæthya</i> and <i>Lophaethya</i> .) | | |
| <i>Sylbeocyclus</i> Bonaparte. | | |
| <i>Dasyptilus</i> Swainson, Class B., II., p. 369 (1837) | .. | <i>P. poliocephalus.</i> |
| <i>Poliocephalus</i> Selby, Cat. Gen. Subgen. Types Aves, p. 47 (1840) | .. .. | <i>P. poliocephalus.</i> |
| <i>Tachybaptus</i> Reichenbach, Nat. Syst. Vög., p. III. (1852) | .. | <i>P. fluviatilis.</i> |
| (Also spelt <i>Tachybaptus</i> .) | | |
| <i>Otdytes id., ib.,</i> p. III. | .. .. | <i>P. nigricollis.</i> |
| <i>Rollandia</i> Bonaparte, Compt. Rend., XLII., p. 775 (1856) | .. | <i>P. rollandi.</i> |
| <i>Calipareus id.</i> (cf. Gray, Handl. B., III., p. 94 (1871)) | .. | <i>P. calipareus.</i> |
| <i>Colymbetes</i> Heine, Nomencl. Mus. Hein. Orn., p. 364 (1890) | | <i>P. poliocephalus.</i> |

SWIMMING birds, with long, straight bills; short, rounded wings; rudimentary tail and peculiar, flattened tarsi, and largely lobed toes with broad, flattened claws. Bill long, straight, and pointed, sometimes slightly curved at the tip; nostrils pervious, and placed at the base of the upper mandible. Wings very short and rounded, the secondaries usually as long as the primaries. Tail rudimentary, consisting of a tuft of downy feathers, no retrices being distinguishable. Tarsus shorter than the middle toe and claw, compressed so as to form a ridge anteriorly and posteriorly, where it is serrated. The toes are flattened and surrounded by large lobes of skin, only connected at the base, not contracted at the joints. The claws are also flattened, forming part of the lobe; the fourth toe is the longest, the hallux is small and also provided, like the others, with a lateral lobe. About twenty-seven species are included in the genus.

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As will be seen by the above synonymy, many genera have at times been proposed for members of this genus ; but the characters have always been, to a great extent, the ornaments which the majority of the members of this group assume during the breeding season. In addition to these ornaments, the chief feature has been size ; but all intermediate sizes can be met with, from the Dabchick to the Great Crested Grebe. I cannot recognise as generic, characters which are only possessed by the birds at certain times of the year ; and therefore must class all the birds together, whatever the nature of their breeding-plumage alone may be.*

DISTRIBUTION. Cosmopolitan.

NOTE.—The above diagnosis includes the genera *Podicipes*, *Dytes*, *Proctopus*, and *Lophæthya* of the *Handlist Birds B.M.*, I., pp. 113-114, and agrees with *Podicipes* of the *Cat. Birds Brit. Mus.*, Vol. XXVI., with the exception of the species *Centropelma micropterum*, which I think can be recognised as generically distinct by means of its curiously swollen bill, and the other characters pointed out by Selater and Salvin (*Exotic Ornith.*, II., p. 189 (1869)).

* cf. Mathews, *Nov. Zool.*, XVII., p. 494 (1910).

Key to the Species.

- A. Larger; wing over 170 mm. *P. christiani*, p. 267.
B. Smaller; wing under 120 mm.
 a. Head without elongated, hair-like feathers *P. novæ-hollandiæ*, p. 262.
 b. Head with elongated, hair-like feathers *P. poliocephalus*, p. 265.

PODICEPS FLUVIATILIS NOVÆ-HOLLANDIÆ.

BLACK-THROATED GREBE.

(PLATE 62.)

PODICEPS NOVÆ-HOLLANDIÆ Stephens, in Shaw's Gen. Zool., XIII., Pt. I., p. 18 (1826)
(ex Latham), Australia, New South Wales.

New Holland Grebe Latham, Gen. Hist. B., X., p. 33 (1824).

Podiceps novæ-hollandiæ Stephens, in Shaw's Gen. Zool., XIII., p. 18 (1825); Ramsay, P.L.S., N.S.W., I., p. 200 (1877); *id.*, Tab List Austr. B., p. 22 (1888); North, Austr. Mus. Cat., No. 12, p. 348 (1889); Keartland, Trans. Roy. Soc. S. Austr., XXII., p. 191 (1898); North, B. County Cumb., p. 116 (1898).

Podiceps gularis Gould, P.Z.S., p. 145 (1836); *id.*, Syn. B. Austr., Pl. 19 (1837); *id.*, B. Austr., VII., Pl. 81 (1848); Sturt, Narr. Exp. Centr. Austr., App., p. 59 (1849); Castelnau and Ramsay, P.L.S., N.S.W., I., p. 386 (1876); Gould, Handb. B. Austr., II., p. 513 (1865); Keartland, B. Melb. Dist., p. 121 (1900).

Tachybaptus gularis Bonaparte, Compt. Rend., XLII., p. 775 (1856).

Podiceps novæ-hollandiæ Ogilvie-Grant, Cat. B. Brit. Mus., XXVI., p. 519 (1898); Campbell, Nests and Eggs Austr. B., p. 1002 (1901); Oates, Cat. Birds' Eggs Brit. Mus., I., p. 134 (1901); Hall, Emu, III., p. 43 (1903); Barnard, *ib.*, p. 236 (1904); Hall, Key B. Austr., p. 104 (1906); Berney, Emu, VI., p. 156 (1907); Ingram, Ibis, p. 392 (1907); *id.*, *ib.*, p. 461 (1908); Mathews, Handl. B. Austral., p. 14 (1908); *id.*, Emu, IX., p. 54 (1909); Ogilvie-Grant, Ibis, p. 186 (1910); Littler, Handb. B. Tasmania, p. 203 (1910).

Colymbus fluviatilis novæ-hollandiæ Hartert, Nov. Zool., XII., p. 199 (1905).

DISTRIBUTION. Australia generally; Tasmania.

Adult male, breeding. Upper-surface dark brown, with a tinge of grey on the wings; wing-coverts like the back; bastard-wing and primary-coverts dark brown; primary-quills dark brown, white at base which increases in extent towards the inner ones; secondaries white, with a shade of brown on the outer webs; the long innermost secondaries brown with white bases; head black, glossed with green; a line of chestnut from behind the eye which widens out on the sides of the neck; throat patch glossy black; fore-neck rusty-brown; feathers of the breast tipped with dark brown, more intensely on the sides, giving a speckled appearance; remainder of the under-surface pearly-white, becoming dusky on the sides of the body and sides of vent;



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PODICIPES NOVÆ-HOLLANDIÆ.
(BLACK-THROATED GREBE).

BLACK-THROATED GREBE.

axillaries and under wing-coverts pure white ; " Bill black, tip pearly-white ; iris orange, orbits yellow ; feet bluish-grey " (T. Carter). Total length, 250 mm. ; culmen, 23 ; wing, 110 ; tarsus, 34.

Adult female, breeding. Similar to the above.

Adult male in winter. Differs from the adult in breeding plumage in having the top of the head, hind-neck, back, and wings dark ashy-grey ; the throat pure white, a tinge of buff on the sides of the neck, upper-breast and sides of body, lower flanks rufous-buff, the feathers tipped with grey ; tips of primaries grey.

Adult female in winter. Similar to the above.

Immature female (December 19th, 1899). Similar to the adult in winter, but differs in having longitudinal lines of brown and white on the sides of the head and neck ; forehead and a streak over the eye brown ; a white line above the eye which crosses the middle of the crown, where it is sandy-buff, and extends in a narrow streak on to the sides of the neck ; a white spot on each side of the nape ; a very narrow line of white from the hinder-part of the eye, which joins the one on the side of the crown ; a brown streak from behind the eye to the sides of the neck ; a white line from the hinder part of the eye, which unites with another on the cheeks and extends to the sides of the neck enclosing a patch of brown at the gape, which extends in a narrow line along the sides of the face ; a less distinct line of brown skirting the sides of the throat and extending backwards to the sides of the neck.

Nestling in down. Upper-surface black, with numerous narrow lines of white which run horizontally from the hind-neck to the end of the body ; under-surface white ; crown of head and hind-neck black, as also two streaks on the sides of the neck and another on the fore-neck ; a small chestnut patch on the middle of the crown ; a rufous and white V-shaped line from the fore-part of the crown to the sides of the nape ; throat white, with three irregular lines of black running longitudinally on to the fore-neck.

Nest. Constructed of rushes, weeds, etc., low down in the water, and always damp, and warmed by fermentation. Dimensions 12 in. by 6 to 12 deep ; egg cavity, 6 in. by 2½ deep.

Eggs. Clutch five to eight ; usually nest-stained, which on being scraped off reveals a pale green ground-colour. Axis, 31—38 ; diameter, 24—26.

Breeding season. September to October (Carter) ; to November (Belcher) ; to February (Rogers).

MR. CHARLES BELCHER sends me the following notes : " This bird is a local species, breeding almost wherever it is found. It frequents quiet, inland waters, preferring small ponds and lakes in timbered country. From the middle of October to the end of November is the breeding season, south of the Dividing range. Six is the usual clutch, and they may at once be distinguished from those of the *Podiceps poliocephalus* by their very smooth surface, even if their slightly smaller size is not always to be relied on. The nest is usually placed about twenty yards out from the bank, and is easily detected by the practised eye, though the bird dives off the nest with such agility as almost invariably to escape notice ; she covers the eggs before diving."

THE BIRDS OF AUSTRALIA.

Mr. Tom Carter writes from Broome Hill, Western Australia: "This species is rather more numerous than *Podiceps poliocephalus*, here. A pair arrives very regularly on each of my stock banks, as soon as the winter rains fill them, usually about the middle of July. Eggs are usually found between September 15th and October 28th, the largest clutch being five eggs."

Mr. J. P. Rogers, writing from North-western Australia, says: "I found a nest on February 22nd, about twenty-five yards from the bank, in about two feet of water. It consisted of a large mass of water-grass and weeds, floating on the surface; the whole mass was wet and heated by fermentation. The eggs, eight in number, were placed in a hollow bowl raised four inches above the surface of the water. Egg cavity measured six inches across. The eggs were white in the fresh laid ones; dirty brown in the others."

Mr. North* says: "While sitting, the female covers herself over with the outer portions of the nest, her head and neck alone being visible; when leaving the nest she covers her eggs over, and dives at once, re-appearing about ten or fifteen yards away."

Mr. E. D. Barnard† observes: "I found a Black-throated Grebe's (*Podiceps novæ-hollandiæ*) nest attached to a snag in a dam, only about 7 or 8 feet from the bank. On wading in I discovered three tiny, fluffy chicks in the nest, covered over in the same manner as the bird covers her eggs when an intruder approaches. They were too frightened to keep still, hence betrayed themselves by jumping off the nest into the water as I drew near. Although they were very young (we judged them as being about two days old) they were able to dive about 15 feet; and as the water was very shallow and clear, we were able to keep them in sight the whole time."

Writing from the Richmond River District in North Queensland, Mr. F. L. Berney‡ remarks: "*Podiceps novæ-hollandiæ* is a constant resident hereabouts; generally seen in couples in quiet pools. They seldom congregate, though one day in January, 1906, I saw ten together in a small but deep hole in the bed of the river. I have watched an old bird with half-grown youngsters in October, and another lot with chicks in down in February. They formed a pretty sight, this last little family party, as they floated on the water, the youngsters scrambling on the mother's back and pushing one another off, till the old bird ended the proceedings by diving."

The bird figured and described is a female collected by Mr. J. P. Rogers, near Wyndham, North-western Australia, on January 16th, 1909.

* *Austr. Mus. Coll.*, No. 12, p. 348 (1889).

† *Emu*, III., p. 236 (1904).

‡ *id.*, VI., p. 156 (1907).



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PODICIPES POLIOCEPHALUS.
(HOARY-HEADED GREBE).

PODICEPS POLIOCEPHALUS.

HOARY-HEADED GREBE.

(PLATE 63.)

PODICEPS POLIOCEPHALUS Jardine and Selby, Ill. Orn., I., Pl. and p. 13 (1827), Australia (New South Wales).

Podiceps poliocephalus Jardine and Selby, Ill. Orn. I., p. 13 (1827); Gould, B. Austr., VII., p. 82 (1848).

Podiceps nestor Gould, P.Z.S., p. 145 (1836); *id.*, Syn. B. Austr., Pl. 19 (1837); *id.*, Handb. B. Austr., II., p. 512 (1865); Ramsay, P.L.S., N.S.W., II., p. 200 (1877); *id.*, Tab. List Austr. B., p. 22 (1888); North, Austr. Mus. Cat., No. 12, p. 347 (1889); *id.*, B. County Cumb., p. 116 (1898); Keartland, Trans. Roy. Soc. S. Austr., XXII., p. 191 (1898).

Podicipes poliocephalus Ogilvie-Grant, Cat. B. Brit. Mus., XXVI., p. 522 (1898); Hall, Key B. Austr., p. 104 (1898); Campbell, Nests and Eggs Austr. B., p. 1003 (1901); D'Ombraïn, Emu, IV., p. 161 (1905); Hall, Key B. Austr., p. 104 (1906); Mathews, Handl. B. Austral., p. 14 (1908); Littler, Handb. B. Tasmania, p. 204 (1910).

DISTRIBUTION. Australia generally; Tasmania.

Adult male in breeding plumage. General colour of the upper-surface dark slate-grey, the feathers of the mantle, back, scapulars, and wing-coverts fringed with white; bastard-wing, primary-coverts, and quills dark brown, the latter blackish at the tips and white on the inner webs, the white increasing in extent on the inner primaries, where they become white shaded with brown at the tips, the dark pattern increasing on the inner secondaries, where it spreads over the greater portion of the feathers, the white pattern being reduced to the base only; sides of the lower-back and rump white streaked with brown; head and neck all round black, dusky on the forehead and lores, the feathers on the top of the head and sides of the face continued into white, hair-like tips, which impart a streaked appearance; lower hind-neck dusky brown, becoming buff on the fore-neck; breast also buff, darker on the sides, which is continued along the sides of the body on to the lower flanks, where they are greyish-brown; under-surface pearly-white; under wing-coverts and axillaries white, the latter with dark brown on the outer webs; bill black, tip flesh-colour; iris straw-yellow; tarsi and feet olive. Total length, 271 mm.; culmen, 25; wing, 111; tarsus, 35.

Adult female in breeding plumage. Similar to the adult male, but differs in being paler, the throat dark brown, and the fore-neck pale fawn. It is also somewhat smaller. Total length, 230 mm.; culmen, 25; wing, 111; tarsus, 32.

THE BIRDS OF AUSTRALIA.

Adult in winter. Everywhere paler on the upper-parts ; top of head grey, blackish on the hind-neck ; the hair-like plumes short on the forehead, longer on the hinder-face and sides of upper-neck ; throat pale grey.

Nest. Very much like that of the preceding species.

Eggs. Clutch four to six ; ground-colour when fresh pale green, covered with white chalky nodules. Axis, 39 ; diameter, 26—27.

Breeding season. October (Swindells, Tasmania) to January (Campbell).

MR. CHARLES BELCHER sends me the following notes : “ This bird must be looked on as a partial migrant, occurring in greater or less numbers from time to time in the same place. In the autumn it is numerous on some of the waters of Port Phillip, and on Lake Connemara. In December, 1901, I found two nests, both with fresh eggs (one contained four and the other six), near the Geelong Race-course, in a swamp which that year was very full of water. The eggs were uncovered, which I have never seen in *Podiceps novæ-hollandiæ*. They are covered all over with small nodules or lumps ; this is a certain means of distinguishing them. This bird has quite exceptional powers of flight for a Grebe. On one occasion, while duck shooting, in February, 1906, near Tongala, I saw in the distance a pair of birds flying very high and rapidly ; on firing, I brought down, to my intense surprise, an example of this species. In general this bird favours open waters on sea, lake, or river, as compared with the seclusion-loving *P. novæ-hollandiæ*.”

Dr. D'Ombraïn,* writing from the Casterton District, Victoria, says : “ Both birds assisted in the building. The nest site was in the reeds, about 5 yards from the end of the dam. The structure was of brown weeds growing in the water near the edge. The birds dived for the weeds, and on reappearing dived again, and came to the surface near the nest. Not much time was spent in placing the weed on the nest, and the birds then dived off the nest. Date 8.11.03. On 10.11.03 nest completed.”

The bird figured and described is a male, collected in Victoria in April, 1890.

* *Emu*, IV., p. 161 (1905).



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LOPHETHYIA CRISTATA.
(*GREAT CRESTED GREBE*).

PODICEPS CRISTATUS CHRISTIANI.

AUSTRALIAN TIPPET GREBE.

(PLATE 64.)*

PODICEPS CRISTATUS CHRISTIANI, subsp. n., Victoria.

Podiceps australis Gould, Handb. B. Austr., II., p. 511 (1865) (not Gould, 1844); Diggles, B. Austr., II., Pl. 122 (1877).*Podiceps cristatus* (subsp.) *australis* Ramsay, P.L.S., N.S.W., II., p. 200 (1877).*Podiceps cristatus* (not L.) *id.*, Tab. List Austr. B., p. 22 (1888); North, Austr. Mus. Cat., No. 12, p. 347 (1889); Keartland, Trans. Roy. Soc. S.A., XXII., p. 191 (1898).*Podicipes cristatus* (*partim*) Ogilvie-Grant, Cat. B. Brit. Mus., XXVI., p. 544 (1898); Campbell Nests and Eggs Austr. B., p. 1004 (1901); Legge, Emu, IV., p. 106 (1905); Hall, Key B. Austr., p. 104 (1906); Littler, Handb. B. Tasmania, p. 205 (1910).*Lophæthya* (*Podicipes*) *cristata* (*partim*) Hall, Emu, III., p. 43 (1903).*Lophæthya cristata* (*partim*) Mathews, Handl. B. Austral., p. 14 (1908).

DISTRIBUTION. Australia generally; Tasmania.

Adult male in breeding plumage. Upper-surface brown, including the head (which has a double crest), hind-neck, mantle, scapulars, and upper-back; lower-back somewhat darker and inclining to dusky brown; marginal wing-coverts white, median- and greater-coverts brown like the bastard-wing and primary-coverts; primary-quills similar in colour, paler on the inner webs and white at the base; secondaries white, the inner ones brown on the outer webs and tips, the innermost like the back; humerals white, outer ones slightly margined with brown; lores whitish; the ruff on the upper-neck and throat chestnut, tipped with black; middle of throat, sides of the face, fore-neck, breast, abdomen, axillaries, and under wing-coverts pearly-white; sides of body brown; "Bill dark horn-colour; iris red; upper-surface of the tarsi and toes dark olive-green, under-surface pale yellow" (Gould). Total length, 520 mm.; culmen, 53; wing, 180; tarsus, 59.

Female (adult). Similar to the bird described above.*Nest.* Constructed of rushes, weeds, etc. Placed low in the water, and always damp. Dimensions outside 18 to 20 in. by 12 to 18 deep; eggs cavity 6 in. by 3 deep.*Eggs.* Clutch five, ground-colour pale green, coated over with a thin layer of lime, which soon becomes nest-stained (brown). Axis, 50 to 52 mm.; diameter, 34—36.*Breeding season.* November to December (Campbell).* The Plate is lettered *Lophæthya cristata*, Great Crested Grebe.

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COL. W. V. LEGGE,* writing from Tasmania, says: "The Great Lake is the headquarters of this species in Tasmania. It is no doubt found all over the Plateau, in the smaller lakes and tarns, but in less numbers than here. It is a shy bird on this lake at all times, not allowing the near approach of a boat. After the manner of its smaller congeners, it not infrequently resorts to flight, and gets along just above the surface of the water at a good pace. The Grebes, like the Musk-Duck, re-appears quickly on the lake after the spring thaw. In the lowlands it is by no means a common bird, but is met with unexpectedly in places where its presence is a surprise. It is occasionally seen in the littoral region of the east of Tasmania, affecting the tidal waters for example, at George's Bay."

Mr. Campbell† remarks: "Although usually an inland bird, large flocks of Tippet Grebes are sometimes seen on the waters of Port Phillip. Occasionally I have noticed odd pairs together with Hoary-headed Grebes gracefully riding the waves near the shipping in Hobson's Bay.

"Both male and female aid in the construction of the nest."

Mr. J. P. Rogers, in a letter dated June, 1908, tells me he shot the only specimen of this species he ever saw in North-western Australia, on February 22nd, 1902.

Gould‡ writes: "It gives a decided preference to those broad, mere-like sheets of water, whose depth is not too great for the growth of rushes and other aquatic plants, among which it constructs its floating nest and rears its progeny. It not only dives extremely well, but stems the billows with amazing power; and I have frequently observed it on the upper part of the Derwent, swimming against wind and tide in a manner that truly surprised me."

The bird figured and described was collected in Victoria, in November, 1903.

For the Australian form of *P. cristatus*, I have proposed, as above, the new name of *P. cristatus christiani* (named after Mr. E. J. Christian, of Victoria), for the following reasons:—

In the *P.Z.S.*, 1844, p. 135, Gould proposed the name of *Podiceps australis* with the following features, "Differs in being somewhat larger in size and having the frill fuller and of a blacker hue;" and apologised for the scant discriminating characters he could see, but apparently depended almost entirely upon locality. His description reads, "Upper-surface and wings dark brown," and his measurements are, "Bill $2\frac{3}{4}$, wing $7\frac{1}{2}$, tarsi $2\frac{1}{4}$ inches." The locality was "Australia and Van Diemen's Land."

* *Emu*, IV., p. 106 (1905).

† *Nests and Eggs Austr. B.*, p. 1005 (1901).

‡ *Handb. B. Austr.*, II., p. 511 (1865).

AUSTRALIAN TIPPET GREBE.

As will be seen from the above synonymy, the distinctness of the Australian form was abandoned in 1888 ; and since then this bird has been referred to *Podiceps cristatus*, which has been given a range of Europe, Asia, Africa, Australia, and New Zealand.

Upon investigation, I found that at least five forms were easily separable, and it was quite probable that even more would be recognisable were better series available for study. An astonishing result of my work was, however, that *no* Australian bird agreed with Gould's diagnosis as above. I can only conclude, then, that Gould did not have an Australian bird in front of him when he drew up that description, and I believe moreover that it was a New Zealand specimen. At that time Gould described some New Zealand specimens as from Australia, and also some Australian birds as from New Zealand. I think that in this case an error of locality has occurred.

On comparing specimens from Victoria, South Australia, Tasmania, New South Wales, and North-west Australia, I find that they are all lighter and *smaller* in every dimension than West European Birds.

New Zealand birds on the other hand, are apparently *larger* and darker, and "*have the frill fuller and of a blacker hue.*"

Under these circumstances I cannot accept Gould's name for the Australian bird, but consider that it should be used for the New Zealand form. The South African bird has been noted to differ from the European form by W. Sclater (*Birds of S. Africa*, IV., p. 510 (1906), and I can confirm the differences there pointed out ; the North African bird has been separated by Salvadori as *Podiceps infuscatus*, and a typical specimen agrees quite closely with South African ones. I am, however, inclined to think that the North and South African birds will eventually be found to be separable.

Asiatic specimens I have examined have been somewhat larger than any others ; but here again it is probable more races than one will be easily recognisable.

My nomenclature of this species reads, at present :—

| | | | | | | | |
|-------------------------------------|-------------------|-----------|----|----|----|----|--------------|
| <i>Podiceps cristatus cristatus</i> | Linné | .. | .. | .. | .. | .. | Europe. |
| " " | <i>infuscatus</i> | Salvadori | .. | .. | .. | .. | Africa. |
| " " | .. | .. | .. | .. | .. | .. | Asia. |
| " " | <i>christiani</i> | Mathews | .. | .. | .. | .. | Australia. |
| " " | <i>australis</i> | Gould | .. | .. | .. | .. | New Zealand. |

A peculiar feature to me was, that I found *no* specimens from Australia or New Zealand in any other than full-breeding plumage, although I examined specimens killed from November to August. Buller never noted any "winter" plumage for the New Zealand form, yet Gould wrote : "The

THE BIRDS OF AUSTRALIA.

beautiful frill which adorns the neck of the *P. australis* is acquired in the spring, worn during the breeding season, and then cast off, when the face becomes of a greyish white, or similar in colour to the other part of the neck." I suggest this was written from Gould's knowledge of the European bird, and not from the actual facts, and would ask Australian ornithologists for further information.

In confirmation of my conjecture that the birds wear the same plumage throughout the year, would appear to be the habits of the Clebes bird, of which Grant (*Cat. B. Brit. Mus.*, XXVI., p. 517) wrote: "I am thus led to the belief that *P. tricolor* does not assume a winter or non-breeding plumage like the rest of its allies."

My measurements of a series of Australian and European examples read:—

| | Culmen. | Wing. | Tarsus. | Longest Toe. |
|-------------------------------------|---------|---------|---------|--------------|
| <i>P. cristatus cristatus</i> | 52-57 | 188-190 | 62-66 | 70-73.5 |
| ,, <i>christiani</i> | 47-53 | 170-180 | 55-59 | 63-65 |

A noticeable feature in the Australian subspecies is the shortness of the toes; and though the bill is not much shorter, it is decidedly more slender.

ORDER VII.—SPHENISCIFORMES.

FAMILY—SPHENISCIDÆ.

GENUS—APTENODYTES.

- APTENODYTES Miller, Var. Subjects Nat. Hist., Pt. IV., Pl. 23
(1778) *A. patagonica.*
Apterodita Scopoli, Del. Flor. et Faun. Insubr., II., p. 91 (1786) ..
Pinguinaria Shaw, Mus. Lever., p. 144 (1792)

BIRDS of very large size, with the bill about as long as, or not much shorter than, the head, and comparatively slender, and curved downwards near the tip. No crest. The tail consists of about twenty very short rectrices, which are barely longer than the tail-coverts.

All Penguins are at once known by their peculiarly thick, tight, scale-like plumage. The fore-limbs are generally called flippers, as they have no flight-feathers, and therefore are more like fins than wings; they enable the birds to swim, but not to fly. The metatarsus is extraordinarily short, being nearly as broad as it is long, and has the metatarsal bones more or less separated. All Penguins inhabit the southern hemisphere, only one species going as far north as the equator. There are at least five species and subspecies in this genus.

DISTRIBUTION.—Australia (accidental) and the whole of the Antarctic Continent.

APTENODYTES PATAGONICA HALLI.

KING PENGUIN.

APTENODYTES PATAGONICA HALLI, subsp. n., Macquarie Island.

Aptenodytes patachonica Bennett, P.Z.S., p. 34 (1834).

Aptenodytes pennantii Gray, Ann. Mag. Nat. Hist., XIII., p. 315 (1844) (*partim*).

Aptenodytes longirostris Coues, Proc. Ac. Nat. Sci. Philad., p. 193 (1872) (*partim*).; Buller, B. New Zeal., 2nd Ed., II., p. 306 (1888).

Aptenodytes patagonica Ogilvie-Grant, Cat. B. Brit. Mus., XXVI., p. 627 (1898) (*partim*); Buller, Suppl. B. New Zeal., I., p. 78 (1905); Hall, Emu, IX., p. 250 (1910).

DISTRIBUTION. Tasmania (accidental) (Macquarie I., Snares I., Stewart I.).

Adult male. General colour of the upper-surface bluish-grey, the feathers dusky at the base with black shaft-streaks and greyish-white spots more or less surrounded with black; the shaft-streaks more pronounced on the upper tail-coverts; the sides of the neck greyish-white; head, sides of the face, throat, and a line on each side of the breast black, with a greenish gloss on the throat, a patch of orange on the hinder part of the head, which is continued in a narrow line and joined to the somewhat deeper-coloured orange of the fore-neck; remainder of the under-surface creamy-white, becoming pure white on the lower-abdomen; flippers dark grey above, under-surface white, margined and tipped with bluish-grey; maxilla and tip of mandible black; base of mandible sealing-wax red, shading off into lead-grey towards the tips; iris brown; feet black. Total length, 38 inches; culmen, 122 mm.; flipper, 280; middle toe and claw, 112.

Adult female. Similar to the adult male, but the colour on the bill not so pronounced.

Nest. No nest is made, the egg being placed on the bare ground.

Egg. Clutch, one; ground-colour pale greenish-white, covered wholly or in part with a thin calcareous matter; tapering suddenly from the diameter to the tip. Axis, 104 to 108; diameter, 75 to 76.

Breeding season. March (Hamilton).

THE first appearance of this bird on Australian shores was recorded by Mr. Robert Hall, in the *Emu*.* It was killed in December of 1909, by some fishermen on the ocean beach of Marie Island, on the east coast of Tasmania; the New Zealand group being its nearest previous record to Australia.

* Vol. IX., p. 250 (1910).

KING PENGUIN.

Mr. G. Bennett* gives the following account of this bird on Macquarie Island. After speaking of the great numbers of birds on the island, he says: "They are arranged, when on shore, in as compact a manner and in as regular ranks as a regiment of soldiers; and are classed with the greatest order, the young birds being in one situation, the moulting birds in another, the sitting hens in a third, the clean birds in a fourth, etc., and so strictly do birds in similar condition congregate, that should a bird that is moulting intrude itself amongst those which are clean, it is immediately ejected from among them.

"The females hatch the eggs by keeping them close between their thighs; and if approached during the time of incubation, move away carrying the eggs with them. At this time the male bird goes to sea and collects food for the female, which becomes very fat. After the young is hatched, both parents go to sea, and bring home food for it; it soon becomes so fat as scarcely to be able to walk, the old birds getting very thin. They sit quite upright in their roosting places, and walk in the erect position until they arrive at the beach, when they throw themselves on their breasts, in order to encounter the very heavy sea met with at their landing-place."

Mr. A. Hamilton,† also from Macquarie Island, says: "We had to amuse ourselves by watching the thousands of King Penguins (*Aptenodytes*) sporting around us, sometimes chasing each other in strings, like porpoises, at other times rushing by in a compact body, seemingly moving in concert, diving, and bobbing up and down, lying on their backs in a most comical way, and making every now and then a curious 'quank,' which at a certain distance and at certain times seems like a human cry. They manifested great curiosity, or else took the ship for a new kind of rock, as they were constantly pecking at the sides, and apparently trying to scramble on board. They were very quick in their movements, easily avoiding anything thrown at them by a sudden dive, reappearing the next instant. We could not see that they caught anything in the way of food, but they seemed to come off in large parties from the shore and swim round the ship, playing and springing clean out of the water, and after a little time returning to the shore, landing on the crest of a wave, and scrambling up the stony beach in a most comical way."

Again, on p. 570: "The interest and the novelty of the sight of 30 or 40 acres of Penguins made up for the deafening noise and the fearful smell, and we found that if we stood still the birds did not take the trouble to move or bite. Some of the birds were fighting with their neighbours, standing still, either in a puddle, or on a wet slimy stone, but keeping their wings and bill in constant action, their apparent object being to make everybody keep his regulation

* *P.Z.S.*, p. 34 (1834).

† *Trans. N. Zeal. Inst.*, XXVII., p. 562 (1894).

THE BIRDS OF AUSTRALIA.

distance from the others. No sign of a nest is to be seen. Subangular fragments of rock covered with slimy, black mud covered the ground, and the beautiful white breasts of the birds were simply filthy with the splashings. Some few birds just at the edge of the crowd (late arrivals I suppose) had eggs not yet hatched, one egg to each bird, and this egg was carefully carried on the two big black feet, with a fold of the skin of the abdomen held over it. They even found it possible to move about like this, with the egg in this curious position, much resembling a boy in a sack-race. There were others whose anxieties were over, and who had the care of a fat little chicken, as black as a coal and very helpless. They all endeavoured to get as far under their parents as possible; but these seemed to be very little protection for them."

The bird figured and described is the type male, collected on Macquarie Island.

The distribution of *Aptenodytes patagonica* has been usually given as "Kerguelen I., Crozets I., Macquarie I., South Georgia, etc." I find that three races can be differentiated, and would advise the following nomenclature:—

| | |
|--|----------------------------|
| <i>Aptenodytes patagonica patagonica</i> Miller | South Georgia, Falkland I. |
| <i>Aptenodytes patagonica longirostris</i> Scopoli | Crozet I., Kerguelen I. |
| <i>Aptenodytes patagonica halli</i> Mathews | Macquarie I. |

I have preserved for the Crozet-Kerguelen form Scopoli's name, as it seems certain to me that that was the form named by Scopoli. Sonnerat described the bird, upon which *longirostris* is founded, after voyaging from the Seychelles to Luzon, and I cannot see how he could have met with any other form. It is impossible to accept New Guinea as the habitat of a bird like this.

The type locality of *A. patagonica* is South Georgia, as Foster's drawing in the British Museum avers, and this is the original of Miller's illustration. The only form needing a name is the one I have described, and which, breeding on Macquarie Island, would be the most likely form to occur in Australia. I have not examined the only Australian killed specimen, but confidently put forward this name as being applicable to it. Though the King Penguins are very similar, I would point out, as the result of examination of a series, that:—

A. p. halli differs in its lighter coloration above and less blue on the under-side of the flipper, from the typical form, while the feathers of the inside on the tarsus are white; in the typical subspecies the feathers of the tarsus are blue all round, forming a collar.

KING PENGUIN.

A. p. longirostris agrees with *A. p. halli* in the absence of the blue tarsal-ring, but is darker above than the typical form, and has even more blue on the under-side of the flipper.

I find these characters fairly constant, so that nearly all the birds can be localised by the flipper-coloration alone; the few not answering to that test being separable by means of the coloration of the tarsus, while freshly moulted birds are quite recognisable by their upper coloration.

GENUS—PENGUINUS.

| | | |
|--|-------|-----------------------|
| PENGUINUS Brunnich, Zool. Fund., p. 78 (1772)* | | <i>P. chrysocome.</i> |
| <i>Eudyptes</i> Vieillot, Analyse, p. 67 (1816).. | .. .. | <i>P. chrysocome.</i> |
| <i>Chrysocome</i> Stephens, in Shaw's Gen. Zool., XIII., p. 57 (1826) | | <i>P. chrysocome.</i> |
| <i>Microdyptes</i> Milne-Edwards, Ann. Sci. Nat. (6), IX., Art. 9, p. 58 (1880) | .. .. | <i>P. serresiana.</i> |

BILL short and very thick, the latericorn of the upper mandible swollen. The fourteen to sixteen rectrices are much longer than the tail-coverts, which are short. Above the eyes, on each side of the head, a more or less elongated tuft of feathers. Five species.

DISTRIBUTION. From Tierra del Fuego to the Australian region.

* Linné, in the 10th ed. of his *Syst. Nat.*, p. 135 (1758), described *Phaethon demersus*, which though undoubtedly a "Crested Penguin," is obviously a young bird, and unfortunately must be regarded as indeterminate. Brunnich's genus *Penguinus* was certainly founded on the characters of this bird, but as no species was named by him, I herewith designate *Aptenodytes chrysocome* Forster as the type of Brunnich's genus. I have fully discussed the technical points of this matter elsewhere (*Nov. Zool.*, xvii., p. 495 (1910)), and there accepted *P. demersus* Linné as the type of *Penguinus* as I identified Forster's *P. chrysocome* with Linné's species. The course I now advocate I consider better, as tending to give more stability to our nomenclature.



H. Grönvold. del.

Witherby & Co

♂
CATARRHACTES CHRYSOCOME.
(CRESTED PENGUIN).

PENGUINUS CHRYSOCOME CHRYSOCOME.

CRESTED PENGUIN.

(PLATE 65.)*

APTENODYTES CHRYSOCOME Forster, † *Comm. Gottingensis*, III., p. 135., Pl. I. (1781), Tasmania.

Aptenodytes chrysocome Forster, *Comm Gottingensis*, III., p. 135, Pl. I. (1781); Gmelin, *Syst. Nat.*, p. 555 (1789); Latham, *Ind. Orn.*, p. 878 (1790).

Aptenodyta chrysocome Bonnaterre, *Tabl. Encyl. Method. Orn.*, I., p. 68, Pl. 17, Fig. 2: Pl. 18, Fig. 4 (1791).

Pinguinaria cirrhata Shaw, in Miller's *Cimelia Physica*, p. 92 (1796).

Aptenodytes crestata Miller, *ib.*, Pl. XLIX. (1796).

Pinguinaria cristata Shaw and Nodder, *Nat. Misc.*, XI., Pl. 437 (1800).

Chrysocoma saltator Stephens, in Shaw's *Gen. Zool.*, XIII., p. 58, Pl. 8 (1826).

Eudyptes chrysocome Gould, *B. Austr.*, VII., Pl. 83 (1848); Gray, *Gen. B.*, III., p. 641 (1489); Coues, *Proc. Ac. Nat. Sci. Philad.*, 1872, p. 202 (*partim*); Buller, *B. New Zeal.*, 2nd Ed. II., p. 290 (1888).

Chrysocoma catarractes Gould, *Handb. B. Austr.*, II., p. 517 (1865).

Spheniscus chrysocome Schlegel, *Mus. P.-B.*, Vol. VI., *Urinatores*, p. 6 (1867).

? *Eudyptes filholi* Hutton, *P.L.S., N.S.W.*, III., p. 334 (1878).

Catarractes chrysocome Ramsay, *P.L.S., N.S.W.*, II., p. 201 (1877); Waite, *Subant. Isl. N.Z.*, I., p. 576 (1909).

Catarrhactes chrysocome Ogilvie-Grant, *Cat. B. Brit. Mus.*, XXVI., p. 635 (1898) (*partim*); Campbell, *Nests and Eggs Austr. B.*, p. 1007 (1901); Hutton, *Emu*, II., p. 7 (1902); Buller, *Suppl. B. N.Z.*, I., p. 84 (1905); Hall, *Key B. Austr.*, p. 105 (1906); Mathews, *Handl. B. Austral.*, p. 15 (1908); Littler, *Handb. B. Tasmania*, p. 206 (1910); Nicholls, *Emu*, X., p. 41 (1910).

* The Plate is lettered *Catarrhactes chrysocome*.

† The type of *C. chrysocome* was collected by Tobias Furneaux, in Adventure Bay, Bruni Island, Tasmania. Furneaux visited Tasmania in command of the s.s. "Adventure," in March, 1773. He accompanied Captain Cook, who commanded the s.s. "Resolute," on his second voyage. On their voyage towards the South Pole the vessels were separated: while Cook steered to New Zealand, Furneaux directed his course to Tasmania, the coasts of which he reached on the 9th March, and anchored near Penguin Island in Adventure Bay.

THE BIRDS OF AUSTRALIA.

Penguinus "demersus" Mathews, Nov. Zool., XVII., p. 495 (1910).

DISTRIBUTION. Coasts of New South Wales; Victoria; South and West Australia; Tasmania (New Zealand, Campbell, Antipodes and Bounty Is.).

Adult male. General colour of the upper-surface dark bluish-grey; a line of yellow feathers from the lores over the eye, where it is elongated into a crest on the sides of the crown, mixed with black; throat and sides of face dusky black; remainder of under-surface white; flippers white below, more or less blackish on the outer margin and tip; "Bill orange; iris deep pink; toes and tarsus white" (Kidder). Total length, 497 mm exposed portion of culmen, 43; flipper, 147; tarsus, 30; middle toe and claw, 63.

Adult female. Similar to the adult male.

Nestling. "Head, throat, hind-neck, and upper-parts—that is to say the surface that is coloured in the adult—covered with short sooty-black down, and the under-parts with short white down; bill whitish-horn colour; feet pale brown" (Buller).

Young. "Differs from the adult in being appreciably smaller in size, and in having a whitish-grey throat; the long crests are absent, being represented by a tuft of feathers little more than half an inch in length, commencing immediately above the eyes and extending back one and half inches towards the occiput, and being pale lemon-yellow, with blue tips. Bill black, with reddish-brown tips" (Buller).

Immature. Birds have the throat ashy white and the superciliary line yellowish-white, but no pronounced crest (Tring Museum).

Nest. No nest is built.

Eggs. Clutch, one or two. Ground-colour pale green, covered with a coating of lime. Axis, 62 mm., diameter, 45.

Breeding season. November and December (Authors). Length of incubation about six weeks (Sir Wyville Thomson).

THIS bird has from time to time been taken on the southern coast of Australia.

Mr. Campbell* says they commence to arrive on Macquarie Island about the beginning of November. "Some eggs are laid by the middle of that month. The nesting places are amongst the tumble-down boulders, the pair of eggs being deposited on the bare ground or rock. It is remarkable that the first egg laid should be smaller than the other. The old birds take their young away in March, the former returning to moult in May, and finally leaving about the middle of June. It may not be generally known that a Penguin takes exactly twenty-eight days to moult."

Waite† gives the following account of this form: "This species occurs on all our southern islands, and was the only Penguin I saw on Disappointment Island. It was at the Antipodes that I found it to be the most numerous, and had the best opportunities of observing it.

"The beach where we landed was piled up with huge rounded boulders, and was reached by the rowing boats through a broad band of kelp. As we put

* *Nests and Eggs Austr. B.*, p. 1007 (1901).

† *Subant. Isl. N.Z.*, p. 576 (1909).

CRESTED PENGUIN.

foot ashore we were greeted with the defiant shrieks of birds, chiefly *C. sclateri*, present in countless thousands. The big-crested Penguin (*C. sclateri*) occupied all the available space on the beach, and for some distance up the slopes also. As we ascended we fell in with the smaller tufted Penguins (*C. chrysocome*), and these alone were on the higher cliffs. They were extremely numerous, and have long distances to travel to reach the sea. It seems reasonable to suppose that they occupy these higher grounds, reached only by long and arduous climbing, by force of circumstance rather than by choice, being driven from more accessible haunts by the larger *C. sclateri*. The birds were tending their young, the breeding season being over at this period (February). The young birds were losing their down, and presented a quaint appearance, some parts being quite sleek with feathers, and others fluffy in down. This substance lay thick on the ground in the neighbourhood, and was occasionally blown about like thistle down. The nests, then out of use, and doubtless trodden out of shape, are like shallow craters made of mud, and the whole surroundings plastered with mud and dung. In wet weather the mess and stench must be wellnigh intolerable.

“The plumes on the side of the head are golden coloured in the adult, but pale yellow in the young. They stand out at right angles, and give the bird a wild or scared appearance.

“The eyes of all Penguins that I have seen are remarkable for the smallness of the pupil, scarcely larger than the head of a pin, and it did not appear to me that it was capable of dilation; yet in no drawing I have seen of a Penguin is the pupil so relatively small as observed by me.

“The note of this bird is much higher pitched than that of *C. sclateri*, and the shriek is quite piercing.”

Mr. W. Smyth* says this bird, when excited, erects its crest all round, like a rainbow.

The bird figured and described was collected off the New Zealand coast.

* In Buller's *Suppl. B.N.Z.*, I., p. 85 (1905).

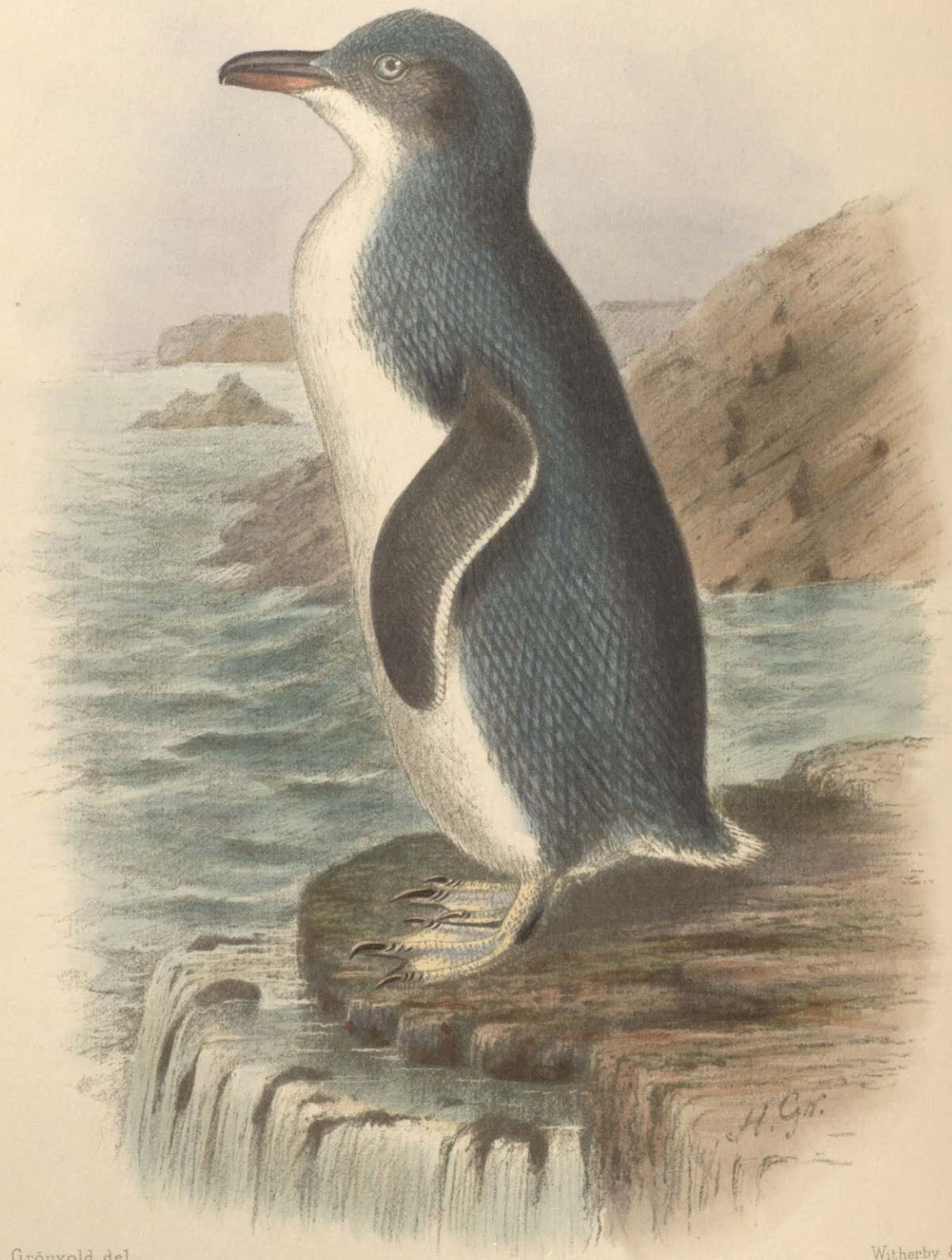
GENUS—EUDYPTULA.

EUDYPTULA Bonaparte, Compt. Rend., XLII., p. 775 (1856) .. *E. minor*.
(Also spelt *Eudypfila*.)

Eudyptes (non Vieillot) Reichenbach, Nat. Syst. Vög., p. III. (1852) *E. minor*.

BILL short, hooked, curved, much more laterally compressed than in the other genera of our region. Tail consisting of sixteen rectrices, which are short, being equal to or only a little longer than the upper tail-coverts. No crest. Body plumage, with the feathers shorter and more rounded than in the other genera, feeling somewhat softer.

DISTRIBUTION. Australian and New Zealand seas.



H. Grönvold. del.

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$\frac{1}{2}$
EUDYPTULA MINOR.
(LITTLE PENGUIN).

EUDYPTULA MINOR NOVÆ-HOLLANDIÆ.

LITTLE PENGUIN.

(PLATE 66.)*

SPHENISCUS NOVÆ-HOLLANDIÆ Stephens, in Shaw's Gen. Zool., XIII., p. 68 (1826), Port Jackson, New South Wales.

Spheniscus novæ hollandiæ Stephens, in Shaw's Gen. Zool., XIII., p. 68 (1826).

Aptenodytes minor (not Forster) King, Survey Intertrop. Coasts Austr., II., p. 422 (1827).

Aptenodytes undina Gould, P.Z.S., p. 57 (1844).

Spheniscus minor Gould, B. Austr., VII., Pl. 84 (1848) (*partim*); Coues, Proc. Ac. Nat. Sci. Philad., 1872, p. 207 (*partim*).

Spheniscus undina Gould, B. Austr., VII., Pl. 85 (1848).

Eudyptes undina Reichenbach, Natatores, Pl. 1A, Figs., 9, 10 (1850).

Eudyptula undina Bonaparte, Compt. Rend., XLII., p. 775 (1856); Gould, Handb. B. Austr., II., p. 521 (1865); Ramsay, P.L.S., N.S.W., II., p. 201 (1877); *id.*, Tab List Austr. B., p. 22 (1888); North, Austr. Mus. Cat., No. 12, p. 350 (1889); Hall, Vict. Nat., XI., p. 43 (1894); Keartland, Birds Melb. Dist., p. 121 (1900); Campbell, Nests and Eggs Austr. B., p. 1012 (1901); Mathews, Handl. B. Austral., p. 15 (1908); Littler, Handb. B. Tasmania, p. 212 (1910).

Eudyptula minor Gould, Handb. B. Austr., II., p. 518 (1865); Ramsay, P.L.S., N.S.W., II., p. 201 (1877); *id.*, Tab. List. Austr. B., p. 22 (1888); North, Austr. Mus. Cat., No. 12, p. 349 (1885); Le Souëf, Ibis, p. 419 (1895); Ogilvie-Grant, Cat. B. Brit. Mus., XXVI., p. 646 (1898); Keartland, Birds Melb. Dist., p. 121 (1900); Campbell, Nests and Eggs Austr. B., p. 1010 (1901); McClymont, Emu, III., p. 237 (1904); *id.*, *ib.*, V., p. 162 (1906); Hall, Key B. Austr., p. 105 (1906); Mathews, Handl. B. Austral., p. 15 (1908); Mattingley, Vict. Nat., XXV., p. 13 (1908); Littler, Handb. B. Tasmania, p. 209 (1910).

Eudyptula undina Gray, Handl. B. Brit. Mus., III., p. 99 (1871).

Eudyptula minor Sharpe, Hist. Coll. Brit. Mus., Birds, p. 153 (1906).

* The Plate is lettered *Eudyptula minor*.

THE BIRDS OF AUSTRALIA.

DISTRIBUTION. Coasts of New South Wales ; Victoria ; Tasmania ; South Australia ; West Australia.

Adult male. Upper-surface glossy bluish-grey, the feathers with black shafts and grey margins ; flippers darker than the upper-surface, and the lower edge margined with white for about two rows of feathers ; tail-feathers white with black shafts towards the base ; sides of face and sides of breast ashy ; chin and entire under-surface, including the flippers, white ; the feathers of the fore-neck have dusky bases with blackish shaft-streaks ; a line of feathers with dusky bases crosses the vent from the thighs on either side ; iris silvery white ; feet white. Total length, 398 mm. ; exposed portion of culmen, 38 ; depth of bill, 12 ; flippers, 111 ; tail, 28 ; tarsus, 24 ; middle toes and claw, 48.

Adult female. Similar to the adult male.

Immature (about three-quarters grown). Head, entire back, sides of the body and a band across the fore-neck sooty-brown, somewhat darker on the head and flippers, and paler on the fore-neck ; the throat ashy-grey, and the remainder of the under-surface dull white.

Nestling. Sooty-brown on the back and throat, becoming paler on the abdomen ; top of the head and sides of the face black.

Nest. " A little dry grass or weeds, placed in cavities between rocks, a hollow scraped out underneath tussock grass or other vegetation, or sometimes a deserted Petrel's burrow, usually on isolated islands " (Campbell).

Eggs. Clutch, two ; dull white, surface smooth ; axis, 55—57.5 ; diameter, 42.5—43.

Breeding season. September to January (Gould).

MR. D. LE SOUËF* gives an account of these birds on Albatross Island : " Just before dark they approach their landing-places in flocks of some thirty birds. They waited about one hundred yards out from the land for some time before coming in, and occasionally two flocks were to be seen not far from one another ; the members of each flock keeping very close together. After a time one lot would rapidly approach the land, swimming both on and under the surface, and coming in just behind the break of the swell. . . They all endeavoured to get a foothold on the rocks before the drawback carried them away, and there was a great deal of squealing and splashing about in the water in their haste to accomplish it. . .

" After landing they assembled just along high-water mark, and remained there for some time preening their feathers. When about half an hour had elapsed after the first contingent landed, and the members had been augmented by fresh arrivals to over 100 birds, one would start along their well-worn track, and the others would all follow, but they soon branched off along different paths that led to their various nests. Many ascended steep inclines to reach the top of the island, and it was astonishing to see them climbing up at an angle of 60 degrees and more, occasionally aiding themselves with their wings and beak, sometimes walking, sometimes hopping from rock to rock.

" On reaching their mates on the nest they commenced their peculiar

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braying sound, first one bird and then the other; and in the caves where numbers of these birds had their nests, the sound was kept up more or less all night. The noise is very loud and discordant.

“The young. . . obtained their food by putting their beak inside that of their parent—the young being very noisy at feeding-time. They do not leave the nest until fully fledged, although when about three-parts grown their parents leave them to themselves during the day.

“The birds remained perfectly quiet all day on their nests, except when disturbed.”

Mr. J. W. Mellor says they are plentiful in the South Australian waters, Kangaroo Island and other islands off the coast, and on the rocky mainland of Eyre's Peninsula. They burrow slightly, but more often lay their eggs under the thick, low bushes and herbage found on the bleak, rocky shores, or under shelving rocks. He found it breeding on The Nobbies, Phillip Island, in November, and also on Penguin Island.

Mr. A. F. Basset Hull* writing of this bird on Montague Island says: “The numbers breeding there could not be even roughly estimated, as at no time were there any large groups in sight, but their runs and burrows are found all over the south island. During the day the birds are either out fishing or, if on the land, they are under the thick vegetation, and only discoverable after a long search. In the evening the fishers return about dusk, landing near the jetty or on the extreme southern point of the island, which is quite low. They come ashore in twos, and leisurely waddle up the path, crooning their tremulous little song, and, forming into straggling groups like tired soldiers, proceed on their way home, breaking off from time to time as they reach the turn-off to their own particular ‘run.’ I think that this island is the most northerly breeding place of this species.” Since this was written, Mr. Hull on the authority of Mr. Bailey records it breeding on Tollgates, a group of islets off Bateman's Bay, about forty miles north of Montague Island.

The bird figured and described is a male, collected on Sandy Hook Island, West Australia, by Mr. J. T. Tunney, on the 15th of November, 1904.

Hitherto Australian ornithologists have recognised two species of Little Penguin: a larger, light-coloured species, known as the Little Penguin—or *Eudyptula minor* Forster—and a smaller dark-coloured species, the Fairy Penguin, or *Eudyptula undina* Gould. New Zealand workers have been divided between accepting the above two as residents of their country, or the alternative of the Blue Penguin—or *Eudyptula minor* Forster—and the White-flipped Penguin—or *Eudyptula albosignata* Finsch. The first notice is

* *Emu*, VIII., p. 83 (1908).

THE BIRDS OF AUSTRALIA.

Forster's, who introduced *A. minor* for the New Zealand form, from Dusky Sound and Queen Charlotte's Sound. Gmelin described a slightly different specimen under the same name, one chief feature being its larger measurements. Gmelin's usage gained acceptance, and this has caused much confusion. Latham described a drawing made at Port Jackson, but it was in his old age, and the description was unrecognisable until the original drawing was discovered. It was then seen to be a good picture of this species, and as Stephens had given a Latin name to this description, we should accept this as the earliest name available for the Australian form.

In 1844, Gould, having in view the Gmelinian "*minor*," described the Tasmanian form as *A. undina*. The two forms recognised by Gould were well figured in his *Birds of Australia*. In 1874 (*P.Z.S.*, p. 207) Finsch described a new species from Akaroa, New Zealand, as *albosignata*, characterised "by the broad white edge which borders the wing anteriorly and posteriorly, and by the white patch on the upper tail-coverts." This raised a controversy with Buller, who maintained the distinctness of *E. minor* and *undina*, and the invalidity of *E. albosignata*; Hutton distinguished *E. minor* and *E. albosignata*, and refused recognition to *E. undina*; Grant, in the *Cat. Birds*, XXVI., accepted the inclusion of Australian and New Zealand birds as *E. minor*, and admitted *E. albosignata* as distinct; Buller, in *Suppl. B. New Zeal.*, I., p. 96, 1905, reiterated his belief in *E. minor* and *E. undina*, pointing out that in his mind Grant's action was equivalent to replacing *E. minor* by *albosignata* and *E. undina* by *minor*.

That Buller's views were acceptable to Australian ornithologists, is evidenced by the review of his book in the *Emu*, and I was influenced into accepting the two forms *E. minor* and *E. undina* in my *Handlist*.

A careful study of this species had led me to revise my views, with the following result:—

Eudyptula minor is apparently at present in a plastic state, several subspecies being in process of formation, but from the material I have been able to see it is impossible to diagnose them accurately. The form *albosignata* is easily recognisable by its coloration, and this conclusion is confirmed by my friend Mr. Tom Iredale, who made a special study of this form when in New Zealand. He tells me: "In September, 1905, I examined a colony of *E. albosignata* breeding near Lyttelton, New Zealand, with the special object of observing the difference assigned to this species. I found that though all were breeding birds, some were large and others small. No bird had so much white on the flipper as Dr. Finsch observed, though birds in the Canterbury Museum agreed in that character. Every bird, however, showed some trace of white on the upper edge of the flipper, and all agreed in coloration, which was slate-blue. I then

LITTLE PENGUIN.

travelled to Otago and examined a colony of *E. minor*, and found that all the specimens living there were constant in their dark blue coloration, and that none showed any white on the upper edge of the flipper."

Unfortunately authors not conversant with the peculiarities of *E. albosignata*, have used this name for New South Wales specimens, as noted by Buller; but the N.S.W. birds do not agree with *E. albosignata* in its peculiar coloration, though they are generally lighter than the "*undina*" form from Tasmania.

I have been impressed with the variation shown in the examples I have studied from West Australia, Tasmania, South Australia, and New South Wales. I have therefore decided to use for the whole of the Australian forms the subspecific name *novæ-hollandiæ*. I am afraid that this course will not commend itself to Australian ornithologists, but invite them to co-operate in solving the problems that are put forward by this bird. Nothing but the study of series from breeding places will serve to explain their variation.

General coloration will, I believe, be of the greatest value if correctly used. If only freshly-moulted birds are used for comparison, differences will be noted in coloration, which, I think, a large series will emphasize; but from one colony as above, degrees of coloration may be seen which I suggest are due to the different ages and breeding times in the colony. This bird's plumage seems to wear very quickly, as examination of the feathers of a freshly-moulted bird and a dull bird shows a great difference in length of the feathers.

Mr. Iredale also tells me that, "although Captain Hutton believed *E. albosignata* did not breed until October, he found on the 17th September one bird had hard-set eggs, another about a week set, others with fresh eggs, though the majority had not laid.

"In the first week in November the Otago birds were in the same medley. There was one fully-plumaged young, eggs hard-set and fresh eggs, as well as birds that had no eggs."

This casual manner of breeding would possibly account for the observed lighter and darker birds in the one colony.

The few specimens from each locality I have studied have not allowed me to diagnose any subspecies of the Australian bird, but I find that the white tail of the Australian form renders it separable from the New Zealand bird, which is also constantly darker.

The nomenclature is:—

| | | | | |
|------------------------------|---------|-----------------------|----------|-----------------------------|
| <i>Eudyptula minor minor</i> | Forster | .. | .. | Queen Charlotte Sound, N.Z. |
| ,, | ,, | <i>albosignata</i> | Finsch | Akaroa, N.Z. |
| ,, | ,, | <i>iredalei</i> | Mathews | Chatham Islands. |
| ,, | ,, | <i>novæ-hollandiæ</i> | Stephens | Australia. |

Order SPHENISCIFORMES

Family SPHENISCIDÆ.

EUDYPTULA MINOR IREDALEI.

THE CHATHAM ISLANDS LITTLE PENGUIN.

(PLATE 67.)*

EUDYPTULA MINOR IREDALEI, subsp. n., Chatham Islands.

Adult male. Differs from *E. minor minor* in its smaller size and darker coloration, and by its short, thick bill—exposed portion of culmen 34 mm., depth 16 : Type no. 243 in my collection.

WHEN the Plates of the Penguins were prepared, now over two years ago, I admitted two subspecies of *Eudyptula*, viz. *E. minor* and *E. undina*. The most typical bird of the latter species, to me, was one obtained in New Zealand waters. As at that time the New Zealand and Australian species were confused, I figured the above new subspecies as *Eudyptula undina*. It was a "good species" to me, as it was easily recognisable, in addition to its smaller and darker coloration, by its short thick bill.

My recent researches have enabled me to trace this form as the subspecies breeding on the Chatham Islands. I am, therefore, distinguishing it as above, and publishing the prepared Plate, although I admit it is not an Australian bird. This instance will show the difficulties to be contended with through the preparation of the Plates some years in advance of the text.

* The Plate is lettered *Eudyptula undina*.



H. Grönvold. del

Witherby & Co

$\frac{1}{2}$
EUDYPTULA UNDINA.
(FAIRY PENGUIN).

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WITH HAND-COLOURED PLATES



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